Department of Defense
Fiscal Year (FY) 2021 Budget Estimates

February 2020

Missile Defense Agency

Defense-Wide Justification Book Volume 2a of 5

Research, Development, Test & Evaluation, Defense-Wide

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Introduction & Explanation of Contents

The Department of Defense Fiscal Year (FY) 2021 Budget Estimate Submission RDT&E (Includes Procurement, O&M, and MILCON), Defense-wide Volume 2, Missile Defense Agency (MDA) justification materials consists of two books titled Volume 2a and 2b. Justification documents are provided in the books as listed below.

Volume 2a

- R-1 Comptroller Exhibit
- MDA FY 2021 Budget Estimate Overview
- MDA Appropriation Summary
- Acronyms
- RDT&E Exhibits in BA-03, BA-04, and BA-06

Volume 2b

- P-1 Comptroller Exhibit
- MDA Operations and Maintenance Exhibit
- MDA MILCON Exhibits
- MDA Procurement Exhibits

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Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

07 Feb 2020

Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Research, Development, Test & Eval, DW	7,246,099	8,138,197			8,138,197
Total Research, Development, Test & Evaluation	7,246,099	8,138,197			8,138,197

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

07 Feb 2020

Appropriation	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Research, Development, Test & Eval, DW	7,169,641				7,169,641
Total Research, Development, Test & Evaluation	7,169,641				7,169,641

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Advanced Technology Development	123,769	87,475			87,475
Advanced Component Development & Prototypes	6,999,143	8,023,657			8,023,657
Management Support	123,187	27,065			27,065
Total Research, Development, Test & Evaluation	7,246,099	8,138,197			8,138,197
Summary Recap of FYDP Programs					
Intelligence and Communications	961	11,138			11,138
Research and Development	7,084,252	7,923,080			7,923,080
Administration and Associated Activities	28,626	27,065			27,065
Space	132,260	176,914			176,914
Total Research, Development, Test & Evaluation	7,246,099	8,138,197			8,138,197

Department of Defense
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

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Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Advanced Technology Development	44,655				44,655
Advanced Component Development & Prototypes	7,098,084				7,098,084
Management Support	26,902				26,902
Total Research, Development, Test & Evaluation	7,169,641				7,169,641
Summary Recap of FYDP Programs					
Intelligence and Communications	1,148				1,148
Research and Development	7,075,379				7,075,379
Administration and Associated Activities	26,902				26,902
Space	66,212				66,212
Total Research, Development, Test & Evaluation	7,169,641				7,169,641

Defense-Wide
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Appropriation	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
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Total Research, Development, Test & Evaluation	7,246,099	8,138,197			8,138,197

Defense-Wide
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Total Research, Development, Test & Evaluation	7,169,641				7,169,641

Defense-Wide
FY 2021President's Budget
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(Dollars in Thousands)

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
30	0603176C	Advanced Concepts and Performance Assessment	03	12,720	46,201			46,201	U
31	0603178C	Weapons Technology	03	13,400					U
32	0603180C	Advanced Research	03	42,100	27,674			27,674	U
39	0603294C	Common Kill Vehicle Technology	03	55,549	13,600			13,600	U
		Advanced Technology Development		123,769	87,475			87,475	
76	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	383,369	306,761			306,761	U
77	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	790,316	1,303,716			1,303,716	U
79	0603884C	Ballistic Missile Defense Sensors	04	382,759	352,288			352,288	U
80	0603890C	BMD Enabling Programs	04	614,855	634,449			634,449	U
81	0603891C	Special Programs - MDA	04	418,722	512,098			512,098	U
82	0603892C	AEGIS BMD	04	724,731	737,269			737,269	U
83	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	500,965	549,756			549,756	U
84	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	48,401	51,532			51,532	U
85	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	51,689	56,161			56,161	U
86	0603906C	Regarding Trench	04	16,512	22,424			22,424	U
87	0603907C	Sea Based X-Band Radar (SBX)	04	125,900	128,156			128,156	U
88	0603913C	Israeli Cooperative Programs	04	300,000	300,000			300,000	U

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Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
30	0603176C	Advanced Concepts and Performance Assessment	03	14,910				14,910	U
31	0603178C	Weapons Technology	03						U
32	0603180C	Advanced Research	03	18,687				18,687	U
39	0603294C	Common Kill Vehicle Technology	03	11,058				11,058	U
		Advanced Technology Development		44,655				44,655	
76	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	412,627				412,627	U
77	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,004,305				1,004,305	U
79	0603884C	Ballistic Missile Defense Sensors	04	281,957				281,957	U
80	0603890C	BMD Enabling Programs	04	599,380				599,380	U
81	0603891C	Special Programs - MDA	04	420,216				420,216	U
82	0603892C	AEGIS BMD	04	814,936				814,936	U
83	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	593,353				593,353	U
84	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	49,560				49,560	U
85	0603904C	Missile Defense Integration & Operations Center (MDIOC)	04	55,356				55,356	U
86	0603906C	Regarding Trench	04	11,863				11,863	U
87	0603907C	Sea Based X-Band Radar (SBX)	04	118,318				118,318	U
88	0603913C	Israeli Cooperative Programs	04	300,000				300,000	U

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Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
89	0603914C	Ballistic Missile Defense Test	04	510,292	399,738			399,738	U
90	0603915C	Ballistic Missile Defense Targets	04	561,349	542,939			542,939	U
95	0604115C	Technology Maturation Initiatives	04	312,074	264,520			264,520	U
98	0604181C	Hypersonic Defense	04	132,612	390,204			390,204	U
105	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04	70,735	188,480			188,480	U
106	0604673C	Pacific Discriminating Radar	04	14,453	6,711			6,711	U
110	0604873C	Long Range Discrimination Radar (LRDR)	04	172,705	136,423			136,423	U
111	0604874C	Improved Homeland Defense Interceptors	04	407,858	515,000			515,000	U
112	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	57,972	25,137			25,137	U
113	0604878C	Aegis BMD Test	04	92,160	169,822			169,822	U
114	0604879C	Ballistic Missile Defense Sensor Test	04	71,905	105,530			105,530	U
115	0604880C	Land-Based SM-3 (LBSM3)	04	25,200	38,352			38,352	U
116	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	72,634	98,139			98,139	U
117	0604894C	Multi-Object Kill Vehicle	04	5,754					U
120	0305103C	Cyber Security Initiative	04	961	11,138			11,138	U
122	1206893C	Space Tracking & Surveillance System	04	36,114	36,349			36,349	U

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89	0603914C	Ballistic Missile Defense Test	04	378,302				378,302	U
90	0603915C	Ballistic Missile Defense Targets	04	536,133				536,133	U
95	0604115C	Technology Maturation Initiatives	04	67,389				67,389	U
98	0604181C	Hypersonic Defense	04	206,832				206,832	U
105	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04						U
106	0604673C	Pacific Discriminating Radar	04						U
110	0604873C	Long Range Discrimination Radar (LRDR)	04	137,256				137,256	U
111	0604874C	Improved Homeland Defense Interceptors	04	664,138				664,138	U
112	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	7,768				7,768	U
113	0604878C	Aegis BMD Test	04	170,880				170,880	U
114	0604879C	Ballistic Missile Defense Sensor Test	04	76,456				76,456	U
115	0604880C	Land-Based SM-3 (LBSM3)	04	56,628				56,628	U
116	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	67,071				67,071	U
117	0604894C	Multi-Object Kill Vehicle	04						U
120	0305103C	Cyber Security Initiative	04	1,148				1,148	U
122	1206893C	Space Tracking & Surveillance System	04	34,144				34,144	U

Defense-Wide
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123	1206895C	Ballistic Missile Defense System Space Programs	04	96,146	140,565			140,565	U
		Advanced Component Development & Prototypes		6,999,143	8,023,657			8,023,657	
163	0605502C	Small Business Innovation Research - MDA	06	91,161					U
178	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06	3,400					U
196	0901598C	Management HQ - MDA	06	28,626	27,065			27,065	U
		Management Support		123,187	27,065			27,065	
Total Research, Development, Test & Eval, DW				7,246,099	8,138,197			8,138,197	

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123	1206895C	Ballistic Missile Defense System Space Programs	04	32,068				32,068	U
		Advanced Component Development & Prototypes		7,098,084				7,098,084	
163	0605502C	Small Business Innovation Research - MDA	06						U
178	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
196	0901598C	Management HQ - MDA	06	26,902				26,902	U
		Management Support		26,902				26,902	
Total Research, Development, Test & Eval, DW				7,169,641				7,169,641	

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Missile Defense Agency
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31	0603178C	Weapons Technology	03	13,400					U
32	0603180C	Advanced Research	03	42,100	27,674			27,674	U
39	0603294C	Common Kill Vehicle Technology	03	55,549	13,600			13,600	U
Advanced Technology Development				123,769	87,475			87,475	
76	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	383,369	306,761			306,761	U
77	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	790,316	1,303,716			1,303,716	U
79	0603884C	Ballistic Missile Defense Sensors	04	382,759	352,288			352,288	U
80	0603890C	BMD Enabling Programs	04	614,855	634,449			634,449	U
81	0603891C	Special Programs - MDA	04	418,722	512,098			512,098	U
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83	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	500,965	549,756			549,756	U
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31	0603178C	Weapons Technology	03						U
32	0603180C	Advanced Research	03	18,687				18,687	U
39	0603294C	Common Kill Vehicle Technology	03	11,058				11,058	U
Advanced Technology Development				44,655				44,655	
76	0603881C	Ballistic Missile Defense Terminal Defense Segment	04	412,627				412,627	U
77	0603882C	Ballistic Missile Defense Midcourse Defense Segment	04	1,004,305				1,004,305	U
79	0603884C	Ballistic Missile Defense Sensors	04	281,957				281,957	U
80	0603890C	BMD Enabling Programs	04	599,380				599,380	U
81	0603891C	Special Programs - MDA	04	420,216				420,216	U
82	0603892C	AEGIS BMD	04	814,936				814,936	U
83	0603896C	Ballistic Missile Defense Command and Control, Battle Management and Communicati	04	593,353				593,353	U
84	0603898C	Ballistic Missile Defense Joint Warfighter Support	04	49,560				49,560	U
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86	0603906C	Regarding Trench	04	11,863				11,863	U
87	0603907C	Sea Based X-Band Radar (SBX)	04	118,318				118,318	U
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89	0603914C	Ballistic Missile Defense Test	04	510,292	399,738			399,738	U
90	0603915C	Ballistic Missile Defense Targets	04	561,349	542,939			542,939	U
95	0604115C	Technology Maturation Initiatives	04	312,074	264,520			264,520	U
98	0604181C	Hypersonic Defense	04	132,612	390,204			390,204	U
105	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04	70,735	188,480			188,480	U
106	0604673C	Pacific Discriminating Radar	04	14,453	6,711			6,711	U
110	0604873C	Long Range Discrimination Radar (LRDR)	04	172,705	136,423			136,423	U
111	0604874C	Improved Homeland Defense Interceptors	04	407,858	515,000			515,000	U
112	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	57,972	25,137			25,137	U
113	0604878C	Aegis BMD Test	04	92,160	169,822			169,822	U
114	0604879C	Ballistic Missile Defense Sensor Test	04	71,905	105,530			105,530	U
115	0604880C	Land-Based SM-3 (LBSM3)	04	25,200	38,352			38,352	U
116	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	72,634	98,139			98,139	U
117	0604894C	Multi-Object Kill Vehicle	04	5,754					U
120	0305103C	Cyber Security Initiative	04	961	11,138			11,138	U
122	1206893C	Space Tracking & Surveillance System	04	36,114	36,349			36,349	U

Missile Defense Agency
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89	0603914C	Ballistic Missile Defense Test	04	378,302				378,302	U
90	0603915C	Ballistic Missile Defense Targets	04	536,133				536,133	U
95	0604115C	Technology Maturation Initiatives	04	67,389				67,389	U
98	0604181C	Hypersonic Defense	04	206,832				206,832	U
105	0604672C	Homeland Defense Radar - Hawaii (HDR-H)	04						U
106	0604673C	Pacific Discriminating Radar	04						U
110	0604873C	Long Range Discrimination Radar (LRDR)	04	137,256				137,256	U
111	0604874C	Improved Homeland Defense Interceptors	04	664,138				664,138	U
112	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	04	7,768				7,768	U
113	0604878C	Aegis BMD Test	04	170,880				170,880	U
114	0604879C	Ballistic Missile Defense Sensor Test	04	76,456				76,456	U
115	0604880C	Land-Based SM-3 (LBSM3)	04	56,628				56,628	U
116	0604887C	Ballistic Missile Defense Midcourse Segment Test	04	67,071				67,071	U
117	0604894C	Multi-Object Kill Vehicle	04						U
120	0305103C	Cyber Security Initiative	04	1,148				1,148	U
122	1206893C	Space Tracking & Surveillance System	04	34,144				34,144	U

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(Dollars in Thousands)

07 Feb 2020

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)	Sec
123	1206895C	Ballistic Missile Defense System Space Programs	04	96,146	140,565			140,565	U
Advanced Component Development & Prototypes				6,999,143	8,023,657			8,023,657	
163	0605502C	Small Business Innovation Research - MDA	06	91,161					U
178	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06	3,400					U
196	0901598C	Management HQ - MDA	06	28,626	27,065			27,065	U
Management Support				123,187	27,065			27,065	
Total Missile Defense Agency				7,246,099	8,138,197			8,138,197	

R-121PB: FY 2021 President's Budget (Published Version), as of February 7, 2020 at 09:56:24

Missile Defense Agency
FY 2021President's Budget
Exhibit R-1 FY 2021 President's Budget
Total Obligational Authority
(Dollars in Thousands)

07 Feb 2020

Appropriation: 0400D Research, Development, Test & Eval, DW

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Sec
123	1206895C	Ballistic Missile Defense System Space Programs	04	32,068				32,068	U
Advanced Component Development & Prototypes				7,098,084				7,098,084	
163	0605502C	Small Business Innovation Research - MDA	06						U
178	0606942C	Assessments and Evaluations Cyber Vulnerabilities	06						U
196	0901598C	Management HQ - MDA	06	26,902				26,902	U
Management Support				26,902				26,902	
Total Missile Defense Agency				7,169,641				7,169,641	

Program Element Table of Contents (by Budget Activity then Line Item Number)

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
30	03	0603176C	Advanced Concepts and Performance Assessment	Volume 2a - 1
31	03	0603178C	Weapons Technology	Volume 2a - 9
32	03	0603180C	Advanced Research	Volume 2a - 13
39	03	0603294C	Common Kill Vehicle Technology	Volume 2a - 21

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
76	04	0603881C	Ballistic Missile Defense Terminal Defense Segment	Volume 2a - 27
77	04	0603882C	Ballistic Missile Defense Midcourse Defense Segment	Volume 2a - 61
79	04	0603884C	Ballistic Missile Defense Sensors	Volume 2a - 97
80	04	0603890C	BMD Enabling Programs	Volume 2a - 131
81	04	0603891C	Special Programs - MDA	Volume 2a - 243
82	04	0603892C	AEGIS BMD	Volume 2a - 245

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
83	04	0603896C	Ballistic Missile Defense Command and Control, Battle Management & Communication	Volume 2a - 313
84	04	0603898C	Ballistic Missile Defense Joint Warfighter Support	Volume 2a - 375
85	04	0603904C	Missile Defense Integration and Operations Center (MDIOC)	Volume 2a - 413
86	04	0603906C	Regarding Trench	Volume 2a - 441
87	04	0603907C	Sea Based X-Band Radar (SBX)	Volume 2a - 443
88	04	0603913C	Israeli Cooperative Programs	Volume 2a - 459
89	04	0603914C	Ballistic Missile Defense Test	Volume 2a - 475
90	04	0603915C	Ballistic Missile Defense Targets	Volume 2a - 511
95	04	0604115C	Technology Maturation Initiatives	Volume 2a - 553
98	04	0604181C	Hypersonic Defense	Volume 2a - 591
105	04	0604672C	Homeland Defense Radar-Hawaii	Volume 2a - 613
106	04	0604673C	Pacific Discriminating Radar	Volume 2a - 627
110	04	0604873C	Long Range Discrimination Radar (LRDR)	Volume 2a - 639
111	04	0604874C	Improved Homeland Defense Interceptors	Volume 2a - 653
112	04	0604876C	Ballistic Missile Defense Terminal Defense Segment Test	Volume 2a - 677
113	04	0604878C	Aegis BMD Test	Volume 2a - 691
114	04	0604879C	Ballistic Missile Defense Sensor Test	Volume 2a - 721
115	04	0604880C	Land Based SM-3 (LBSM3)	Volume 2a - 739

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
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117	04	0604894C	Multi Object Kill Vehicle	Volume 2a - 779
120	04	0305103C	Cyber Security Initiative	Volume 2a - 793
122	04	1206893C	Space Tracking and Surveillance System	Volume 2a - 799
123	04	1206895C	Ballistic Missile Defense System Space Programs	Volume 2a - 823

Appropriation 0400: Research, Development, Test & Evaluation, Defense-Wide

Line #	Budget Activity	Program Element Number	Program Element Title	Page
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178	06	0606942C	Assessments and Evaluations Cyber Vulnerabilities	Volume 2a - 863
196	06	0901598C	Management HQ - MDA	Volume 2a - 867

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Program Element Table of Contents (Alphabetically by Program Element Title)

Program Element Title	Program Element Number	Line #	BA	Page
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Advanced Concepts and Performance Assessment	0603176C	30	03	Volume 2a - 1
Advanced Research	0603180C	32	03	Volume 2a - 13
Aegis BMD Test	0604878C	113	04	Volume 2a - 691
Assessments and Evaluations Cyber Vulnerabilities	0606942C	178	06	Volume 2a - 863
BMD Enabling Programs	0603890C	80	04	Volume 2a - 131
Ballistic Missile Defense Command and Control, Battle Management & Communication	0603896C	83	04	Volume 2a - 313
Ballistic Missile Defense Joint Warfighter Support	0603898C	84	04	Volume 2a - 375
Ballistic Missile Defense Midcourse Defense Segment	0603882C	77	04	Volume 2a - 61
Ballistic Missile Defense Midcourse Defense Segment Test	0604887C	116	04	Volume 2a - 761
Ballistic Missile Defense Sensor Test	0604879C	114	04	Volume 2a - 721
Ballistic Missile Defense Sensors	0603884C	79	04	Volume 2a - 97
Ballistic Missile Defense System Space Programs	1206895C	123	04	Volume 2a - 823
Ballistic Missile Defense Targets	0603915C	90	04	Volume 2a - 511
Ballistic Missile Defense Terminal Defense Segment	0603881C	76	04	Volume 2a - 27
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Program Element Title	Program Element Number	Line #	BA	Page
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Common Kill Vehicle Technology	0603294C	39	03	Volume 2a - 21
Cyber Security Initiative	0305103C	120	04	Volume 2a - 793
Homeland Defense Radar-Hawaii	0604672C	105	04	Volume 2a - 613
Hypersonic Defense	0604181C	98	04	Volume 2a - 591
Improved Homeland Defense Interceptors	0604874C	111	04	Volume 2a - 653
Israeli Cooperative Programs	0603913C	88	04	Volume 2a - 459
Land Based SM-3 (LBSM3)	0604880C	115	04	Volume 2a - 739
Long Range Discrimination Radar (LRDR)	0604873C	110	04	Volume 2a - 639
Management HQ - MDA	0901598C	196	06	Volume 2a - 867
Missile Defense Integration and Operations Center (MDIOC)	0603904C	85	04	Volume 2a - 413
Multi Object Kill Vehicle	0604894C	117	04	Volume 2a - 779
Pacific Discriminating Radar	0604673C	106	04	Volume 2a - 627
Regarding Trench	0603906C	86	04	Volume 2a - 441
Sea Based X-Band Radar (SBX)	0603907C	87	04	Volume 2a - 443
Small Business Innovation Research - MDA	0605502C	163	06	Volume 2a - 859
Space Tracking and Surveillance System	1206893C	122	04	Volume 2a - 799
Special Programs - MDA	0603891C	81	04	Volume 2a - 243
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Program Element Title	Program Element Number	Line #	BA	Page
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Missile Defense Agency
Fiscal Year (FY) 2021
Budget Estimates

OVERVIEW

Approved for Public Release

MDA Overview 20-C-0202

Vol2a RDT&E 20-C-0206

Vol2b O&M 20-C-0203

Vol2b MILCON 20-C-0188

Vol2b Procurement 20-C-0207

Missile Defense Agency

The Missile Defense Agency (MDA) mission is "to develop and deploy a layered Missile Defense System to defend the United States, its deployed forces, allies, and friends from missile attacks in all phases of flight." MDA's budget request of $9.187 billion in Fiscal Year (FY) 2021 will continue the development, rigorous testing and fielding of reliable, increasingly capable, state-of-the-art defenses for the United States, our deployed forces, and the forces and territories of our allies and partners against current and projected missile threats. The Agency's priorities for missile defense development and fielding are as follows: 1) build warfighter confidence through focus on readiness and sustainment; 2) increase engagement capability and capacity to outpace emerging threats; and 3) increase speed of delivery of new capability to address the evolving threat. MDA will continue to collaborate closely with Combatant Commanders and the Services to support current and future needs for missile defense capabilities. MDA and these key stakeholders will leverage the existing all-domain Missile Defense System (MDS) to develop integrated architectures and capabilities to counter not only ballistic missiles but also hypersonic and cruise missile threats to the Homeland in the future. This budget request maintains operational missile defense capacity and capabilities for existing homeland and regional defense forces and will continue to increase interceptor inventory while improving existing sensors, command and control, battle management and communications (C2BMC) system, and kill vehicle capabilities to address evolving threats.

MDA remains vigilant of the growing cyber threat and continues to work aggressively to ensure the nation's missile defenses are hardened, resilient, and able to operate in a highly contested cyber threat environment. MDA is strengthening the cyber defensive posture of missile defense capabilities by ensuring the cybersecurity infrastructure has the latest upgrades, and remains focused on supporting the DoD Cybersecurity Campaign through implementation of the DoD Cybersecurity Discipline Implementation Plan -- Four Lines of Effort for: Strong Authentication, Hardening of Systems, Reducing the DoD Attack Surface, and Alignment to Cybersecurity Service Providers (CSSP) across all networks and, where applicable, MDS weapon systems. MDA defends its networks against the advanced persistent cyber threat through its Cybersecurity Emergency Response Team (CERT). This team provides 24/7 network monitoring and defense of over 24 thousand network devices and continues to expand its breadth of coverage. MDA has continuously supported DoD cyberspace efforts by providing timely MDA situational awareness.

Missile Defense Agency

I. Missile Threat

Nearly all adversaries are developing more capable ballistic and cruise missiles, due in part to the proliferation of advanced technologies, resulting in systems with global reach, increased speed, and greater accuracy. New ballistic missile systems feature multiple independently targetable reentry vehicles (MIRV) and maneuverable reentry vehicles (MaRV), leading to unpredictable flight paths; along with countermeasures such as decoys and jamming devices, these challenge existing defensive systems. New versions of older missiles are showing improved sensors and maneuver capability for maneuver and precision strike. Some weapon systems have characteristics of both ballistic and cruise missiles, such as ballistic missile-launched hypersonic glide vehicles (HGVs), also called boost-glide systems, essentially unpowered cruise missiles. The combination of high speed, maneuverability, and relatively low altitude makes them challenging targets for missile defense systems (sensors and interceptors). The 2019 Missile Defense Review (MDR) underscored the evolving missile threat, including non-ballistic missiles, emphasizing that missile defense must remain a high priority investment in the National Defense Strategy. The MDR also underscored the Department's continued pursuit of cooperative relations with allies and partners to field interoperable and effective regional missile defenses.

The following discussion summarizes the highlights of the major Program Elements (PE), but does not necessarily examine all funding and activities included within each PE.

II. Homeland Defense

MDA remains committed to developing, delivering, sustaining, and improving the nation's homeland missile defenses. The budget request includes:

- **Ground-Based Midcourse Defense (GMD) *(PE 0603882C).*** MDA is requesting $1.004 billion in FY 2021 for GMD. The GMD element of the Missile Defense System (MDS) provides combatant commands (CCMDs) with a continuously available (24 hours a day, 7 days a week, 365 days a year) capability to defend the homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The GMD capability consists of Ground Based Interceptors (GBI), GMD Fire Control system (GFC), GMD Communication Network (GCN), In-Flight Interceptor Communications System Data Terminals (IDTs) and ground Launch Support Systems (LSS).

MDA will continue developing, testing and fielding of a Ground System 8 software build that provides a selectable 2/3 stage capability for employment of GBIs, discrimination improvements, integrates Long Range Discrimination Radar with GMD Fire Control, improves Cybersecurity posture, and supports GCN and IDT modernization. MDA will complete the acquisition of five boosters to support flight testing which will ensure the number of fielded GBIs does not decrease through the FYDP. MDA will continue development, testing and integration of the Fort Greely, Alaska (FGA) Missile Field 4 and a new Launch Support System with GMD Ground Systems to increase Silo capacity and modernize Silo Interface Vault equipment in existing Silos.

- **Improved Homeland Defense Interceptors *(PE 0604874C)*.** MDA is requesting $664.1 million in FY 2021 for the Next Generation Interceptor (NGI). On May 23, 2019, Under Secretary of Defense (Research and Engineering) directed the MDA to stop work on the Redesign Kill Vehicle (RKV) development program in order to examine alternatives to the RKV. The analysis determined that the preferred approach is to begin development on a Next Generation Interceptor (NGI). The NGI allows trades between boost vehicle and payload, improves system survivability, and improves performance against projected threats. The Government terminated the RKV program for convenience on August 22, 2019. MDA intends to leverage the valuable technical information developed under RKV to positively influence future designs. In FY 2021, MDA will continue design and development activities for two competitive interceptor development contracts scheduled to be awarded in July 2020. The request will fund initial requirements analysis, design, development, prototyping, and relevant environment testing to mature the booster, payload, sensor(s), and design-specific critical technologies and technology elements.
- **Ground-Based Midcourse Defense Test *(PE 0604887C*).** MDA is requesting $67.1 million in FY 2021 for the GMD test program, which supports the Integrated Master Test Plan (IMTP) v 21.1. On March 25, 2019, MDA successfully intercepted an advanced ICBM-class target with countermeasures (FTG-11). This was the first salvo engagement resulting in an intercept of a threat representative ICBM-class target with countermeasures by a salvo of two Ground-Based Interceptors launched from Vandenberg Air Force Base (VAFB) missile field in California. All system elements functioned as designed. MDA is developing the capability for the GMD Fire Control to command Interceptor launches in a 2-stage mode in addition to the existing 3-stage mode. This approach

will provide additional homeland defense performance by improving battle-space capability through shorter engagement times without the added expense of a separate 2-stage boost vehicle development program which is scheduled to be flight tested in GM BVT-03 in 1st quarter FY 2021. Although no flight tests will be executed for the NGI until the 2026 timeframe, continued ground testing is an essential requirement to support this critical MDS capability.

- **GMD Maintenance and Sustainment**. MDA is requesting $158.1 million in FY 2021 for the Operation and Maintenance (O&M) of the GMD weapon system. In addition to operation, maintenance and sustainment of the GMD weapon system and operational and support facilities at Fort Greely, Alaska; VAFB; Fort Drum, NY; Schriever AFB, Colorado; and Eareckson Air Station, Alaska, this request includes Warfighter training, wargames, and exercises to maintain readiness.
- **Sea-Based X-band (SBX) Radar *(PE 0603907C*).** MDA is requesting $118.3 million in FY 2021 for the SBX. SBX is an advanced sea-mobile radar that provides precision midcourse tracking and discrimination capabilities. The SBX participates in flight tests to demonstrate discrimination and debris mitigation improvements, as well as operations for homeland defense. The budget request includes funds to continue extended operations for defense of the homeland in the U.S. Indo-Pacific Command (USINDOPACOM) and U.S. Northern Command (USNORTHCOM) areas of responsibility. To address the continued missile threat from North Korea, the budget request includes funds to extend time at sea and conduct contingency operations for defense of the homeland. Specifically, SBX plans approximately 305 days at sea and 60 days for in-port maintenance in FY 2021, and approximately 330 days at sea annually from FY 2022-2025. The budget request also continues the x86 X-Band Radar (XBR) superdome replacement to address obsolete equipment and increase the XBR processing capabilities. The replacement superdome will be fielded in the 2021 timeframe.
- **Long Range Discrimination Radar (LRDR) (*PE 0604873C*).** MDA is requesting $137.3 million in FY 2021 for the LRDR, which will provide persistent long-range midcourse discrimination, precision tracking and hit assessment to support the GMD capability against long-range missile threats from the Pacific theater. LRDR's improved discrimination capability in the Pacific architecture increases the defensive capacity of the homeland defense interceptor inventory by enabling conservation of GBIs. LRDR includes threat discrimination improvements to enhance MDS effectiveness against the evolving threat. LRDR also supports other mission

areas, including Space Situational Awareness. Initial fielding of the LRDR is planned for 2020 leading to an Operational Acceptance by the Warfighter in the 2022 timeframe. MDA's request includes funding for software Independent Verification and Validation (IV&V), Modeling and Simulation (M&S) efforts, and development of software for tracking and discrimination improvements and refined space intelligence data.

- **Aegis Homeland Defense Tier *(PE 0603892C)*.** As part of the overall Aegis BMD budget request, MDA is requesting $39.2 million in FY 2021, to provide greater depth of defense to the homeland consistent with the approach of fielding a layered Missile Defense System. MDA plans to assess the Aegis BMD weapon system to determine whether it can be upgraded to augment homeland defenses by supplementing the GMD system to defeat ICBM threats.
- **THAAD Homeland Defense Tier *(PE 0603881C)*.** As part of the overall BMD Terminal Defense budget request, MDA is requesting $139.0 million in FY 2021. MDA will initiate the development and demonstration of a new interceptor prototype to support Contiguous United States Defense as part of the tiered homeland defense effort. This effort will develop prototype software and hardware and perform a series of demonstrations to prove the technologies to enable expansion of engagement options and coverage areas for the THAAD weapon system in a flight test in FY 2023.

III. Regional Defense

There are hundreds of theater-range missile systems deployed worldwide. The FY 2021 budget request continues to resource and build integrated regional missile defenses that are interoperable with systems deployed by international partners to protect deployed forces, allies and international partners against Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) and potentially regional hypersonic offensive weapon systems. Aegis BMD continues to be a key component of the nation's regional defense for our deployed forces, allies, partners and friends, and directly supports and expands our homeland defenses with long-range surveillance and tracking capability. Aegis BMD capitalizes on and evolves the existing United States Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track ballistic missiles of all ranges, and has the ability to destroy SRBMs and MRBMs in

both the midcourse and terminal phases of flight and IRBMs in the midcourse phase of flight. The FY 2021 budget request supports continued advancement of the Aegis BMD system to counter growing and more complex threats, including improvements in system reliability and missile reliability as well as increases in Aegis BMD engagement capacity and lethality. MDA continues to support the European Phased Adaptive Approach (EPAA) as the U.S. contribution to the North Atlantic Treaty Organization's (NATO's) BMD capability, providing coverage and protection of NATO's European territory, populations, and forces against the increasing ballistic missile threat from outside the Euro-Atlantic region. Currently, there is an operational Aegis Ashore site located in Romania and another under construction in Poland. Additional U.S. contributions to NATO BMD include a forward-based AN/TPY-2 radar in Turkey, four BMD-capable Aegis destroyers with SM-3 missiles, homeported in Rota, Spain, and a command-and-control node at Ramstein Air Base, Germany. Continued provocations from North Korea demonstrate the serious threat North Korea poses to the Republic of Korea (ROK), Japan, the Asia-Pacific region, and U.S. forward-deployed forces. MDA continues to provide training, maintenance and supply support to the THAAD batteries (including its Terminal Mode AN/TPY-2 radar) stationed in the USINDOPACOM area of responsibility. THAAD is a rapidly deployable missile defense system that can augment the MDS globally as demonstrated in the Dynamic Employment to South Korea, Israel and Romania. MDA also supports U.S. forward deployed forces with Navy Aegis BMD ships stationed in Japan.

Both the Aegis BMD and THAAD systems continue to be key components of the Nation's regional defense for our deployed forces, allies, partners and friends. MDA proposes to continue funding the development, procurement, testing, operations and sustainment of these systems. The budget request includes:

- **Aegis *(PE 0603892C)*.** MDA requests $814.9 million in FY 2021 for Aegis BMD (includes funding for Aegis Homeland Defense Tier). The program includes the integration of the SM-3 Block IIA into the Aegis BMD weapon system, transition of the Kinetic Warhead hardware commonality effort to system integration testing, and pre-production of all-up-rounds to support initial deployment. MDA is strongly committed to maintaining and enhancing the Aegis BMD weapon system capability, in alignment with Navy requirements, to improve performance against SRBMs, MRBMs, and IRBMs, as well as demonstrate capability against

ICBM threats. Utilizing improved radar discrimination, Aegis BMD will increase capability against longer range and more sophisticated threats across three main weapon system product lines: BMD 5.1, BMD 4.2, and BMD 6.0. MDA continues to provide additional software capability development to upgrade Integrated Air and Missile Defense (IAMD) Baseline 9.C2 (BMD 5.1) in support of countering advanced threats and capabilities. MDA also continues software development for Aegis Baseline 5.4.1 (BMD 4.2) and the IAMD Baseline 10 (BMD 6.0). Both Baselines bring enhanced weapon system functionality using more capable radars. BMD 4.2 is a joint effort with the U.S. Navy that refurbishes existing ship AN/SPY-1 radar arrays with the installation of antenna Low Noise Amplifiers (LNAs) to provide increased radar sensitivity, discrimination improvements, and an increased threat set. The BMD 6.0 computer upgrade will integrate BMD capability with data provided by the Advanced Air and Missile Defense Radar (AMDR), also known as the AN/SPY-6, for enhanced engagement capability and increased raid capacity. Additionally, MDA continues upgrading the SM-3 Block IB hardware and software to leverage the capability of the SM-3 Block IIA.

- **Land Based SM-3 *(0604880C)*.** MDA is requesting $56.6 million in FY21 to modernize, develop, and test Aegis Ashore capability improvements at the Aegis Ashore Missile Defense Test Complex (AAMDTC) in Hawaii for implementation at operational sites. Funding also supports operations at the site in Romania and completion of construction at the site in Poland. In FY 2021 MDA will initiate High-Altitude Electromagnetic Pulse (HEMP) Combat System hardening in Romania. Land Based SM-3 provides an Aegis Ashore exo-atmospheric defense against short to intermediate-range ballistic missile threats in the later stages of flight.
- **Aegis Testing *(PE 0604878C)*.** MDA is requesting $170.9 million in FY 2021 for the Aegis BMD test program, which supports IMTP v 21.1. Aegis BMD Flight Test Program performs comprehensive testing of Aegis BMD components and demonstrates their interoperability with the MDS. Using accredited Modeling and Simulation (M&S), the ground test program provides the evidence required to transition the capability to the Operational Capacity Baseline. MDA will conduct a flight test (FTM-44) to meet the 2018 NDAA requirement to demonstrate an Aegis SM-3 Block IIA capability against an ICBM-class threat that, if proven, would provide additional, complementary homeland protection to supplement the currently operational GMD system. MDA will conduct this demonstration no later than December 2020.

- **Aegis Procurement**. MDA requests a total of $619.4 million in FY 2021 for SM-3 Procurement. The request procures 34 Aegis SM-3 Block IB and 6 Aegis SM-3 Block IIA missiles. Each missile variant can be used on Aegis BMD ships and at the Aegis Ashore sites in Romania and Poland. The request provides a five-year Multiyear Procurement for Aegis SM-3 Block IB missiles ending in FY 2023. The procurement budget also requests $104.2 million for Aegis BMD weapon systems consisting of Aegis shipset equipment, software, and installation materials. The budget also requests $39.1 million for installation of the combat system and combat structure adaptation at the Aegis Ashore site in Poland.
- **Aegis Maintenance and Sustainment.** MDA is requesting $80.4 million in FY 2021 in Operation and Maintenance (O&M) funding. The Aegis BMD program will perform missile recertification, repair efforts, and Ordnance Assessment/Surveillance. This funding also supports sustainment of BMD Computer Programs, Ship Equipment, and Aegis Ashore Romania, as well as Fleet integration support.

Also key to regional defense capability is the Terminal High Altitude Area Defense (THAAD) weapon system. THAAD is a globally-transportable, ground-based missile defense system that is highly effective against short-, medium-, and limited intermediate-range ballistic missile threats inside and outside the atmosphere in the terminal phase of flight. THAAD provides unique, cost-effective, and rapidly deployable capability to the Combatant Commanders to deepen, extend, and complement MDS homeland and regional defenses. MDA currently supports forward-deployment of two batteries stationed in the USINDOPACOM area of responsibility.

Specific to THAAD, MDA's request includes:

- **Terminal Defense *(PE 0603881C)*.** MDA is requesting $412.6 million for THAAD development efforts in FY 2021 (includes funding for THAAD Homeland Defense Tier). MDA will continue the development of multiple, independent THAAD software upgrades to address the evolving threat, improve the Warfighter's defense planning and, improved capability to engage SRBM, MRBM, and limited IRBM threats. THAAD development and integration will provide enhanced debris mitigation capability, and improved interoperability with other MDS elements. MDA continues development efforts that provides enhanced THAAD capability against specific USINDOPACOM threats, integrates THAAD's capability to detect and track threat ballistic missiles at

longer ranges with the Patriot Advanced Capability-3 Missile Segment Enhancement (PAC-3 MSE) to take advantage of its full kinematic capability, and integrates MSE launchers and missiles into the THAAD weapon system.

- **Terminal Defense Testing (*PE 0604876C*)**. MDA requests $7.8 million for Terminal Defense Testing in FY 2021, which supports IMTP v 21.1. This includes flight testing, ground testing, test operations and infrastructure, wargames and exercises. THAAD will also start preparation, in FY 2021, for a flight test to demonstrate a simultaneous engagement of an IRBM and a MRBM using a THAAD interceptor and a Patriot MSE interceptor.
- **THAAD Procurement**. MDA is requesting $495.4 million for THAAD procurement in FY 2021 for 41 THAAD interceptors, obsolescence mitigation efforts, production and training support, the THAAD Stockpile Reliability Program, and the initial procurement of required THAAD Battery Ground Component enhancement modifications to meet growing cyber threats.
- **THAAD Operations and Maintenance.** MDA is requesting $90.5 million for Operations and Maintenance (O&M) in FY 2021 to support the maintenance and upkeep of all MDS-unique items of the fielded U.S. THAAD batteries and for all THAAD training devices. In FY 2021, MDA will provide support to seven THAAD batteries, including the two forward-batteries stationed in the USINDOPACOM area of responsibility and is prepared to support the U.S. Army in any future deployments around the world.

IV. Developing New Capabilities

MDA is investing in advanced technology today to prepare for tomorrow's threats by improving system performance and effectiveness. This budget request will continue development of technology improvements for the current MDS, along with breakthrough technologies for integration into future missile defense architectures. These efforts include, but are not limited to, advanced discrimination techniques, and hypersonic defense technology. MDA is investigating solutions that reduce the cost per kill while addressing MDS performance gaps, to improve homeland defense performance at dramatically reduced cost.

- **Hypersonic Defense *(PE 0604181C)*.** MDA requests $206.8 million for FY 2021 for Hypersonic Defense. MDA continues to define concepts and develop engineering requirements for future missile defense configurations that keep pace with evolving threats. MDA will pursue a Regional Glide Phase Weapon System for hypersonic defense and leverage existing systems, while developing and

maturing technologies that augment future hypersonic defense architectures. These integrated sets of enhancements will provide incremental capabilities measured by progress and knowledge points.

- **Technology Maturation Initiatives (*PE 0604115C*)**. MDA is requesting $67.4 million in FY 2021 for Technology Maturation Initiatives (TMI). TMI includes demonstration of sensor capabilities against ballistic targets and advanced threats to improve tracking performance and operational utility. MDA will begin integration of an advanced sensor system on an aircraft mounted pod and conduct active ground tests and subsystem level flight tests to improve tracking precision to Aegis engage-on-remote and discrimination performance levels with the goal of integrating the advanced sensor technologies into future missile defense platforms and architectures.
- **Advanced Research Program *(PE 0603180C)*.** MDA is requesting $18.7 million in FY 2021, to conduct innovative research and development with small businesses, universities, and international partners to seek emerging technology and advance future missile defense capabilities. MDA continues to capitalize on the creativity and innovation of the nation's small business community, academia, and other partners to enhance missile defense.
- **Common Kill Vehicle Technology *(PE 0603294C)*.** MDA is requesting $11.1 million in FY 2021, to pursue multiple component and weapon system technology risk reduction efforts. The efforts pursued under the Common Kill Vehicle Technology program element will develop weapon systems concepts, identify key technology gaps, and mature technologies that reduce or eliminate these performance gaps. In addition, these efforts will help in the development of system requirements that are feasible and affordable for the engineering, manufacturing and development of future missile defense weapon systems.
- **Advanced Concepts & Performance Assessment *(PE 0603176C)*.** MDA is requesting $14.9 million in FY 2021 to centralize advanced technology concept modeling, simulation, and performance analysis. Advanced Concepts & Performance Assessment's focus is on the exploration of novel and emerging capabilities that may have the potential to enhance missile defense. The request will fund independent government assessments of industry sensor, directed energy, and weapon system technology concepts and mature related tracking, discrimination, and sensor fusion algorithms. Assessment activities include development of Hypersonic

Defense, Artificial Intelligence and Machine Learning Initiatives, and Left-through-Right Integration key technology areas. The innovative structured concept definition and assessment methodology enables MDA to validate focus areas, verify contractor technology solutions, and evaluate promising concepts for use in future missile defense architectures. This program element supports the monitoring and tracking of cybersecurity mitigations, as well as the exploration of cyber effects on emerging technology.

V. Space

- **Space Program *(PE 1206895C).*** MDA is requesting $32.1 million in FY 2021 for BMD Space Programs. This request funds the Spacebased Kill Assessment (SKA) project, which uses a network of fast rate infrared sensors hosted on commercial satellites to deliver a hit and kill assessment capability for homeland defense. As MDA's pathfinder program to host military payloads on commercial satellites, SKA proved that commercial hosting can deploy assets on orbit quickly – around half the time of the average traditional space program – and at significant cost savings. SKA sensors on orbit today have participated successfully in a variety of MDA flight tests and engineering activities, to include the collection of data for hit assessment in FTG-11. In FY 2021 MDA will develop and ground test hit assessment algorithms, and continue integration of SKA messages into the MDS in support of its efforts to add the SKA capability to the operational MDS.
- **Space Tracking and Surveillance System (STSS) satellite operations and sustainment (*PE 1206893C*).** MDA is requesting $34.1 million in FY 2021for STSS operations and sustainment. STSS consists of two satellites operating in Low Earth Orbit and provides risk reduction data for a future operational MDS tracking and surveillance constellation in the areas of sensor management, target signatures, discrimination, scene characterization, and fire control loop closure. STSS will continue participating in MDA test events and data collections providing battlespace awareness, technical intelligence, and space situational awareness to the Warfighter. This request also funds the Missile Defense Space Center (MDSC), which provides a collaborative environment to exploit and integrate STSS and other national security space assets for ballistic missile defense. Both the STSS program and the MDSC also support concept development activities for space sensor architecture studies and analyses to address advanced threats.

VI. Other Program Highlights

- **Radars Program Maintenance and Sustainment** supports both homeland and regional defense missions. MDA is requesting $176.9 million in FY 2021 to sustain AN/TPY-2 radars, COBRA DANE, and the Upgraded Early Warning Radars (UEWR). The Services and Combatant Commands, with logistical support from MDA, operate AN/TPY-2 (Forward Based Mode) radars in Japan (two radars), Israel, Turkey, and United States Central Command (USCENTCOM) in support of regional defense. MDA continues to support the AN/TPY-2 radar (Terminal Mode) as part of forward-deployed THAAD batteries in the USINDOPACOM area of responsibility.
- **Sensors *(PE 0603884C*).** MDA is requesting $282.0 million in FY 2021 to provide software updates for the AN/TPY-2, COBRA DANE, SBX, and UEWR radars to counter evolving threats, and to develop future radar capabilities through system engineering, software development, and testing. MDA is investing in a robust sensor architecture that supports MDS weapons systems built on a foundation of ground-based fire control radars to provide highly accurate midcourse tracking, discrimination and battle damage assessment for homeland missile defense. The request includes funding for the development of advanced discrimination algorithms for the AN/TPY-2 and SBX radars to counter evolving threats. The improvements will develop and field integrated capabilities to improve the MDS ability to identify lethal and non-lethal objects.
- **Sensors Test (*PE 0604879C)*.** MDA is requesting $76.5 million in FY 2021 for Sensors testing. This includes planning, analysis and execution of MDS flight test events, including pre- and post-test efforts such as Digital and Hardware-in-the-Loop (HWIL) System Pre-Mission Tests and System Post-Flight Reconstruction. Sensor tests also provides planning, analysis and execution in accordance with the ground test Concept of Operations (CONOPS) for MDS-level ground tests identified in the IMTP v 21.1, as well as support to HWIL infrastructure.
- **Command and Control, Battle Management and Communication (C2BMC) *(PE 0603896C)*.** MDA is requesting $593.4 million in FY 2021 for C2BMC. C2BMC provides persistent acquisition, tracking, cueing, discrimination, and fire-control quality data to Aegis BMD, GMD, THAAD, Patriot, and coalition partners to support homeland and regional defense. MDA's C2BMC capabilities support Warfighter command, control and battle management needs across the globe by providing the Combatant

Commander with management and user nodes, the BMD planner, situational awareness tools, and battle management capability to support global missile defense situational awareness, coalition operations, weapons release authority for homeland defense, and to control and task a variety of MDS radars. C2BMC operators and maintainers deploy to some of the world's most threatening regions, and continue to provide around-the-clock support to the local commanders. In FY 2021, MDA will sustain the C2BMC fielded capability (Spiral 8.2-3) in USNORTHCOM, USINDOPACOM, USEUCOM and USCENTCOM Areas of Responsibilities, which includes the following capability: Mobile Sensor Phase 1 and BMDS Overhead Persistent Infra-Red Architecture (BOA) 6.1 track data to the MDS; support for Space Situational Awareness with Hardened AN/TPY-2 radars; and Aegis engage-on-remote, which can provide a seven-fold increase in defended area coverage when compared to individual weapon system organic capability; and provide Protected Anti-Scintillation Anti-Jam Net-Centric support for continued communications between sites and Combatant Commands. MDA will continue development of Spiral 8.2-5, which integrates LRDR into the MDS for support of homeland defense. This spiral provides initial situational awareness and tracking capability for hypersonic threats; significantly expands Space Domain Awareness capabilities for the Air Force with LRDR; integrates the Army's IAMD Battle Management System into the MDS; and develops Initial MDS System Track for homeland defense. MDA will initiate development tasks for Robust Post Intercept Assessment supporting our homeland defense focus and MDS shoot-assess-shoot capability. MDA continues to improve the MDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities and enhance the use of space-based sensor data, using the BOA. Finally, MDA will continue to update its architecture to increase cybersecurity by assessing the risk of C2BMC architecture against possible attack. C2BMC capabilities will be involved in multi-agency cyber-focused tests and assessments planned for in FY 2021 to identify and correct cyber vulnerabilities.

- **MDA Engineering *(PE 0603890C, Budget Projects MD24, MD31, MT23).*** MDA is requesting $317.7 million in FY 2021 to perform the system-level engineering required to design, build, test, assess and field the integrated MDS. MDA Engineering defines missile defense architectures and functional requirements for integrated MDS capabilities to defeat the evolving threats, enables

interoperability between U.S. forces and international partners, and drives future capability development from a system perspective to maximize the effectiveness of missile defense technologies. MDA Engineering also performs pre- and post-mission analysis for MDS tests, and assesses MDS performance in order to deliver capabilities to the warfighter. MDA employs system-level and element-level models and simulations to verify MDS performance and assess MDS capability to engage and defeat complex threats across a spectrum of scenarios that cannot be demonstrated in flight tests. As a result, MDA is able to deliver evolving, integrated, and layered MDS capabilities to the Warfighter that have been thoroughly assessed and validated through testing and Modeling and Simulation. In this budget, MDA is continuing to improve both system-level digital simulation and integrated system-level ground test simulations.

- **MDA Testing**. MDA plans and executes a fully integrated test program that synchronizes the system under test with the Warfighters trained to operate the system under varying wartime conditions against current and emerging threats. In collaboration with stakeholders, the IMTP identifies and incorporates all testing requirements into a comprehensive, highly integrated, cost-effective series of flight tests, ground tests, cybersecurity tests, exercises, and wargames. IMTP Stakeholders, who are also signatories, include: Director, Operational Test & Evaluation (DOT&E); Deputy Director, Developmental Test, Evaluation and Prototyping (DDTE&P); Commander, Joint Functional Component Command for Integrated Missile Defense (JFCC IMD) representing Combatant Commands (CCMD); Commander, Army Test and Evaluation Command (ATEC); Commander, Air Force Operational Test and Evaluation Center (AFOTEC); Commander, Operational Test and Evaluation Force (COMOPTEVFOR); and Commander, Joint Interoperability Test Command (JITC). For flight testing, the Agency incorporates the nine operational realism criteria defined by the Ballistic Missile Defense System Response to National Defense Authorization Act Section 234, for Fiscal Year 2005, Increasing Operational Realism. For system-level ground testing, all tests culminate in operational testing with Warfighters on console and independent operational assessments by the MDS Operational Test Agency Team. This ensures that MDS capabilities are credibly demonstrated and validated prior to delivery to the Warfighter. IMTP v 21.1 supports MDA's programming strategy and test priorities. This test program captures new Flight Tests for SM-3 Block IIA production cut-in as well as demonstrations

against targets with countermeasures; a flight test in support of THAAD 4.0 Global Materiel Release to maintain THAAD annual test cadence; operational tests for Aegis BMD Baseline 5.4.1 and a demonstration of regional/theater air and missile defense capabilities; updates on planning for cybersecurity testing through the Future Years Defense Plan (FYDP); refinements on test planning for system-level ground testing; updates to reflect the GMD test program plan; and an investment in the development of the Modified Ballistic Re-entry Vehicles (MBRV) Front End for future testing. MDA also allocates funding for hypersonic partner flight tests in FY 2021 to be identified, requirements defined, and assets deconflicted.

- **Israeli Programs.** MDA's work with the Israeli Missile Defense Organization is a testament to the strong missile defense partnership we maintain with Israel. MDA is requesting $500 million for Israeli programs in FY 2021. This funding level remains consistent with the Memorandum of Understanding that the United States and Israel signed in 2016. This budget continues MDA's longstanding support of U.S.-Israeli Cooperative Programs, to include the co-development and co-production of the David's Sling Weapon System to the Arrow Weapon System. The Department continues to support co-production efforts for the Iron Dome program to provide critical defense against short-range rockets and artillery. In FY 2021, the MDA budget will also support several flight tests across the Israeli portfolio. These continued joint efforts provide Israel with a three-tiered defense to defend itself from ballistic missiles, rockets, and cruise missiles and ensures Israel maintains its qualitative military edge against its advisories.

VII. Summary

MDA requests $9.187 billion in FY 2021 for comprehensive missile defense development efforts to build warfighter confidence through focus on readiness and sustainment, increase capability and capacity of fielded homeland and regional defense systems, and increase the speed of delivery of advanced technology to counter the advanced missile threat.

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Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY19 Actual**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY21-25**
O&M												
11A	0208866C		O&M	NA	471,048	541,326	505,858	553,445	580,210	698,643	651,897	2,990,053
		MD08	Ground Base Midcourse	NA	139,204	152,504	158,054	175,511	179,368	219,013	169,852	901,798
		MD07	THAAD	NA	87,560	86,743	90,496	95,405	98,913	109,655	113,465	507,934
		MD09	AEGIS	NA	77,435	74,887	80,440	74,591	78,655	81,639	80,949	396,274
		MD11	BMDS AN/TPY-2 Radars	NA	166,849	227,192	176,868	207,938	223,274	288,336	287,631	1,184,047
			Budget Activity 00 Total	NA	471,048	541,326	505,858	553,445	580,210	698,643	651,897	2,990,053
			O&M Total	NA	471,048	541,326	505,858	553,445	580,210	698,643	651,897	2,990,053
Procurement												
42	0208866C		PROCUREMENT	01	2,572,400	1,724,734	1,458,169	1,179,552	1,208,278	2,343,046	2,350,770	8,539,815
		MD07	THAAD	01	1,025,804	407,203	495,396	341,042	328,354	374,424	425,125	1,964,341
		MD08	Ground Based Midcourse	01	520,464	285,471	0	0	10,225	2,130	36,400	48,755
		MD09	AEGIS BMD	01	706,366	433,369	401,096	365,555	413,428	440,949	438,624	2,059,652
		MD11	BMDS Sensors	01	13,585	10,046	0	5,593	22,145	17,065	17,009	61,812
		MD14	SM-3 Block IIA	01	0	238,000	218,322	131,869	127,027	1,180,110	1,108,168	2,765,496
		MD26	Arrow 3 Upper Tier System	01	80,000	55,000	77,000	62,000	90,000	90,000	90,000	409,000
		MD34	Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon Sy	01	50,000	50,000	50,000	30,000	30,000	30,000	30,000	170,000
		MD73	Aegis Ashore Phase III	01	15,000	25,659	39,114	26,248	3,891	2,400	980	72,633
		MD83	Iron Dome	01	70,000	95,000	73,000	108,000	80,000	80,000	80,000	421,000
		MD90	Aegis BMD Hardware and Software	01	91,181	124,986	104,241	109,245	103,208	125,968	124,464	567,126
			Budget Activity 01 Total	01	2,572,400	1,724,734	1,458,169	1,179,552	1,208,278	2,343,046	2,350,770	8,539,815
			Procurement Total	01	2,572,400	1,724,734	1,458,169	1,179,552	1,208,278	2,343,046	2,350,770	8,539,815
RDT&E												
30	0603176C		Advanced Concepts and Performance Assessment	03	12,720	46,201	14,910	15,178	16,205	16,879	17,300	80,472
		MD71	Advanced Concepts and Performance Assessments	03	11,350	11,552	11,637	11,872	12,086	12,444	12,709	60,748
		MD40	Program-Wide Support	03	605	605	592	602	652	864	944	3,654
		MC71	Cyber Operations	03	765	34,044	2,681	2,704	3,467	3,571	3,647	16,070
31	0603178C		Weapons Technology	03	13,400	0	0	0	0	0	0	0
		MD72	Interceptor Technology	03	13,400	0	0	0	0	0	0	0
32	0603180C		Advanced Research	03	42,100	27,674	18,687	18,883	18,975	19,720	20,222	96,487
		MD25	Advanced Technology Development	03	41,196	26,793	17,945	18,134	18,212	18,711	19,119	92,121
		MD40	Program-Wide Support	03	904	881	742	749	763	1,009	1,103	4,366
39	0603294C		Common Kill Vehicle Technology	03	55,549	13,600	11,058	10,996	11,052	11,290	11,563	55,959
		MD85	Common Kill Vehicle Technology	03	49,509	10,941	10,619	10,560	10,608	10,712	10,932	53,431
		MD40	Program Wide Support	03	6,040	2,659	439	436	444	578	631	2,528
			Budget Activity 03 Total	03	123,769	87,475	44,655	45,057	46,232	47,889	49,085	232,918
120	0305103C		Cyber Security Initiative	04	961	11,138	1,148	1,172	1,194	1,231	1,255	6,000
		MDCS	Cyber Security Initiative	04	961	11,138	1,148	1,172	1,194	1,231	1,255	6,000
76	0603881C		Ballistic Missile Defense Terminal Defense Segment	04	383,369	306,761	412,627	340,071	302,279	204,986	227,970	1,487,933
		MD07	THAAD	04	224,495	194,752	360,233	313,000	280,307	188,601	208,923	1,351,064
		MC07	Cyber Operations	04	6,087	13,580	9,806	12,325	8,544	4,595	5,286	40,556
		MD06	Patriot Advanced Capability-3 (PAC-3)	04	144,054	90,404	26,198	1,251	1,274	1,300	1,326	31,349
		MD40	Program-Wide Support	04	8,733	8,025	16,390	13,495	12,154	10,490	12,435	64,964
77	0603882C		Ballistic Missile Defense Midcourse Defense Segment	04	790,316	1,303,716	1,004,305	776,125	726,566	767,592	1,068,536	4,343,124
		MD08	Ground Based Midcourse	04	725,790	1,186,995	919,589	710,948	662,265	696,270	987,209	3,976,281
		MC08	Cyber Operations	04	34,472	63,407	44,824	34,378	35,086	32,041	31,399	177,728
		MD40	Program-Wide Support	04	30,054	53,314	39,892	30,799	29,215	39,281	49,928	189,115
79	0603884C		Ballistic Missile Defense Sensors	04	382,759	352,288	281,957	576,699	656,539	574,703	593,592	2,683,490
		MD11	BMDS Radars	04	360,338	311,998	269,199	552,234	633,753	555,360	571,096	2,581,642
		MC11	Cyber Operations	04	6,053	28,506	1,558	1,580	1,614	1,191	5,390	11,333
		MD40	Program-Wide Support	04	16,368	11,784	11,200	22,885	21,172	18,152	17,106	90,515
80	0603890C		BMD Enabling Programs	04	614,855	634,449	599,380	552,815	544,582	560,863	582,675	2,840,315
		MD24	System Engineering & Integration	04	205,845	164,291	160,678	147,997	147,202	156,300	162,148	774,325
		MT23	Enabling - Test	04	38,699	59,029	49,293	45,398	49,007	49,922	52,408	246,028

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		MD28	Intelligence & Security	04	46,628	43,851	42,501	42,698	43,312	46,345	52,063	226,919
		MD30	BMD Information Management Systems	04	76,997	84,525	84,753	85,475	80,309	81,248	83,249	415,034
		MC30	Cyber Operations	04	97,405	117,100	64,659	67,264	68,130	69,815	71,257	341,125
		MD31	Modeling & Simulation	04	79,982	88,487	107,710	88,557	77,761	70,661	69,913	414,602
		MC31	Engineering Cyber Operations	04	20,559	23,618	35,709	22,911	25,706	25,689	27,007	137,022
		MD32	Quality, Safety, and Mission Assurance	04	28,190	29,986	30,269	30,578	31,258	32,181	32,846	157,132
		MD40	Program-Wide Support	04	20,550	23,562	23,808	21,937	21,897	28,702	31,784	128,128
81	0603891C		Special Programs - MDA	04	418,722	512,098	420,216	448,064	386,824	313,780	301,189	1,870,073
		MD27	Special Programs	04	418,722	512,098	420,216	448,064	386,824	313,780	301,189	1,870,073
82	0603892C		AEGIS BMD	04	724,731	737,269	814,936	674,825	553,402	478,000	449,145	2,970,308
		MD09	Aegis BMD	04	229,791	274,932	405,041	366,322	327,247	258,300	248,567	1,605,477
		MG09	Aegis BMD SM-3 Development Articles	04	79,686	0	0	0	0	0	0	0
		MM09	Aegis BMD SM-3 Development	04	187,879	253,244	201,970	102,453	28,969	14,285	7,954	355,631
		MC09	Cyber Operations	04	13,005	19,617	29,392	38,348	48,632	46,252	28,946	191,570
		MX09	Aegis BMD Development Support	04	179,320	163,628	148,030	140,923	126,302	134,702	139,178	689,135
		MD40	Program-Wide Support	04	35,050	25,848	30,503	26,779	22,252	24,461	24,500	128,495
83	0603896C		Ballistic Missile Defense Command and Control, Battle Management &	04	500,965	549,756	593,353	593,330	546,471	581,376	543,971	2,858,501
		MD01	Command & Control, Battle Management, Communications (C2BMC)	04	295,608	313,562	367,380	351,374	309,375	330,737	289,908	1,648,774
		MC01	Cyber Operations	04	17,468	33,012	12,658	21,742	16,403	14,657	14,987	80,447
		MT01	C2BMC Test	04	53,690	64,624	61,264	65,861	59,880	60,784	63,901	311,690
		MX01	Command & Control, Battle Management, Communications (C2BMC) D	04	112,909	114,876	128,482	130,808	138,840	145,446	145,502	689,078
		MD40	Program-Wide Support	04	21,290	23,682	23,569	23,545	21,973	29,752	29,673	128,512
84	0603898C		Ballistic Missile Defense Joint Warfighter Support	04	48,401	51,532	49,560	51,735	51,059	53,133	54,023	259,510
		MD03	Joint Warfighter Support	04	14,914	16,904	14,903	16,336	15,018	15,399	15,332	76,988
		MT03	Joint Warfighter Support Test	04	31,132	32,278	32,531	33,187	33,826	34,848	35,574	169,966
		MC03	Cyber Operations	04	150	156	157	159	162	167	170	815
		MD40	Program-Wide Support	04	2,205	2,194	1,969	2,053	2,053	2,719	2,947	11,741
85	0603904C		Missile Defense Integration and Operations Center (MDIOC)	04	51,689	56,161	55,356	55,721	57,457	59,798	61,334	289,666
		MD22	Missile Defense Integration and Operations Center (MDIOC)	04	45,117	53,103	52,519	52,860	54,484	56,054	57,290	273,207
		MC22	Cyber Operations	04	595	634	638	650	663	684	698	3,333
		MD40	Program-Wide Support	04	5,977	2,424	2,199	2,211	2,310	3,060	3,346	13,126
86	0603906C		Regarding Trench	04	16,512	22,424	11,863	12,192	12,424	12,802	13,067	62,348
		MD35	Regarding Trench	04	16,512	22,424	11,863	12,192	12,424	12,802	13,067	62,348
87	0603907C		Sea Based X-Band Radar (SBX)	04	125,900	128,156	118,318	135,931	131,510	145,582	169,980	701,321
		MX46	Sea Based X-Band Radar Development Support	04	119,789	123,089	113,618	130,537	126,222	138,132	160,708	669,217
		MD40	Program-Wide Support	04	6,111	5,067	4,700	5,394	5,288	7,450	9,272	32,104
88	0603913C		Israeli Cooperative Programs	04	300,000	300,000	300,000	300,000	300,000	300,000	300,000	1,500,000
		MD26	Arrow Weapon System	04	163,000	159,000	173,000	173,000	173,000	173,000	173,000	865,000
		MD34	Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon Sy	04	137,000	141,000	127,000	127,000	127,000	127,000	127,000	635,000
89	0603914C		Ballistic Missile Defense Test	04	510,292	399,738	378,302	385,910	396,524	394,949	417,261	1,972,946
		MT04	BMDS Test Program	04	465,268	371,710	354,569	361,796	371,778	365,669	385,245	1,839,057
		MC04	Cyber Operations	04	30,419	12,524	8,706	8,800	8,802	9,069	9,256	44,633
		MD40	Program Wide Support	04	14,605	15,504	15,027	15,314	15,944	20,211	22,760	89,256
90	0603915C		Ballistic Missile Defense Targets	04	561,349	542,939	536,133	593,939	519,028	520,625	540,675	2,710,400
		MC05	Cyber Operations	04	6,236	913	1,698	1,744	1,786	1,828	1,860	8,916
		MT05	BMDS Targets Program	04	538,644	521,181	513,139	568,626	496,372	492,154	509,322	2,579,613
		MD40	Program Wide Support	04	16,469	20,845	21,296	23,569	20,870	26,643	29,493	121,871
95	0604115C		Technology Maturation Initiatives	04	312,074	264,520	67,389	73,214	97,454	60,156	56,076	354,289
		MD98	Directed Energy Demonstrator Development	04	224,771	116,266	0	0	0	0	0	0
		MD99	Discrimination Sensor Demonstrator Development	04	74,710	132,187	64,237	69,845	93,065	56,599	52,528	336,274
		MT99	Technology Maturation Initiatives Test	04	502	6,324	0	0	0	0	0	0
		MC98	Cyber Operations	04	5,430	475	475	464	470	479	489	2,377
		MD40	Program Wide Support	04	6,661	9,268	2,677	2,905	3,919	3,078	3,059	15,638
98	0604181C		Hypersonic Defense	04	132,612	390,204	206,832	107,521	111,084	115,487	118,333	659,257

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			Fiscal Year Amount Based on Business Rule CPS Version:		OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY19 Actual**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY21-25**
		MD29	Hypersonic Defense	04	127,222	383,506	196,749	103,254	106,617	109,577	111,878	628,075
		MD40	Program Wide Support	04	5,390	6,698	10,083	4,267	4,467	5,910	6,455	31,182
105	0604672C		Homeland Defense Radar-Hawaii	04	70,735	188,480	0	0	0	0	0	0
		MD41	Homeland Defense Radar - Hawaii (HDR-H)	04	70,735	181,667	0	0	0	0	0	0
		MD40	Program-Wide Support	04	0	6,813	0	0	0	0	0	0
106	0604673C		Pacific Discriminating Radar	04	14,453	6,711	0	0	0	0	0	0
		MD51	Pacific Radar (PAC Radar)	04	14,453	5,156	0	0	0	0	0	0
		MD40	Program Wide Support	04	0	1,555	0	0	0	0	0	0
110	0604873C		Long Range Discrimination Radar (LRDR)	04	172,705	136,423	137,256	118,787	90,299	60,251	41,726	448,319
		MD96	Long Range Discrim Radar (LRDR)	04	164,759	131,446	131,804	114,073	86,668	57,168	39,450	429,163
		MD40	Program Wide Support	04	7,946	4,977	5,452	4,714	3,631	3,083	2,276	19,156
111	0604874C		Improved Homeland Defense Interceptors	04	407,858	515,000	664,138	921,349	1,339,439	856,712	1,258,000	5,039,638
		MD97	Improved HD Interceptors	04	385,978	36,581	0	0	0	0	0	0
		MD80	Next Generation Interceptor Development (NGI)	04	0	465,000	637,759	884,785	1,285,581	841,322	1,258,000	4,907,447
		MD40	Program Wide Support	04	21,880	13,419	26,379	36,564	53,858	15,390	0	132,191
112	0604876C		Ballistic Missile Defense Terminal Defense Segment Test	04	57,972	25,137	7,768	72,388	74,306	60,179	19,877	234,518
		MT07	THAAD Test	04	54,845	24,417	7,459	69,515	71,318	57,099	18,793	224,184
		MD40	Program Wide Support	04	3,127	720	309	2,873	2,988	3,080	1,084	10,334
113	0604878C		Aegis BMD Test	04	92,160	169,822	170,880	191,744	163,103	179,877	217,735	923,339
		MC13	Network _System Certification and Accreditation - C&A	04	0	0	634	645	662	673	697	3,311
		MT09	AEGIS BMD Test	04	88,937	163,861	163,458	183,490	155,883	169,999	205,161	877,991
		MD40	Program Wide Support	04	3,223	5,961	6,788	7,609	6,558	9,205	11,877	42,037
114	0604879C		Ballistic Missile Defense Sensor Test	04	71,905	105,530	76,456	99,138	131,191	122,983	124,398	554,166
		MT11	BMDS Radars Test	04	67,093	101,053	73,419	95,204	125,916	116,689	117,612	528,840
		MD40	Program Wide Support	04	4,812	4,477	3,037	3,934	5,275	6,294	6,786	25,326
115	0604880C		Land Based SM-3 (LBSM3)	04	25,200	38,352	56,628	43,742	29,073	31,507	27,908	188,858
		MD68	AEGIS Ashore	04	20,840	33,741	51,764	41,043	26,652	28,638	25,129	173,226
		MC68	Cyber Operations	04	2,901	2,980	2,615	963	1,252	1,257	1,257	7,344
		MD40	Program-Wide Support	04	1,459	1,631	2,249	1,736	1,169	1,612	1,522	8,288
116	0604887C		Ballistic Missile Defense Midcourse Defense Segment Test	04	72,634	98,139	67,071	63,240	61,200	79,139	33,282	303,932
		MT08	Midcourse Test	04	69,004	95,231	64,407	60,730	58,739	75,089	31,467	290,432
		MD40	Program Wide Support	04	3,630	2,908	2,664	2,510	2,461	4,050	1,815	13,500
117	0604894C		Multi Object Kill Vehicle	04	5,754	0	0	0	0	0	0	0
		MD85	Multi Object Kill Vehicle	04	5,384	0	0	0	0	0	0	0
		MD40	Program-Wide Support	04	370	0	0	0	0	0	0	0
122	1206893C		Space Tracking and Surveillance System	04	36,114	36,349	34,144	34,657	35,268	36,627	37,734	178,430
		MD12	Space Tracking and Surveillance System (STSS)	04	31,448	32,633	32,044	32,439	32,989	33,836	34,740	166,048
		MC12	Cyber Operations	04	2,925	2,190	744	843	861	917	936	4,301
		MD40	Program-Wide Support	04	1,741	1,526	1,356	1,375	1,418	1,874	2,058	8,081
123	1206895C		Ballistic Missile Defense System Space Programs	04	96,146	140,565	32,068	28,591	41,201	39,090	39,630	180,580
		MD33	MD Space Exp Center (MDSEC)	04	17,406	26,013	30,408	27,060	39,139	36,670	37,040	170,317
		MD42	Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping	04	0	108,000	0	0	0	0	0	0
		MD37	Space Sensor Layer	04	73,000	0	0	0	0	0	0	0
		MC33	MD Space Exp Center (MDSEC)	04	5,000	5,380	386	396	405	420	428	2,035
		MD40	Program-Wide Support	04	740	1,172	1,274	1,135	1,657	2,000	2,162	8,228
			Budget Activity 04 Total	04	6,999,143	8,023,657	7,098,084	7,252,900	7,359,477	6,611,428	7,299,372	35,621,261
163	0605502C		Small Business Innovation Research - MDA	06	91,161	0	0	0	0	0	0	0
		MD45	Small Business Innovation Research	06	91,161	0	0	0	0	0	0	0
178	0606942C		Assessments and Evaluations Cyber Vulnerabilities	06	3,400	0	0	0	0	0	0	0
		MC39	Assessment and Evaluation of Cyber Vulnerabilities	06	3,400	0	0	0	0	0	0	0
194	0901598C		Management HQ - MDA	06	28,626	27,065	26,902	26,708	26,364	26,495	27,036	133,505
		MD38	Management Headquarters	06	28,626	27,065	26,902	26,708	26,364	26,495	27,036	133,505
			Budget Activity 06 Total	06	123,187	27,065	26,902	26,708	26,364	26,495	27,036	133,505
			RDT&E Total	06	7,246,099	8,138,197	7,169,641	7,324,665	7,432,073	6,685,812	7,375,493	35,987,684

Missile Defense Agency
PB 2021 Missile Defense Agency
FY 2021- FY 2025 Appropriation Summary
R-1 Exhibit
($ Thousands)

Appropriation Summary Based on OFFLINE PB21 FY21-FY25 R33 - 01/21/2020

				Fiscal Year Amount Based on Business Rule CPS Version:	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	OFFLINE PB21 FY21-FY25 R33	
Line Number	**Program Element**	**Budget Project**	**Program**	**Budget Activity**	**FY19 Actual**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY21-25**
MILCON												
	0603882C		MID-COURSE MILCON	NA	8,000	0	48,000	0	0	0	0	48,000
		MM08	Missile Defense Complex, Ft. Greely, AK	NA	8,000	0	48,000	0	0	0	0	48,000
	0603884C		SENSORS MILCON	NA	174,000	0	0	0	0	0	0	0
		MM11	Long Range Discrimination Radar Cmplx, Clear AFS, AK	NA	174,000	0	0	0	0	0	0	0
	22299902		MINOR MILCON	NA	10,000	10,000	4,922	4,531	4,783	4,976	4,762	23,974
		MM14	Minor MILCON	NA	10,000	10,000	4,922	4,531	4,783	4,976	4,762	23,974
	31299903		MILCON PLANNING and DESIGN	NA	6,184	35,472	0	0	0	0	40	40
		MM32	MILCON Planning Design	NA	6,184	35,472	0	0	0	0	40	40
			Budget Activity 00 Total	NA	198,184	45,472	52,922	4,531	4,783	4,976	4,802	72,014
			MILCON Total	NA	198,184	45,472	52,922	4,531	4,783	4,976	4,802	72,014
				Program Total	**10,487,731**	**10,449,729**	**9,186,590**	**9,062,193**	**9,225,344**	**9,732,477**	**10,382,962**	**47,589,566**

789654Reporting Requirement Reference	Reporting Requirement Language	Budget Documentation Location
FY20 House (HAC-D) Appropriations H Rept. 116-84, pp. 5	At the time the President submits the budget request for fiscal year 2021, the Secretary of Defense is directed to transmit to the congressional defense committees budget justification documents to be known as the M–1 and O–1, which shall identify, at the budget activity, activity group, and sub-activity group level, the amounts requested by the President to be appropriated to the Department of Defense for military personnel and operation and maintenance in any budget request, or amended budget request, for fiscal year 2021.	Submitted in the FY2021 Budget Justification Materials
FY20 National Defense Authorization Act - Sec. 1683	**Acceleration of the deployment of persistent space-based sensor architecture (sec. 1673)** The provision would also require the Comptroller and the Director for Cost Assessment and Program Evaluation to certify to the congressional defense committees whether the HBTSS program is fully funded in the future years defense program submitted with the fiscal year 2021 budget request. The provision would also require the Director of the MDA to begin on-orbit testing of an HBTSS no later than December 31, 2021. Finally, the provision would require the Secretary to submit a report on efforts relating to space-based sensing and tracking capabilities for missile defense at the MDA, the Defense Advanced Research Projects Agency, the Air Force, and the Space Development Agency.	Submitted with the fiscal year 2021 budget request.
FY16 National Defense Authorization Act (HR 1735), pp. 1056-1059	**SEC. 1684. ADDITIONAL MISSILE DEFENSE SENSOR COVERAGE FOR PROTECTION OF UNITED STATES HOMELAND** (b) STUDIES AND EVALUATIONS ON HOMEPORT OF SEA-BASED X-BAND RADAR.—Not later than 60 days after the date of the enactment of this Act, the Director of the Missile Defense Agency shall commence any siting studies, environmental impact assessments or statements required pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) that have not otherwise been prepared, homeport agreements for sea-based X-band radar support, evaluations of any needed pier modifications, and evaluations of any communications capabilities or other requirements to carry out the reassignment of the homeport of the sea-based X-band radar to a homeport on the East Coast of the United States. (c) POTENTIAL FUTURE MISSILE DEFENSE SENSOR SITES.— (1) EVALUATION.— Not later than March 31, 2016, the Director shall commence a study to evaluate at least three possible additional locations (in or outside the United States), selected by the Director, that would be best suited for future deployment of an advanced missile defense sensor site optimized against threats from Iran. (2) ENVIRONMENTAL IMPACT STATEMENTS.— Except as provided by paragraph (3), the evaluation under paragraph (1) shall include an environmental impact statement or other analysis in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) for each location included in the evaluation. (3) EXCEPTION.—If an environmental impact statement or other analysis described in paragraph (2) has already been prepared, or is not required by law, for a location included in the evaluation under paragraph (1), the Director shall not be required to carry out paragraph (2) with respect to such location. (d) DEPLOYMENT OF ADDITIONAL COVERAGE.— (1) DEPLOYMENT.—Not later than December 31, 2020, the Director, in cooperation with the relevant combatant command, shall deploy a long-range	Submitted in the FY2021 Budget Justification Materials in PE 0603890C (BMD Enabling Programs) and PE 0603884C (BMD Sensors)

	discrimination radar or other appropriate sensor capability in a location optimized to support the defense of the homeland of the United States from emerging long-range ballistic missile threats from Iran. (2) SEA-BASED X-BAND RADAR.—If the Director carries out paragraph (1) by reassigning the homeport of the sea-based X-band radar, the Director and the Secretary of the Navy may not carry out such reassignment until the date on which the Director certifies to the congressional defense committees that Hawaii will have adequate missile defense coverage prior to such reassignment. (e) SUBMISSION OF INFORMATION.— (1) REPORT.— Not later than December 31, 2018, the Director shall submit to the congressional defense committees a report containing the following: (A) The findings of the study conducted under paragraph (1) of subsection (c), including any environmental impact statements or analyses required by paragraph (2) of such subsection. (B) Notification of the manner in which Hawaii is being provided ballistic missile defense coverage. (2) PLAN.— In the budget justification materials submitted to Congress in support of the budget for each of fiscal years 2017 through 2020 submitted by the President to Congress under section 1105 of title 31, United States Code, the Director shall include— (A) the plan of the Director to carry out subsection (d); and (B) an update on the progress of the Director in implementing subsections (b) and (c).	
FY04 National Defense Authorization Act (H.R. 1588) Report 108-354, pp. 30-31	**BUDGET JUSTIFICATION MATERIALS** In the budget justification materials submitted to Congress in support of the Department of Defense budget for any fiscal year (as submitted with the budget of the President under section 1105(a) of title 31), the Secretary of Defense shall specify, for each ballistic missile defense system element for which the Missile Defense Agency is engaged in planning for production and initial fielding, the following information: (1) The production rate capabilities of the production facilities planned to be used for production of that element. (2) The potential date of availability of that element for initial fielding. (3) The estimated date on which the administration of the acquisition of that element is to be transferred from the Director of the Missile Defense Agency to the Secretary of a military department.	MDA to provide BMDS Accountability Report (BAR) to Congressional Defense Committees. The BAR partially satisfies the requirement through its schedule baseline. **Exhibit P-21 – Budget Production Schedule**
FY04 National Defense Authorization (H.R. 1588), Report 108-354, pp. 30-31	**FUTURE-YEARS DEFENSE PROGRAM** The Secretary of Defense shall include in the future-years defense program submitted to Congress each year under section 221 of this title an estimate of the amount necessary for procurement for each ballistic missile defense system element, together with a discussion of the underlying factors and reasoning justifying the estimate.	**Exhibit P-21 – Budget Production Schedule**

ACRONYMS	DEFINITION
A	
A&A	**Assessment and Authorization**
A&AS	Advisory and Assistance Services
AAEA	Aegis Ashore Engineering Agent
AAFTM	Aegis Ashore Flight Test Mission
AAMDS	Aegis Ashore Missile Defense System
AAMDSC	Aegis Ashore Missile Defense System Complex
AAMDTC	Aegis Ashore Missile Defense Test Complex
AAW	Anti-Air Warfare
ABEWS	Airborne Early Warning System
ABIR	Airborne Infrared Radar
ABMD	Aegis Ballistic Missile Defense
ABS	Airborne Sensors; American Bureau of Shipping
ABWO	Assistant Ballistic Missile Defense Watch Officer
ACB	Advanced Capability Build
ACB 12	Advanced Capability Build 12
ACD	Adversary Capability Document
ACD	**Advance Capability Development**
ACD&P	Advanced Component Development & Prototypes
ACL	Achievable Capabilities List
ACPA	Advanced Concepts and Performance Assessment
ACS	Aegis Combat System
ACS	**Attitude Control System**
ADP	Arrow Deployability Program; Automated Data Processing; Adversary Delta Package
AEDC	Arnold Engineering Development Center
AEI	Annual Integration Events
AEP	Analysis Execution Plans
AEU	Antenna Equipment Unit
AFB	Air Force Base
AFS	Avionics Flight Software/ Air Force Station
AFSPC	**Air Force Space Command**
AI	Artificial Intelligence
AI&T	Assembly, Integration and Test
AIE	Annual Integration Event
AIE	**Annual Integration Event**
ALO	Aegis Light-Off
ALTB	Active Layered Theater Ballistic
AMCOM	Army Aviation and Missile Command
AMDR	**Air and Missile Defense Radar**
AMDWS	Air and Missile Defense Workstation
AMOD	Aegis Modernization (program)
AMRDEC	Aviation and Missile Research, Development and Engineering Center
AN/SPY-1	Joint Army-Navy equipment nomenclature: S -Water (surface ship), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 1 - model number [AN/SPY-1 is an equipment nomenclature, not an Acronym]
AN/TPY-2	Joint Army-Navy equipment nomenclature: T - Transportable (ground), P - Radar, Y - Surveillance (target detecting and tracking) and Control (fire control and/or air control), 2 - model number [AN/TPY-2 is an equipment nomenclature, not an Acronym]
AO	**Authorizing Official**
AOA	**Analysis of Alternatives**
AOC	Air Operations Center
AOR	Area of Responsibility
APEX	Assessment Parameter Extraction
APL	Applied Physics Laboratory
APLITS	**Approved Products List Integrated Tracking System**
ARAV	Aegis Readiness Assessment Vehicles
ARC	**Advanced Research Center**
ARST	Advanced Remote Sensor Technology
ARSTRST	(US) Army Forces Strategic Command
ASD(R&E)	**Assistant Secretary of Defense Research and Engineering**
ASDM	**Acquisition Strategy Decision Memorandum**
ASIP	Arrow System Improvement Program; Application Specific Integrated Circuit
AT&L	Acquisition, Technology and Logistics
ATD	Advanced Technology Development; Assistant to the Director; Assistant Test Directors
ATEC	Army Test and Evaluation Command
ATK	Alliant Techsystems, Inc.
ATO	**Authorization to Operation**
AUPP	**Average Unit Production Price**

ACRONYMS	DEFINITION
AUR	All Up Round
AWS	Arrow Weapon System; AEGIS Weapon System
B	
BAA	**Broad Agency Announcement**
BAM	**BMDS Asset Management**
BAR	BMDS Accountability Report
BCA	Business Case Analysis; BMDS Capability Assessment
BCF	BCF Solutions, Incorporated
BCM	BMDS C2BMC Model
BCN	BMDS Communications Network
BCS	**Battle Command System**
BCSC-T	BMDS Communication System Complex Transportable
BDR	BMDS Discrepancy Reports
BER	Baseline Execution Reviews
BID	BMDS Integration and Development
BM	Battle Management; Ballistic Missile
BMC	**Battle Management Center**
BMD	Ballistic Missile Defense
BMDS	Ballistic Missile Defense System
BNOSC	BMDS Network Operations and Security Center
BOA	BMDS ONIR Architecture
BoD	Boards of Director
BORRS	BMDS Operational Readiness Reporting System
BOS	Base Operations Support
BSA	Budget Sub-Activity
BSC	Battery Support Center
BSO	BMDS Safety Officers
BSP	BMD Signal Processor
BTG	BCN Teleport Gateway
BTS	**BMDS Test Site**
BWA	Broadband Wireless Access
BWO	BMDS Watch Officers
C	
C&A	Certification and Accreditation
C/FFP	Cost Fixed Firm Price
C2BMC	Command and Control, Battle Management, and Communications
C2	Command and Control
C2P	Command and Control Processor
C4I	Command, Control, Communications, Computers and Intelligence
CA	**Certification Authority**
CAFM	Computer-aided Facilities Management
CAFS	**Clear Air Force Station**
CANES	**Consolidated Afloat Networks and Enterprise Services**
CARD	Cost Analysis and Requirements Document
CATs	Cyber Assistance Teams
CBAU	Consolidated Booster Avionics Upgrade
CCA	**Circuit Card Assemblies**
CCaR	**Comprehensive Cost and Requirements**
CCAS	Combat Capabilities Assessment Schedule
CCC	C2BMC Control Center
CCC	**C2BMC Command and Control Center**
CCLS	Centralized Contractor Logistics Support
CCM	Counter Counter-Measures
CCMD	Combatant Commander; **Combatant Commands**
CD	Concept Descriptions; Cobra Dane
CDA	Continuous Digital Assessment
CDCS	Coherent Doppler Collection System
CDI	Continuous Development and Integration
CDIN	C2BMC Deployable Interface Node
CDLMS	Common Data Link Monitoring System
CDR	Critical Design Review
CDS	**Cross Domain Solution**
CDU	Cobra Dane Upgrade
CE	Capability Enhanced
CEC	Critical Engagement Condition
CECOM	Communications & Electronics Command
CENAU	Corps of Engineers European Division

ACRONYMS	DEFINITION
CENTCOM	Central Command
CERT	**Computer Emergency Response Team**
CEU	Cooling Equipment Unit
CG	US Navy ship hull classification symbol for - Guided Missile Cruiser [CG is not an Acronym]
CI/CAT	**Continuous Integration/Continuous Agile Testing**
CIC	Counterintelligence in Cyberspace
CIDS	Critical Items Description Specifications
CIIA	Cyber, Identity, and Information Assurance
CIL	**Computer in the Loop**
CIO	**Chief Information Officer**
CIRT	Computer Incident Response Team
CKV	**Common Kill Vehicle**
CLE	Command and Launch Equipment
CLS	Contractor Logistics Support
CND	Computer Network Defense
CNDSP	**Computer Network Defense Service Provider**
CNET	Classified Network
COCOM	Combatant Command
COMNET	Communications Network
COMSEC	Communication Security
CONOPS	Concept of Operations
CONPLAN	Concept Plan
CONPLANS	Contingency Plans
CONUS	Continental United States
COOP	Calibrated Orbiting Objects Program ; **Continuity of Operations**
CoS	Colorado Springs
COTS	Commercial off the Shelf
CP	Computer Program
CPAF	Cost Plus Award Fee
CPCR	Computer Program Change Request
CPFF	Cost Plus Fixed Fee
CPIF	Cost Plus Incentive Fee
CPRS	Computer Program Requirements Specifications
CR	Capability Release
CS	Control Systems
CSC	Computer Sciences Corporation
CSCS	Center for Surface Combat Systems
CSEDS	Combat Systems Engineering Development Site
CSS	Contractor Support Services
CSSP	**Cyber Security Service Provider**
CTM	Core Truth Models
CTTO	Concurrent Test, Training and Operations
CTV	Control Test Vehicle
CTV-01	Controlled Test Vehicle-01
CU	Capability Upgrade
CUI	**Controlled Unclassified Information**
CVPAs	Cyber Vulnerability Penetration Assessments
CVT	Controls Validation Testing
CY	Calendar Year
D	
DAA	Defense Appropriations Act; Designated Approving Authority
DAC	Divert Attitude Control
DACS	Divert and Attitude Control System
DARPA	Defense Advanced Research Projects Agency
DASA	German Aerospace. Member of the MEADS Program Team.
DASD(DT&E)	**Deputy Assistant Secretary of Defense, Developmental Test and Evaluation**
DAU	Defense Acquisition University
DDCS	Digital Data Collection System
DDG	US Navy ship hull classification symbol for - Guided Missile Destroyer [DDG is not an Acronym]
DDL	**Dual-band Data Link**
DECC	Defense Enterprise Computing Center
DEDD	**Directed Energy Demonstrator Development**
DEERS	Defense Enrollment Eligibility Reporting System
DESH	MDA/DESH - Missile Defense Agency (MDA)/Modeling & Simulation Huntsville (DESH) [office symbol within MDA Engineering Directorate, not an Acronym]
DESIM	Discrete Event Simulation
DFAR	Defense Federal Acquisition Regulation

ACRONYMS	DEFINITION
DHP	Data Handling Plan
DIA	Defense Intelligence Agency
DIACAP	DoD Information Assurance Certification and Accreditation Process; DoD Information Assurance Certification and Accreditation Program
DIB	**Defense Industrial Base**
DISA	Defense Information Systems Agency
DISN	**Defense Information System Network**
DL	**Data Link**
DMETS	Distributed, Multi-Echelon Training System
DMIC	Digital M&S Integration Center
DMS	Diminished Manufacturing Support
DMSM	**Diminishing Manufacturing Sources Mitigation**
DO	**Delivery Order**
DoD	Department of Defense
DODIC	DoD Identification Code
DoDI	Department of Defense Instruction
DODIN	**DoD Information Network**
DOT&E	Director of Operational Test and Evaluation
DOTMLPF	**Doctrine, Organization, Training, Material, Leadership and Education, and Personnel and Facilities**
DPALS	Diode Pumped Alkali Laser System
DPF	MDA Facilities, MILCON & Environmental Management Directorate
DR/COOP	**Disaster Recovery and Continuity of Operations**
DREN	Defense Research Engineering Network
DREX	**Digital Receiver/Exciter**
DRSN	Defense Red Switch Network
DSA	Digital Simulation Architecture
DSC	**Development and Sustainment Contract**
DSCS	Defense Satellite Communication System
DSDD	**Discrimination Sensor Demonstrator Development**
DSS	**Defense Security Service**
DSWS	David's Sling Weapon System
DT&E	Developmental Test and Evaluation
DTIC	Digital Test and Integration Center
DTLOMS	Doctrine, Training, Leadership, Organization, Materiel, Soldier
DTRA	Defense Threat Reduction Agency
DTS	**Distributed Training System**
DTSS	**Directorate of Test Support System**
DVSG	**DISN Video Services Global**
DW	Defense Wide
DWR	Defense Wide
DWCF	Defense Working Capital Fund
E	
E/CCA	Element/Component Characteristics for Analysis
EA	Executing Agent; Engineering Assessment
EADSIM	Extended Air Defense Simulation
EAL	**Evaluated Assurance Level**
EAS	Eareckson Air Station
ECART	**Electronic Content and Records Tool**
ECE	**Element Cybersecurity Experiments**
ECP	**Engineering Change Proposal**
ECS	Element Capability Specification; Engineering Change Summary
EDISS	**Enterprise Digital Integrated System Simulation**
EDP	Evolutionary Development Program
EDP	**Early Digital Product**
EECS	Event Execution Control System
EPAA	European Phased Adaptive Approach
EEU	Electronics Equipment Unit
EGP	**Exceedance Generation Processing**
EHF	Extremely High Frequency
EKV	Exoatmospheric Kill Vehicle
E-LMS	**Electronic Learning Management System**
E-LRALT	Enhanced Long Range Air Launch Target
eMASS	**Enterprise Mission Assurance Support Service**
EMD	Engineering, Manufacturing, and Development
EMDR	Executive Mission Data Review

ACRONYMS	DEFINITION
EME	Empirical Measurement Events
eMRBM	Extended Medium Range Ballistic Missile
EMRL	Engineering and Manufacturing Readiness Level
EO/IR	Electro-Optical/Infrared
EOQ	**Economic Order Quantity**
EoR	Engage-on-Remote
EPAA	European Phased Adaptive Approach
EQLB	Executive Quick Look Briefing
ERT	**Element Review Team**
ES	**Elevated Sensor**
ESD	Enterprise System Directorate
ESI	External System Interface; Enterprise Software Initiative
ESL	External Sensors Lab; **Enterprise Sensors Laboratory**
ESOH	Environmental, Safety and Occupational Health
ET	Embedded Test;
ETEDDS	**End to End Distributed Development System**
ETR	**Element Technical Reviews**
EUCOM	European Command
EVMS	Earned Value Management System
EWR	Early Warning Radar
EWS	Enterprise Work Stations
F	
FAR	**Federal Acquisition Regulation**
FBM	Forward Based Mode
FCS	Fire Control Section; Fire Control System (SPY/FCS - AN/SPY radar Fire Control System)
FD	Facilities and Deployments
FDP	Full Digital Product
FDE	Force Developers Evaluation
FFP	Firm Fixed Price
FFPLOE	Firm Fixed Prices Level of Effort
FFRDC	Federally Funded Research and Development Center
FISMA	Federal Information Security Management Act
FLITES	Fast Line-of Sight Imagery for Target and Exhaust Plume Signatures
FMA	Foreign Material Acquisition; Foreign Military Asset
FMS	Foreign Military Sales
FOCI	Foreign Ownership, Control, and Influence
FOIA	Freedom of Information Act
FPA	Focal Plane Array
FPAF	Fixed Price Award Fee
FPEPA	**Fixed Price with Economic Price Adjustment**
FPIF	Fixed Price Incentive Firm
FPIS	Fixed Price Incentive Successive
FRACAS	**Failure Reporting, Analysis, and Corrective Action System**
FSRM	Facilities Sustainment, Restoration and Modernization
FT	Flight Test
FTCN	**Flight Test Communication Network**
FTF	Flexibility Target Family
FTG	Flight Test GMD
FTM	Flight Test Mission
FTO-02	Flight Test Operational-02
FTT	Flight Test - THAAD
FY	Fiscal Year
FYDP	Future Years Defense Program; Fiscal Year Defense Plan
G	
GBI	Ground Based Interceptor
GBR-P	Ground Based Radar Prototype
GBSD	**Ground Based Strategic Deterrent**
GCC	Geographic Combatant Commander
GCC	**Geographic Combatant Commands**
GCCS-M	Global Command and Control System - Maritime
GCN	Global Command Network; GMD Communications Network
GD	Global Deployment
GDDT	Government Directed Down Time
GEM	Global Engagement Manager; Guidance Enhancement Missiles (PATRIOT)
GENSER	General Services
GEO	**Geosynchronous Earth Orbits**

ACRONYMS	DEFINITION
GEOINT	Geospatial Intelligence
GEP	Ground Entry Point
GEU	**Guidance Electronics Unit**
GFC	GMD Fire Control
GFC / C	GMD Fire Control and Communications
GFE	Government Furnished Equipment
GFI	**Government Furnished Information**
GFS	Government Furnished Services
GIG	Global Information Grid
GM	Ground-based Midcourse
GMD	Ground-based Midcourse Defense
GMR	**Guided Missile Round**
GNC	**Guidance, Navigation and Control**
GOTS	**Government Off-The-Shelf**
GP	**Green Pine**
GPNTS	**GPS-Based Positioning, Navigation and Timing Service**
GPS	Global Positioning System
GS	Ground Systems
GSA	**General Service Administration**
GSOC	Global Security Operations Center
GT	Ground Test
GTD	Ground Test Distributed
GTI	Ground Test Integrated
GTISS	**Ground Test Integrated System Simulation (GTISS)**
GTRI	Georgia Tech Research Institute
GTX	Ground Test (Element to Element)
GWS	GEM Work Stations
H	
HA	Hit Assessment
HAENS	High Altitude Exoatmospheric Nuclear Survivability
HBTSS	Hypersonic and Ballistic Tracking Space Sensor
HD	Hypersonic Defense
HDAWG	**Homeland Defense Architecture Working Group**
HDR-H	**Homeland Defense Radar - Hawaii**
HEMP	High Altitude Electromagnetic Pulse
HEMTT	Heavy Expanded Mobility Tactical Truck
HEO	**Highly Elliptical Orbits**
HIL	Human-in-the-Loop; Hardware-in-the-Loop
HLD	**Homeland Defense**
HMI	**Human Machine Interface**
HMOC	Huntsville Mission Operations Center
HOSC	Huntsville Operations Support Center
HRTS	Human Resource Tracking System
HRTS/PTS	**Human Resource Tracking System/Personnel Tracking System**
HVAC	**Heating, Ventilation, and Air Conditioning**
HWIL	Hardware-in-the-loop
I	
I&T	Integration & Test
IA	Information Assurance
IAI	Israel Aircraft Industries; Israel Aerospace Industries
IAM	Information Assurance Manager
IAMD	Integrated Air and Missile Defense
IAR	**Intra-agency Acquisition Review**
IAS	Interocean American Shipping
IAVA	**Information Assurance Vulnerability Alerts**
IAW	In Accordance With
IBCS	Integrated Air and Missile Defense (IAMD) Battle Command System
IBR	**Integrated Baseline Review**
IBS	**Integrated Broadcast Service**
ICBM	Intercontinental Ballistic Missiles
ICD	Interface Control Document
ICOFT	Institutional Conduct of Fire Trainer
ICP	Interface Change Proposal
ICTA	**Information Technology Networks and Systems**
IDIQ	Indefinite Delivery Indefinite Quantity
IDMP	Integrated Data Management Plan

ACRONYMS	DEFINITION
IDS	**Interface Description Specifications**
IDT	In-Flight Interceptor Communications System Data Terminal
IEM	Integrated Electronics Module
IETM	Integrated Electronic Technical Manual
IETT	Integrated Event Test Team
IFICS	In-Flight Interceptor Communications System
ILP	Initial Lot Production
ILS	Integrated Logistics Support
IM	Insensitive Munitions
IMAP	Integrated Master Assessment Plan
IMD	Integrated Missile Defense
IMoD	Israeli Ministry of Defense
IMPACT	**Information Management Program Activity Control Tool**
IMTP	Integrated Master Test Plan
IMU	Inertial Measurement Unit
IMVP	Integrated Master VV&A Plan
INFOSEC	Information Security
INSURV	**Inspection and Survey**
IOM	**Inert Operational Missile**
IPA	Intergovernmental Personnel Act
IR	Infra-red
IRBM	Intermediate-Range Ballistic Missiles
IRES	**Integrated Research & Development for Enterprise Solutions**
ISA	**Installation Support Agreements**
ISA&I	Israeli System Architecture and Integration
ISEA	**In-service Engineering Agent**
ISET	Integrated Systems Engineering Team
ISIM	International Simulation
ISSAM	Information Assurance System Security Manager
ISSM	**Information Systems Security Manager**
IT	Integrated Test; Information Technology
IT&E	**Integration, Testing, and Evaluation**
ITB	Institutional Training Base; Israeli Test Bed
IV&V	Independent Verification and Validation
IWS	Indications and Warning System; Integrated Warfare Systems
J	
JAT	Joint Analysis Teams
JBTEC	Joint BMDS Training and Education Center
JEON	**Joint Emergent Operational Need**
JEONS	Joint Emerging Operational Needs Statement
JEWL	Joint Early Warning Laboratory
JFCC	Joint Functional Component Command
JFCC-IMD	Joint Functional Component Command - Integrated Missile Defense
JHU	John Hopkins University
JHU/APL	John's Hopkins University/Applied Physics Laboratory
JMOD	Japan Ministry of Defense
JOG	Joint OPIR Ground
JNIC	Joint National Integration Center, Schriever AFB, CO
JPOW	Joint Project Optical Windmill
JRDC	JNIC Research and Development Contract
JRMET	Joint Reliability and Maintainability Engineering Team
JROC	Joint Requirements Oversight Council
JSIMTP	**Joint Service Insensitive Munitions Technical Panel**
JSP	**Joint Service Provider**
JTF-GNO	Joint Task Force-Global Network Operations
JTIDS	Joint Tactical Information Data System
JTOC	JNIC Target Operations Center
JWSP	Joint Warfighter Support Program
K	
KHILS	Kinetic Kill Vehicle hardware in-the-Loop Simulator
KIDD	Kinetic Impact Debris Distribution
KP	**Knowledge Points**
KV	Kill Vehicle
KW	Kinetic Warhead
L	
L&TSE	Launch and Test Support Equipment
LBSM3	Land Based SM-3 (early name for Aegis Ashore)
LCC	Launcher Control Center; **Local Control Center**

ACRONYMS	DEFINITION
LCCS	Liquid Conditioning and Circulations System
LES	**LRDR Equipment Shelter**
LHCT	Long Haul Communications Transport
LLNL	Lawrence Livermore National Laboratory
LM	Lockheed Martin
LMMT	**Link Monitoring and Management Tool**
LMSSC	Lockheed Martin Space Systems Company
LNA	**Low Noise Amplifiers**
LNO	Liaison Officer
LOE	Level of Effort
LoR	Launch on Remote
LPLD	**Low Power Laser Demonstrator**
LRDR	**Long Range Discrimination Radar**
LRDS	Long Range Detection Suite
LRS&T	Long Range Surveillance and Tracking; Long Range Surveillance and Track
LRU	Line Replaceable Unit'
LSC	Launch Site Controller
LSE	Launch Support Equipment
LSS	Launch Support Systems
LTPO	Lower Tier Program Office
M	
M&S	Materials and Structure; Modeling and simulation
MAFIOT	**Mount Wilson Aerospace Facility for Integrated Optical Test**
MAIDIQ	**Multi-Awarded IDIQ**
MAIS	Major Automated Information System
MAJCOM	**Major Command**
MAP	MDA Assurance Plan; MDA Assurance Provisions
MAR	MDA Assurance Representative
MARAD	Maritime Administration
MARS	**Modular Analysis and Reporting Suite**
MASINT	Measures and Signals Intelligence
MAX/MIF	Maximum (number of)/Missiles In Flight
MBRV	**Modified Ballistic Reentry Vehicle**
MCC-T	**Mission Control Center - Targets**
MCF	**Mission Control Facility**
MD	Missile Defense
MDA	Missile Defense Agency
MDAHQ	Missile Defense Agency Headquarters
MDAP	Major Defense Acquisition Program
MDDE	**Missile Defeat and Enhancements**
MDEB	Missile Defense Executive Board
MDIOC	Missile Defense Integrated Operations Center
MDR	Mission Data Review
MDS	Missile Defense System
MDSC	**Missile Defense Space Center**
MDSDC	Missile Defense Space Development Center
MDSE	Missile Defense System Exerciser
MDSEC	Missile Defense Space Experimentation Center
MDST	Missile Defense Space Warning Tool
MEDIC	**Multi-band Electronic attack Digital Injection Capability**
MEIT	**Multi-Element Integration and Test**
MET	Modernization Enterprise Terminal
MFRL	Modification and Fielding Request List
MFU	Missile Firing Unit
MHA	**Management Headquarters Activity**
MICS	MDA Integrated Communications Services
MiDAESS	Missile Defense Agency Engineering and Support Services
MIF	**Management Information Format**
MILCON	Military Construction; Military Construction funding (type of Appropriation)
MILSATCOM	**Military Satellite Communications**
MIL-STD	Military Standards
MIP	Master Integration Plan
MIPR	Military Interdepartmental Purchase Request
MIS	MDSDC Interchange System; MDSEC Interchange System
MISL	**Missile Intelligence Secure Link**
MIT	Miniature Interceptor Technology; Massachusetts Institute of Technology
MIT/LL	Massachusetts Institute of Technology, Lincoln Laboratory, Lexington, MA
MMR	Multi-Mission Radar

ACRONYMS	DEFINITION
MOC	Missile Defense Agency Operations Center
MOKV	**Multi Object Kill Vehicle**
MoKVA	Modular open Kill Vehicle Architecture
MOU	Memorandum of Understanding
MPAT	Producibility and Manufacturing Technology
MPG	**Mission Processing Group**
MPL	ManPower Loading
MRA	Mission Readiness Assessment
MRBM	Medium-Range Ballistic Missiles
MRDR	**Medium Range Discrimating Radar**
MRT	Medium Range Target
MRTF	Major Range and Test Facilities
MSE	**Missile Segment Enhancement**
MSR	Minimum Sustaining Rate
MSVP	Specific Vendor Plug-in
MTOE	Modified Table of Organization and Equipment
MTS	Multi-Spectral Targeting System
MW/MD	**Missile Warning/Missile Defense**
N	
NASIC	National Air and Space Intelligence Center
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Facility
NAVSEA	Naval Sea Systems Command
NAWC	Naval Air Warfare Center
NCR	National Capital Region
NDAA	National Defense Authorization Act
NEPA	National Environmental Policy Act
NFIRE	Near Field Infrared Experiment
NGAS	Northrop Grumman Aerospace Systems
NGI	Next Generation Interceptor
NGST	Northrop Grumman Space Technology
NICE	**National Initiative for Cybersecurity Education**
NIPRNET	Non-Secure Internet Protocol Router Network
NIST	National Institute of Standards and Technology
NMR	**Network Management Resources**
NORAD	North American Aerospace Defense Command
NORTHCOM	Northern Command
NOSC	**Network Operations Security Center**
NOSSA	**Naval Ordnance Safety and Security Activity**
NRE	Non-Recurring Engineering
NRL	Naval Research Laboratory, Washington, DC
NRT	Navy Review Team
NSA	National Security Agency
NSWC	Naval Surface Warfare Center
NTD	Near-Term Discrimination
O	
O&M	Operations and Maintenance
O&S	Operations and Sustainment
OA	Open Architecture
OCB	**Operational Capacity Baseline**
OCO	Overseas Contingency Operations
OCONUS	Outside of CONUS
OGA	Other Government Agency
OMB	Office of Management and Budget
ONIR	Overhead Non-Imaging Infra-Red
OPIR	Overhead Persistent Infrared
OPLAN	Operations Plan
OPSCAP	Operations Capabilities
OPTISIG	Optical Signatures In-Line Generator
OQE	**Objective Qualitative Evidence**
ORNL	Oak Ridge National Laboratory
OSA	Open Systems Architecture
OSC	Operations Support Center; **Optical Signatures Code**
OSC/OPTISIG	**Optical Signatures Code/Optical Signature Inline Generator**
OSD	Office of the Secretary of Defense
OSF	Objective Simulation Framework
OSFC	Operations Forces Standing Committee
OSI	Open Systems Architecture Signal Injectors

ACRONYMS	DEFINITION
OSM	Object Sighting Message; Open Systems Architecture Sensor Models
OSPT	Operations Support Planning Team
OSS	Off-Shore Support; Optimistic Sensor Model
OTA	Operational Test Agencies
OUSD/AT&L	Office of Under Secretary of Defense/Acquisitions, Technology and Logistics
P	
P&P	Policy and Procurement
PA	Performance Assessments; Project Arrangement
PAA	Phased Adaptive Approach
PAAWNS	**Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System**
PAC-3	Patriot Advanced Capability-3
PACOM	Pacific Command
PAM	Planning Allocation Matrix
PATRIOT	**Phased Array Tracking Radar Intercept on Target**
PAV	**Performance Assessment and Verification**
PB	President's Budget
PBL	Performance Based Logistics
PCIL	**Prime Consolidated Integration Lab**
PCL	**Prioritized Capabilities List**
PCO	Procurement Contracting Office
PCRSS	**Pacific Collector Range Safety System**
PDR	Preliminary Design Review
PDSS	Post Deployment Software Support
PE	Program Element
PEELS	Parametric Endo/Exo-atmospheric Lethality Simulation
PEGEM	Post Engagement Ground Effects Model
PEO IWS	Program Executive Office - Integrated Warfare Systems
PFR	Post Flight Reconstruction
PHACIL	Phacil, Incorporated
PIA	**Post Intercept Assessment**
PIDS	Prime Item Development Specifications
PLET	Phenomenology, Lethality, Environment, Threat
PLT	Production Lead Time
PLUS	Plume Simulation
PM	Program Manager
PM/IAM	Program Manager/Information Assurance Manager
PMAP	Process Mission Assurance Plan
PMDCATS	Program Manager - Communications and Transmission Systems
PME	Primary Mission Equipment
PMI	preventative maintenance inspection
PMP	Parts, Materials and Processes
PMRF	Pacific Missile Range Facility, Barking Sands, Kauai, HI
PMT	Pre-Mission Test
PNT	**Positioning, Navigation and Timing**
POA&M	Plan of Action and Milestones
POC	Point of Contact / Payload Operations Center
PPR	Pre-Planned Responses
PPU	Prime Power Unit
PRIDE	**Program Resource Internet Database Environment**
PROCAP	Protection Capability
PSE	**Production Support Engineering**
PSEM	Patriot System Effectiveness Model
PSN	Parallel Staging Area
PTSS	Precision Tracking Space System
PWS	Program-Wide Support
PY	Prior Year
Q	
QLB	Quick Look Briefing
QoS	Quality of Service
QRT	Quick Response Team
QSMA	Quality Safety and Mission Assurance
R	
R&C	**Readiness and Control**
RAFU	Radar Field Upgrade
RAM	Reliability, Availability and Maintainability
RAM	**Reliability, Availability, and Maintainability**
RAM-T	Reliability, Availability, Maintainability and Testability
RAR	Risk Assessment Report

ACRONYMS	DEFINITION
RASP	Rapid Scenario Prototype
RCS	Radar Cross Section
RDC	Radar Development Contract
RDEC	Research, Development, and Engineering Center
RDECOM	Research, Development, Engineering Command
RDL	**RKV Development Laboratory**
RDT&E	Research, Development, Test & Evaluation
RF	Radio Frequency
RFA	Requests for Analysis
RFARFI	Request for Analysis Request for Information
RFI	Requests for Information
RFP	Request for Proposal
RKV	**Redesigned Kill Vehicle**
RMF	**Risk Management Framework**
RMOET	Radar March Order & Emplacement Trainer
ROI	Return on Investment
RPFM	Rocket Plume Flowfield Model
RPG	**Radar Processing Group**
RSC	Radar Sustainment Contract
RSO	Resident Space Object
RTI	Return to Intercept
RTS	Ronald Reagan Test Site, Kwajalein, Marshall Islands
RV	Reentry Vehicle
S	
SA	Situational Awareness
SAP	**Special Access Programs**
SAS	**Sub-Array Suites**
SATCOM	Satellite Communications
SBIR	Small Business Innovative Research;
SBIR/STTR	Small Business Innovative Research/Small Business Technology Transfer
SBIRS	Space Based Infrared System; Space-Based Infrared Sensors
SBS	**Sea Based Systems**
SBT	Sea Based Terminal
SBX	Sea Based Test X-Band Radar
SCA	**Security Controls Assessment**
SCARE	**Software Change Analysis Review Environment**
SCD	SM-3 Cooperative Development; Standard Missile-3 Cooperative Development (Program)
SCG	Security Classification Guides
SCIF	Sensitive Compartmented Information Facility
SCN	System Change Notices
SCN	**Specification Change Notices**
SCORE	**System Coordination and Observation Reporting Environment**
SCOUT	**Simultaneous Correlation of Unambiguous Tracks**
SCR	SM-3 Cooperative Development; System Capability Review
SCRM	Supply Chain Risk Management
SDACS	Solid Divert Attitude Control System
SDD	System Description Document
SDL	Space Dynamics Laboratory
SDR	System Design Review; Software Design Review
SE&I	Systems Engineering and Integration
SEAR	System Engineering Assessment Report
SECDEF	**Secretary of Defense**
SED	Software Engineering Design
SEI	Systems Engineering & Integration
SEPM	System Engineering Program Management
SGP	Super Green Pine
SIAO	Senior Information Assurance Officer
SIAO/CA	Senior Information Assurance Officer (SIAO)/Certification Authority (CA)
SIGNIT	Signal Intelligence
SIM	Simulation
SIPRNET	Secret Internet Protocol Router Network
SISSO	**Senior Information Systems Security Officer**
SITE	**System Integration and Test Environment**
SIU	SSF Interface Unit
SIU	**System Interface Units; Simulation Interface Units**
SI	Special Instructions
SIV	silo interface vault
SKA	**Spacebased Kill Assessment**

ACRONYMS	DEFINITION
SLEP	**System Life Extension Program**
SM	Standard Missile
SM-3	Standard Missile -3
SMAC	**Shot Management Analysis Cell**
SMDC	Space and Missile Defense Command, U.S. Army
SMDC/ARSTRST	Space and Missile Defense Command/Army Forces Strategic Command
SME	Subject Matter Expert
SMM	System Mission Manager
SNL	Sandia National Lab
SNWC	Space and Naval Warfare Command
SOLD	Simulation-Over-Live Driver
SPAWAR	Naval Space and Warfare Command; Space and Naval Warfare Systems Command
SPFR	System Post Flight Reconstruction
SPMT	System Pre Mission Test
SPPN	**Special Purpose Processing Node**
SPS	Standard Procurement System
SPURC	Standard Plume Ultraviolet Radiation Code
SRALT	Short Range Air Launch Target
SRBM	Short-Range Ballistic Missiles
SRBMD	Short Range Ballistic Missile Defense
SRHSM	Sensor Registration Health & Status Monitoring
SRP	Stockpile Reliability Program
SRR	System Requirements Review; Software Readiness Review
SS	Sole Source; Summary Screens; System Specification
SS/CPAF	Soul Source/ Cost Plus Award Fee
SS/CPFF	Soul Source/ Cost Plus Fixed Fee
SSA	Space Situational Awareness
SSC	System Security Concept
SSF	Single Stimulation Framework
SSL	**Space Sensor Layer**
STEM	**Science, Technology, Engineering, and Mathematics**
STOC	System Test and Operations Center
STRATCOM	Strategic Command
STSS	Satellite Tracking and Surveillance System; Space Tracking and Surveillance System
STTR	Small Business Technology Transfer
SUW	**Surface Warfare**
SWDC	**Specialized Warfighter Development Contract**
SYMP	Symposium
T	
T2	Transition & Transfer
T&E	Test and Evaluation
TALSS	THAAD Active Leak Sensor System
TARDEC	Tank Automotive Research, Development, and Engineering Center
TC	Targets and Countermeasures
TCD	Technical Capability Declarations
TDP	Technical Data Package
TFCC	THAAD Fire Control and Communication
THAAD	Terminal High Altitude Area Defense
TM	Terminal Mode
TRL	Technology Readiness Level
TTP	Tactics, Techniques, and Procedures
U	
USAF	United States Air Force
UEWR	Upgraded Early Warning Radars
UARCs	University Affiliated Research Centers
USINDOPACOM	United States Indo-Pacific Command
USSTRATCOM	United States Strategic Command
V	
VLS	Vertical Launch System
VSD	Variable Speed Drive
VV&A	Verification, Validation and Accreditation
VV&C	Verification, Validation, and Certification
W	
WIP	Warfighter Involvement Process
X	
XAOR	Cross-Area of Responsibility
XBR	X-Band Radars
X-Lab	Experimentation Laboratory

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	58.079	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
MD71: *Advanced Concepts and Performance Assessments*	55.660	11.350	11.552	11.637	-	11.637	11.872	12.086	12.444	12.709	Continuing	Continuing
MD40: *Program-Wide Support*	2.419	0.605	0.605	0.592	-	0.592	0.602	0.652	0.864	0.944	Continuing	Continuing
MC71: *Cyber Operations*	-	0.765	34.044	2.681	-	2.681	2.704	3.467	3.571	3.647	0.000	50.879

Program MDAP/MAIS Code: 362

Note

The increase from FY 2019 to FY 2020 and decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add for advanced cyber capabilities and cybersecurity of left through right of launch.

A. Mission Description and Budget Item Justification

The Advanced Concepts and Performance Assessment (ACPA) Program Element delivers an integrated government concept definition, simulation, and analysis capability. ACPA's focus is on the exploration of novel and/or emerging capabilities that may have the potential to enhance the Missile Defense System (MDS). ACPA centralizes assessment of advanced missile defense technology and delivers insight into the performance of proposed concepts extending the Missile Defense Agency's (MDA) ability to address evolving threats for the Warfighter.

Subject Matter Experts (SMEs) provide independent assessments of government, university, and industry technology concepts, used in concert with systems engineering requirements, to support acquisition strategy decisions and define technology focus areas. The innovative structured concept definition and assessment methodology enables MDA to quickly validate focus areas, verify contractor technology solutions, and evaluate promising concepts in future MDS architectures. This methodology significantly enhances MDA's ability to assess technology concepts while decreasing the cost of development through:

- Independent model-based simulations of industry technology concepts to inform the systems engineering process
- Digital simulation and hardware-in-the-loop performance assessments of algorithms and hardware concepts prior to expensive live fire test events
- End-to-end testing of technology concepts integrated with weapon systems and Command, Control, Battle Management and Communications (C2BMC)

Performance assessment of advanced concepts is the key enabler for Government evaluation of concepts in the earliest stages of technology development and maximizes the efficiency of technology investments. Performance assessment is used to quantify capability expectations of innovative concepts to counter the expanding regional and homeland missile threats, including ballistic and cruise missiles, and hypersonic vehicles.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.017	14.208	14.904	-	14.904
Current President's Budget	12.720	46.201	14.910	-	14.910
Total Adjustments	-0.297	31.993	0.006	-	0.006
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	31.993			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.297	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.006	-	0.006

Change Summary Explanation

Increase in FY 2020 reflects the Congressional add for advanced cyber capabilities and cybersecurity of left through right of launch.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD71 / *Advanced Concepts and Performance Assessments*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD71: *Advanced Concepts and Performance Assessments*	55.660	11.350	11.552	11.637	-	11.637	11.872	12.086	12.444	12.709	Continuing	Continuing

Note

N/A

A. Mission Description and Budget Item Justification

Advanced Concepts and Performance Assessments (ACPA) centralizes advanced technology concept modeling, simulation, software, and analysis. Integrating models of promising disruptive technical solutions into Missile Defense System (MDS) system-level simulations enables leadership to make data driven acquisition and technology investment decisions. Concepts that improve or adapt existing systems, that incorporate mobile sensors and interceptors that can be surged into zones of crisis or conflict are also deemed disruptive. Examples of efforts required to quantify the contribution of disruptive technologies may include, but not be limited to environmental experimentation and phenomenological characterization required for new sensor concepts, advanced weapon technologies, and emerging directed energy concepts. Coupled with these characterization efforts, ACPA develops innovative left-through-right-of-launch modeling capabilities including physics-based representations in the areas of cyber, sensor technologies, lethality and survivability, communications, and sensor support. ACPA is focusing on Science and Technology initiatives which increase interoperability and leverages expertise with Allied and Service partners.

ACPA capitalizes on the innovation of small businesses, universities, Federally Funded Research and Development Centers (FFRDCs), and University Affiliated Research Centers (UARCs) to pursue a broad range of hardware, software, models, algorithms, trade studies, and analysis. These innovations bring together government developed models representing existing and future missile defense architectures, technology concepts, and advanced algorithms to provide detailed assessments of concept performance and inform investment decisions. These innovations, combined with a robust high performance computing infrastructure, provide a unique in-house government capability to demonstrate and assess technology concepts for emerging technology risk reduction, to mature concepts with laboratory, ground, and flight test data, and where possible, apply concepts in simulated exercises with weapon systems across representative communication architectures.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Advanced Concepts and Performance Assessment	11.350	11.552	11.637
Description: Provide quantitative assessments that define the benefits of technology investments and inform requirements using an integrated concept definition, simulation, and performance analysis capability. A staff of diverse Subject Matter Experts (SMEs) delivers independent government performance evaluations which exercise kinetic and non-kinetic missile defense concept representations against the broad spectrum of evolving threats. - Assess forward-and ground-based airborne electro-optical infrared and advanced sensors - Provide independent government assessments of industry sensor, directed energy and weapon system technology concepts - Evaluate lethality impacts from emerging concepts			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD71 / *Advanced Concepts and Performance Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Examine directed energy pathfinder solutions - Study low earth orbit satellite capabilities - Assess and identify promising boost phase intercept capabilities - Perform concept performance against emerging advanced threats including hypersonic threat testing scenarios - Mature advanced technology concepts through lab, ground, and flight test data - Apply concepts in simulated exercises with weapon systems - Work with the MDS Architect and Missile Defense Agency (MDA) Systems Engineer to design concepts, build models and assess technology concepts for the future MDS - Develop and extend modeling techniques - Focus research and engineering activities from university and small business partners to identify suitable technology and concepts that improve MDS performance through a rapid innovation model based on an engineering test bed - Assess multi-domain data fusion concept for current or future weapon systems. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** Due to the evolving nature of the threat, ACPA's diverse staff of SMEs develops advanced concepts across a broad spectrum of missile defense technology initiatives. Concept assessment initiatives identified above will be matured and coupled with increased emphasis on the following: - Quantify the contribution of emerging concepts by integrating representative performance with Command and Control, Battle Management, Communications (C2BMC) networks (eg. MDA C2BMC, Integrated Air and Missile Defense, Cooperative Engagement Capability, Artificial Intelligence (AI) enabling end-to-end capability demonstrations with weapon systems) - Develop the computing infrastructure for AI Test bed and the development of deep neural networks to exercise advanced algorithms and assess potential applications to machine learning - Extend the Government's capability to evaluate engagement decision timelines and evaluate concept of operations that could possibly expand engagement opportunities - Develop an initial integrated modeling and analysis capability to assess new technology concepts associated with the complex interactions between left through right of launch integration - Address the capability gap in testing/simulation of advanced sensors in a credible environment by developing an advance photonics test bed capable of providing foundational truth for advanced sensor performance assessment of industry concepts - Develop Cyber test bed environment to enable the ability to model cyber-attacks and their impact on affected systems, understand the characteristics of cyber-attacks and how they come about, gain insight into network vulnerability and develop improved security strategies.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD71 / *Advanced Concepts and Performance Assessments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Identify cooperative initiatives to leverage Allied and Service Partners contributions and focus on expanding opportunities for collaboration on missile defense Science and Technology initiatives. ***FY 2021 Plans:*** See Above. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	11.350	11.552	11.637

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603178C: *Weapons Technology*	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.549	13.600	11.058	-	11.058	10.996	11.052	11.290	11.563	Continuing	Continuing

Remarks

D. Acquisition Strategy

Employ various contracting strategies in a flexible manner to maximize the contribution to MDA. Execute through utilization of small businesses, leverage the Nation's engineering centers of excellence (FFRDCs and UARCs); generate cooperatives with other Government Agencies to provide concept modeling and assessment capability. This strategy uses agency and partner SMEs and government model-based assessments to inform Better Buying Power acquisition decisions.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	2.419	0.605	0.605	0.592	-	0.592	0.602	0.652	0.864	0.944	Continuing	Continuing

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MC71 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC71: *Cyber Operations*	-	0.765	34.044	2.681	-	2.681	2.704	3.467	3.571	3.647	0.000	50.879

Note

The increase from FY 2019 to FY 2020 and decrease from FY 2020 to FY 2021 reflects the Congressional add for advanced cyber capabilities and cybersecurity of left through right of launch.

A. Mission Description and Budget Item Justification

This project supports the monitoring and tracking of Cybersecurity mitigations as required in the Department of Defense (DoD) Instruction Number 8510.01 which establishes Risk Management Framework (RMF) requirements for DoD Information Technology (IT). Funds in this project implement and sustain DoD-required RMF and associated Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance System Security Manager (ISSAM) Plans of Action and Milestones for enabling modeling and simulation mission systems. This project captures the RMF documentation (artifacts, validation results, Information Assurance (IA) risk assessment results, and MDA authorizing official and chief information officer accreditation decisions) into the Defense Information Systems Agency's Enterprise Mission Assurance Support Service system. Hardware and software upgrades required to meet DoD standards are supported by funding in this project. Independent verification and validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Information Assurance / Cyber Network Defense	0.765	34.044	2.681

Description: Funds network defense and ISSAM activities including:
- Conduct cybersecurity/IA engineering and architecture planning
- Plan and test IA controls
- Develop DoD RMF certification and accreditation packages
- Conduct controls validation testing of systems and provide plan of action and milestones to mitigate IA deficiencies
- Conduct annual IA reviews to assess compliance in implementing and maintaining IA controls

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
In addition to baseline efforts identified above emphasis in FY 2020 will be expanded to:
- Explore cyber effects on emerging technology concepts

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603176C / *Advanced Concepts and Performance Assessment*	**Project (Number/Name)** MC71 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Sustain and improve IT toolsets, maintain hardware currency, and sustain the IT and IA workforce ***FY 2021 Plans:*** See Above. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add for advanced cyber capabilities and cybersecurity of left through right of launch.			
Accomplishments/Planned Programs Subtotals	0.765	34.044	2.681

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603178C / *Weapons Technology*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.400
MD72: *Interceptor Technology*	-	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.400

Program MDAP/MAIS Code: 362

Note

Decrease in FY 2020 reflects the Congressional reduction for the cancelled joint USAF/MDA program.

A. Mission Description and Budget Item Justification

MDA requests no funding in this program element in FY 2021 and the out years.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.400	10.000	10.000	-	10.000
Current President's Budget	13.400	0.000	0.000	-	0.000
Total Adjustments	0.000	-10.000	-10.000	-	-10.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-10.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-10.000	-	-10.000

Change Summary Explanation

Decrease in FY 2020 reflects Congressional reduction for the cancelled joint USAF/MDA program. There is no funding requested in FY 2021 and out.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603178C / *Weapons Technology*	**Project (Number/Name)** MD72 / *Interceptor Technology*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD72: *Interceptor Technology*	-	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	13.400

Note

FY 2020 reflects the Congressional reduction for the cancelled joint USAF/MDA program.

A. Mission Description and Budget Item Justification

MDA requests no funding in this program element in FY 2021 and out.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Hypersonic Defense Weapon Systems Concept Definition ***Description:*** This effort conducted Hypersonic Defense Weapon Systems Concept Definition with industry to develop weapon systems concepts through a multi-phased approach to provide a near term capability to destroy hypersonic vehicle threats. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A	13.400	0.000	0.000
Title: USAF/MDA Missile Defense Capability ***Description:*** FY 2020 reflects the Congressional reduction for the cancelled joint USAF/MDA program. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** MDA requests no funding in this Program Element in FY 2021 and the out years.	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	13.400	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603178C / *Weapons Technology*	**Project (Number/Name)** MD72 / *Interceptor Technology*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing

Remarks

D. Acquisition Strategy

To optimize Missile Defense System (MDS) performance, MDA leverages the nation's engineering centers of excellence at government agencies, Military Services, Federally Funded Research and Development Centers, University Affiliated Research Centers and industry. The executing agents use varying contracting strategies in a flexible manner to maximize their contribution to the MDS. MDA acquires products and services by competitive means to the extent that is possible, practical and uses the Broad Agency Announcement process to award concept definition contracts.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	108.942	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
MD25: *Advanced Technology Development*	106.327	41.196	26.793	17.945	-	17.945	18.134	18.212	18.711	19.119	Continuing	Continuing
MD40: *Program-Wide Support*	2.615	0.904	0.881	0.742	-	0.742	0.749	0.763	1.009	1.103	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2019 to FY 2020 reflects the FY 2019 Congressional add of $22.200 million to accelerate Hypersonic Defense (HD) technologies to raise the Technology Readiness Levels of new hypersonic components and to integrate into the HD architecture to include: kinetic, non-kinetic, sensors, communications, command and control (C2), propulsion and modeling and simulation (M&S). Decrease from FY 2020 to FY 2021 reflects the $7 million Congressional add in FY 2020 for Advanced Carbon Composites Manufacturing.

A. Mission Description and Budget Item Justification

The Advanced Research program conducts leading edge advanced research and development to create and enable future missile defense capabilities. The Missile Defense Agency (MDA) executes this mission by capitalizing on the creativity and innovation of the brightest minds in our Nation's universities; small and large businesses; national laboratories; and collaborative research partnerships between allied countries, academic institutions, and industry. In accordance with identified Agency requirements and Warfighter needs, the program assesses and demonstrates the utility of emerging component technologies. After successful maturation and demonstration activities, the program facilitates transition of the technologies to the Missile Defense System through a Commercialization and Transition Office and other MDA programs.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	42.565	20.674	21.154	-	21.154
Current President's Budget	42.100	27.674	18.687	-	18.687
Total Adjustments	-0.465	7.000	-2.467	-	-2.467
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	7.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.465	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	

• Other Adjustment	0.000	0.000	-2.467	-	-2.467

Change Summary Explanation

Increase in FY 2020 reflects the Congressional add for Advanced Carbon Composite Manufacturing.

Decrease in FY 2021 reflects the Agency priorities for reduction of civilian labor.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 3					**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*				**Project (Number/Name)** MD25 / *Advanced Technology Development*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
MD25: *Advanced Technology Development*	106.327	41.196	26.793	17.945	-	17.945	18.134	18.212	18.711	19.119	Continuing	Continuing

Note

Decrease from FY 2019 to FY 2020 reflects the FY 2019 Congressional add of $22.200 million to accelerate Hypersonic Defense (HD) technologies to raise the Technology Readiness Levels of new hypersonic components and to integrate into the HD architecture to include: kinetic, non-kinetic, sensors, communications, command and control (C2), propulsion and modeling and simulation (M&S). Decrease from FY 2020 to FY 2021 reflects the $7 million Congressional add in FY 2020 for Advanced Carbon Composites Manufacturing.

A. Mission Description and Budget Item Justification

The Missile Defense Agency's (MDA) Advanced Technology Development Project pursues a broad range of emerging technologies targeted for application and insertion into the Missile Defense System (MDS). MDA explores potential new MDS capabilities by leveraging the creativity and innovation of the Nation's industry, universities, and national laboratories to conduct advanced technology development. MDA also pursues advanced technology development through cooperative international research agreements between U.S. and foreign universities of allied nations. The program manages the selection process and administers the Missile Defense Small Business Innovation Research (SBIR) program element (PE), 0605502C. SBIR topics and projects are selected annually based on needs across the MDS and executed in partnership with sponsoring intra-agency organizations. These mechanisms foster a cooperative environment between small businesses, prime contractors, and MDA elements to yield reduced cost and increased returns on investment for successful technology integration efforts.

MDA's Advanced Technology Development Project assesses the feasibility and technical performance of the advanced research and development efforts through in-house means and partnerships with Department of Defense and other government agency laboratories. MDA provides independent assessments, demonstration and experimentation environments, and other concept assessment capabilities. The output of the experimentation, demonstration, and laboratory efforts provide risk, transition feasibility, and performance assessments, concept assessment data and analysis, and an overall improvement in the state-of-the-art of advanced technology evaluation. The culmination of research, development, and assessment is the commercialization and transition of promising technologies into the MDS.

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021**
Title: Advanced Research	41.196	26.793	17.945
Description: This activity funds technology and research initiatives. - Conduct systems engineering, integration, research, and materiel solution analysis to identify initiatives and technology to include missiles, sensors, and command and control components in the defense against current and future threats - Pursue advanced technology investments for defense against non-ballistic hypersonic threats - Utilize NanoSat technology demonstrations to conduct testing and reduce risk for new and advanced technologies for the MDS - Leverage university to university international research opportunities with allied nations to enhance MDS advanced technology initiatives and build stronger relationships with allies and partners			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Manage the selection process of SBIR and technology application programs to assist MDA funded technology developers in finding and entering technology transfer opportunities to missile defense applications - Assess and evaluate advanced technology investments to extract risk-reduction information and determine transition feasibility Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Sponsor breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and non-profit organizations, using the Advanced Technology Innovation Broad Agency Announcement (BAA), for example: -- Additive manufacturing technology initiatives for interceptor propulsion and structural components -- Space & sensor technology -- Directed energy technology -- Radar systems -- Electro-Optical Infrared sensor systems -- Computer science, signal, and data processing -- Mechanical and aerospace engineering -- Left through right of launch integration -- Decision theory -- Modeling & Simulation (M&S) -- Interceptor technology -- Future MDS concept development -- 3D printing of diamond composite structures -- HD component technologies --- Technology development to raise Technology Readiness Level (TRL) of new hypersonic components and integrate into the HD architecture ---- Kinetic ---- Non-kinetic ---- Sensors ---- Communications ---- C2 ---- M&S - Nanosat Testbed Initiative: providing risk reduction in the development of new and advanced technologies, in support of the MDS, by testing and demonstrating capabilities under realistic environmental conditions			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Mature component technology and reduce technology risk using sounding rockets to demonstrate interceptor in a relevant environment			
FY 2021 Plans: - Sponsor and assess breakthrough technology and innovative solutions from private industry, qualified accredited domestic educational institutions, and non-profit organizations, for topics focused on, but not limited to the following: -- Additive manufacturing technology initiatives for interceptor propulsion and structural components -- Advanced threat component technologies -- Artificial intelligence, machine learning, Big Data -- Computer science, signal, and data processing -- Directed energy technology -- Disruptive technology -- Electro-Optical Infrared sensor and communication systems -- Future MDS concept development -- International MDS Cooperation -- Interceptor and space systems -- Left through right of launch integration -- Materials and processing -- Mathematics, probability, and decision theory -- Mechanical and aerospace engineering -- M&S -- Phenomenology -- Radar and radio frequency communication systems -- Space & sensor technology			
- NanoSat Testbed Initiative: provide risk reduction in the development of new and advanced technologies, in support of the MDS, by testing and demonstrating capabilities under realistic environmental conditions			
-- Mature component technology and reduce technology risk using sounding rockets to demonstrate interceptor technology in a relevant environment			
- High Temperature Seeker Window Development: Mature and evaluate seeker windows that support existing and future missions.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*	**Project (Number/Name)** MD25 / *Advanced Technology Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
- Conduct fundamental material development, modeling and simulation, and low and high fidelity testing. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add for Advanced Carbon Composites Manufacturing.			
Accomplishments/Planned Programs Subtotals	41.196	26.793	17.945

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603178C: *Weapons Technology*	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.549	13.600	11.058	-	11.058	10.996	11.052	11.290	11.563	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy to conduct these technology development agreements consists of partnering with accredited domestic universities, small businesses, and nonprofit organizations. MDA awards competitive procurements via the MDA Science and Technology Advanced Research Broad Agency Announcement (BAA); the Advanced Technology Innovation BAA; the Small Business Innovative Research and the Small Business Technology Transfer program.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 3					**R-1 Program Element (Number/Name)** PE 0603180C / *Advanced Research*				**Project (Number/Name)** MD40 / *Program-Wide Support*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
MD40: *Program-Wide Support*	2.615	0.904	0.881	0.742	-	0.742	0.749	0.763	1.009	1.103	Continuing	Continuing

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	256.671	55.549	13.600	11.058	-	11.058	10.996	11.052	11.290	11.563	Continuing	Continuing
MD85: *Common Kill Vehicle Technology*	253.708	49.509	10.941	10.619	-	10.619	10.560	10.608	10.712	10.932	Continuing	Continuing
MD40: *Program Wide Support*	2.963	6.040	2.659	0.439	-	0.439	0.436	0.444	0.578	0.631	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2020 to FY 2021 reflects an adjustment to the Program Wide Support (PWS) allocation, which is calculated on a pro-rata basis of the total program element (PE) value by fiscal year (FY).

A. Mission Description and Budget Item Justification

The weapons systems technology maturation efforts under the CKV program element will develop kill vehicle concepts, identify key technology gaps, and establish efforts to reduce component risks. In addition, these efforts will inform system requirements that are feasible and affordable for the engineering, manufacturing and development of future systems.

The Missile Defense Agency will pursue multiple component risk reduction efforts for weapon technologies that will enable advanced concepts and designs to mature technology for future and current end-to-end weapon systems and components up to concept prototypes.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	56.753	13.600	13.475	-	13.475
Current President's Budget	55.549	13.600	11.058	-	11.058
Total Adjustments	-1.204	0.000	-2.417	-	-2.417
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.204	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-2.417	-	-2.417

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*

Change Summary Explanation

Decrease in FY 2021 reflects an adjustment to the PWS allocation, which is calculated on a pro-rata basis of the total PE value by FY.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD85 / *Common Kill Vehicle Technology*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD85: *Common Kill Vehicle Technology*	253.708	49.509	10.941	10.619	-	10.619	10.560	10.608	10.712	10.932	Continuing	Continuing

Note

The decrease from FY 2020 to FY 2021 reflects an adjustment to the Program Wide Support (PWS) allocation, which is calculated on a pro-rata basis of the total program element (PE) value by fiscal year (FY).

A. Mission Description and Budget Item Justification

The CKV program will enhance weapons systems performance to enable the Warfighter to counter numerous and complex threats to the homeland by establishing the technological foundation for improving current and future systems. The Missile Defense Agency is developing next-generation kill vehicle concepts and technology based on a modular open systems architecture designed to common interfaces and standards, making upgrades easier, and enabling a more competitive, broader supplier industrial base.

Common Kill Vehicle (CKV) Technology research efforts will include maturation of advanced weapon technologies for current weapon systems concepts (e.g., Aegis, Terminal High Altitude Area Defense (THAAD), Ground-Based Midcourse Defense (GMD)) and advance concepts and designs to mature technology for future and current end-to-end weapon systems and components up to concept prototypes. The CKV program efforts will be well integrated with the Missile Defense System architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Common Kill Vehicle	49.509	10.941	10.619
Description: CKV research efforts will include maturation of advanced weapons technologies for current weapon systems concepts (e.g., Aegis, THAAD, GMD) and advance concepts and designs to mature technology for future and current end-to-end weapon systems and components up to concept prototypes. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** Develop weapon system concepts, identify key technology gaps, and develop and test technologies necessary to the successful requirements validation and technology risk reduction of advanced MDS weapon systems. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD85 / *Common Kill Vehicle Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Develop weapon system concepts, identify key technology gaps, and develop and test technologies necessary to the successful requirements validation and technology risk reduction of advanced MDS weapon systems. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	49.509	10.941	10.619

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603178C: *Weapons Technology*	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	5.754	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.754

Remarks

D. Acquisition Strategy

The full acquisition strategy consists of three focus areas. First, through competition with industry, develop weapon system architectures and interfaces with competitive design for improvements to current and future weapon systems. Second, conduct risk reduction activities to identify and mature the technology necessary to increase the reliability and performance of our weapon systems using the Advanced Technology Innovation Broad Agency Announcement and competitive development. Make investments that mitigate the component technology gaps for current and future weapon systems that enhance the competitive environment. Third, leverage the technical expertise of Federally Funded Research and Development Centers, University Applied Research Centers, and Universities and government laboratories to independently develop reference concepts using proven modeling and analysis techniques.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	2.963	6.040	2.659	0.439	-	0.439	0.436	0.444	0.578	0.631	Continuing	Continuing

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	6.040	2.659	0.439
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603294C / *Common Kill Vehicle Technology*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	6.040	2.659	0.439

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,990.559	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
MD07: *THAAD*	1,729.357	224.495	194.752	360.233	-	360.233	313.000	280.307	188.601	208.923	Continuing	Continuing
MC07: *Cyber Operations*	12.674	6.087	13.580	9.806	-	9.806	12.325	8.544	4.595	5.286	Continuing	Continuing
MD06: *Patriot Advanced Capability-3 (PAC-3)*	153.370	144.054	90.404	26.198	-	26.198	1.251	1.274	1.300	1.326	Continuing	Continuing
MD40: *Program-Wide Support*	95.158	8.733	8.025	16.390	-	16.390	13.495	12.154	10.490	12.435	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2020 to FY 2021 provides for the initiation of the development for the THAAD Layered Homeland Defense Prototype, additional development requirements in support of Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration Part 1 (USINDOPACOM JEON), and provides for a full year of Software Build 5.0 - Expanded Regional Defense development to include: development of Enhanced THAAD / MSE Integration Part 2, development for TFCC Remote Workstations with Dual Monitors, and Expanded Active Sensor Bias Monitoring.

The FY 2021 funding request was reduced by $3.0 million during DWR to reduce Facilities Sustainment, Restoration, and Modernization (FSRM) Projects.

The funding request for FY 2021 includes Joint Emergent Operational Need (JEON) PC-0021 requirements.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense (BMD) Terminal Defense Segment provides vital forward-deployable capabilities to support regional defensive BMD operations. The Terminal High Altitude Area Defense (THAAD) system provides Combatant Commands (CCMD) a globally-transportable, rapidly-deployable capability to intercept and destroy short-range, medium-range, and limited intermediate-range missile threats inside or outside the atmosphere during terminal phase of flight. This Program Element investigates concepts and continues the development and integration of multiple, independent THAAD software upgrades to address the evolving threat, improve warfighter's defense planning, and improve capabilities to engage short-range ballistic missile (SRBM), medium-range ballistic missile (MRBM), and limited intermediate-range ballistic missile (IRBM) threats.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	388.273	302.761	234.679	-	234.679
Current President's Budget	383.369	306.761	412.627	-	412.627
Total Adjustments	-4.904	4.000	177.948	-	177.948
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	4.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.904	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	177.948	-	177.948

Change Summary Explanation

Increase in FY 2020 provides a $4M Congressional add for Cyber Security enhancements.

Increase in FY 2021 provides funding for initiation of the development for the THAAD Layered Homeland Defense Prototype, additional development requirements in support of Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration Part 1 (USINDOPACOM JEON) and Software Build 5.0 - Expanded Regional Defense.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD07: *THAAD*	1,729.357	224.495	194.752	360.233	-	360.233	313.000	280.307	188.601	208.923	Continuing	Continuing
Quantity of RDT&E Articles	50	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides for the initiation of the development for the THAAD Layered Homeland Defense Prototype, additional development requirements in support of Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration Part 1 (USINDOPACOM JEON), and provides for a full year of Software Build 5.0 - Expanded Regional Defense development to include: development of Enhanced THAAD / MSE Integration Part 2, development for TFCC Remote Workstations with Dual Monitors, and Expanded Active Sensor Bias Monitoring.

A. Mission Description and Budget Item Justification

The THAAD system provides a capability to intercept and destroy short-range, medium-range, and limited intermediate-range missile threats inside or outside the atmosphere during the terminal phase of flight. THAAD continues the development and integration of multiple, independent software upgrades to address the evolving threat, improve the Warfighter's defense planning, and improve capabilities to engage SRBM, MRBM, and limited IRBM threats.

THAAD Development continues the development and integration of multiple, independent software builds to deliver enhanced system capabilities and expand the defense of allies and deployed forces from short-to-intermediate-range threats.

Program Operations provides strategic planning, program integration, cost estimating, contracting, financial management, internal reviews and audits, earned-value management and program assessments for the THAAD Program Office.

USINDOPACOM JEON provides enhanced capability against specific USINDOPACOM threats by expanding engagement options and increasing coverage areas.

Project Redwood details are provided at a Higher Classification reported in accordance with Title 10, United States Code, Section 119 (a)(1) in the Special Access Program Annual Report to Congress.

THAAD Program Support provides support for communications and interoperability efforts to operate on multiple networks and safety and mission assurance efforts in support of the Materiel Release process.

THAAD Layered Homeland Defense Prototype Development provides the development and demonstration of a new interceptor prototype to support Contiguous United States (CONUS) defense as part of the Layered Homeland Defense strategy.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Terminal High Altitude Area Defense (THAAD) Development	103.811	110.300	156.894

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-

Description: The THAAD Development program continues the development and integration of multiple, independent software builds to deliver enhanced system capabilities and expand the defense of allies and deployed forces from short-to-intermediate-range threats.

Software Build deliveries have been adjusted to efficiently and effectively deliver both the USINDOPACOM JEON content along with the program of record capabilities as follows:

Software Build 3.2 - Remote Launcher Part 1 (USINDOPACOM JEON) (completed in 4QFY2019)
- Initial requirements for increased defended area footprints via remote operation of THAAD Launchers in support of USINDOPACOM JEON.
- PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize Patriot Advanced Capability (PAC-3) MSE's full kinematic capability in support of USINDOPACOM JEON.

Software Build 4.0 - THAAD/MSE Integration Part 1 (USINDOPACOM JEON) (scheduled to be completed in 2QFY2021)
- Initial requirements to integrate MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability in support of USINDOPACOM JEON.
- Expanded requirements for increased defended area footprints via THAAD Remote Launcher Part 2.
- Improved capability to engage short-range ballistic missile (SRBM), medium-range ballistic missile (MRBM) and limited intermediate-range ballistic missile (IRBM) threats capable of creating complex scenes.
- Expanded requirements for THAAD Electronic Protection/Objective Debris Mitigation to provide radar enhancements improving performance against adverse environments.

Software Build 5.0 - Expanded Regional Defense (scheduled to be completed in 2QFY2023)
- Expanded THAAD/MSE Integration will significantly expand the threat set and provide a more robust capability by integrating the full capability of the MSE interceptor, as well as implementing safety measures including Cold Fire Prevention and Manual Emplacement.
- External THAAD Fire Control and Communication (TFCC) hardware and software connectivity allowing for the capability to remote from the TFCC tactical shelter to a remote location.
- Integrate Dual Monitor capabilities into the TFCC tactical shelters as well as at the remoted locations to satisfy the need for additional monitor viewing space as identified in multiple U.S. Army Test and Evaluation Command (ATEC) Milestone Assessment Reports.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Expanded Active Sensor Bias Monitoring allows the weapon system to actively compute and continuously monitor any radar bias errors/track covariance to ensure positional accuracy during engagements. Recurring efforts include: - Support element Models and Simulations (M&S) related activities, to include Verification, Validation and Accreditation (VV&A) and Continuous Digital Assessment (CDA) on the path of accredited models and simulations for BMDS assessment. - Support M&S related activities in element and BMDS test events in the approved Integrated Master Test Plan (IMTP) such as requirements, design, development, and VV&A. - Design, develop, test, and field the releases of THAAD system software to ensure continued performance and operation of fielded batteries. - Provide software updates in support of the incremental evolution of performance upgrades. - Support laboratory assets and equipment to enable future development, and to isolate, identify, and remedy root causes of equipment and software deficiencies identified by the warfighter. - Perform requirements development, engineering analysis, and performance verification for THAAD development and BMDS integration to ensure THAAD compliance with the Ballistic Missile Defense (BMD) System Specification, BMD System Description Document, and Master Integration Plan. - Participate in Missile Defense Agency (MDA) and Army studies to determine the architecture and integration of the THAAD Weapon system into the Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS). - Provide and coordinate analysis, studies and papers to support the resolution of issues and concerns with the integration of the THAAD weapon system into the future Army IBCS architecture. - Development of improved tactical network architecture in order to increase availability, robustness, and security of the system to counter cybersecurity threats. - Incremental Development Process to identify THAAD evolution and synchronize requirements that address emerging threat evolution, obsolescence needs, Army training needs, reliability and sustainment issues. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Provides development of Expanded THAAD Electronic Protection/Objective Debris Mitigation and remote operation of THAAD Launchers. - Provides development for improved capability to engage short-range ballistic missile (SRBM), medium-range ballistic missile (MRBM) and limited intermediate-range ballistic missile (IRBM) threats capable of creating complex scenes.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provides development, qualification, and integration efforts to replace current GPS antennas with Position, Navigation and Timing (PNT) Antennas and regional clock capabilities. This effort is a Department of Defense mandate to ensure the integrity and availability of PNT data for the THAAD weapon system. - Initiate preliminary requirements development and early concept of operations for THAAD Software Build 5.0 - Expanded Regional Defense to include: - Initiate Enhanced THAAD/MSE integration Part 2 to provide the warfighter the capability to extend the defended area and provide the THAAD weapon system with self-defense capability. ***FY 2021 Plans:*** - Complete development efforts and integration of THAAD Software Build 4.0. - THAAD/MSE Integration (USINDOPACOM JEON) into the THAAD Weapon System. - Complete development of Expanded THAAD Electronic Protection/Objective Debris Mitigation. - Provides development efforts and integration of THAAD Software Build 5.0 - Expanded Regional Defense to include: - Provides development of Enhanced THAAD / MSE Integration Part 2 to provide the warfighter the capability to extend the defended area and provide the THAAD weapon system with self-defense capability. - Initiate development for TFCC remote Workstations with Dual Monitors to address warfighter requirement for External hardware and software connectivity. - Initiate Expanded Active Sensor Bias Monitoring allows the weapon system to actively compute and continuously monitor any radar bias errors/track covariance to ensure positional accuracy during engagements. - Provides development, qualification, and integration efforts to replace current GPS antennas with Position, Navigation and Timing (PNT) Antennas and regional clock capabilities. This effort is a Department of Defense mandate to ensure the integrity and availability of PNT data for the THAAD weapon system. - Provides Software Independent Verification and Validation (IV&V) and software assurance risk report. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides for additional development requirements in support of Software Build 4.0 - THAAD/ Missile Segment Enhancement (MSE) Integration Part 1 (USINDOPACOM JEON) and provides for a full year of Software Build 5.0 - Expanded Regional Defense development to include: development of Enhanced THAAD / MSE Integration Part 2, development for TFCC remote Workstations with Dual Monitors, and Expanded Active Sensor Bias Monitoring. Previous THAAD software builds related to USINDOPACOM JEON were predominately funded from the USINDOPACOM JEON Accomplishment. This increase reflects the realignment of follow-on THAAD software development requirements being funded from the THAAD Development Accomplishment.			
Title: Program Operations	47.101	43.801	47.864
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Program Operations provides strategic planning, program integration, contracting, acquisition, engineering, financial management, internal reviews and audits, and program assessments for the THAAD Program Office. Recurring efforts include: -Provide technical and business management support activities to provide the Program Director with critical program status and decision quality data. -Ensure THAAD program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process. -Conduct internal program reviews to measure program progress against the six Missile Defense Agency approved baselines. -Continue a Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs. -Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A.			
Title: USINDOPACOM JEON	60.700	33.300	3.200
Articles:	-	-	-
Description: This accomplishment fully funds the THAAD portion of USINDOPACOM JEON to deliver expanded engagement options and increased coverage area. This includes accelerating some content previously included in the THAAD Development accomplishment, while adding new development efforts which include Rapid Deployment of Command and Control and Software upgrades and Performance Optimization Against Additional Threats as well as the following three new priorities: 1) PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE's full kinematic capability.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
2) THAAD/MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability. 3) THAAD Remote Launcher Part 1 that utilizes flexible communication paths to extend the defended area of a THAAD battery. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Completes and delivers PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE's full kinematic capability. - Continues THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability. ***FY 2021 Plans:*** - Complete and deliver THAAD/MSE Integration Part 1 integrating MSE launchers and missiles in to the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion and delivery of the THAAD/MSE Integration Part 1 USINDOPACOM JEON development requirements. Follow-on THAAD software development funding resides in the THAAD Development Accomplishment.			
Title: Project Redwood- Details at a Higher Classification	11.556	4.430	10.493
Articles:	-	-	-
Description: This project is reported in accordance with Title 10, United States Code, Section 119 (a)(1) in the Special Access Program (SAP) Annual Report to Congress. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Further details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.			
Title: THAAD Program Support	1.327	2.921	2.782

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-
Description: This activity provides support for efforts such as communications and interoperability upgrades to operate on joint, service, or allied communications networks. This activity provides support for safety and mission assurance requirements, and support of independent government offices as part of the Materiel Release process. Recurring efforts include: - Interoperability development and maintenance to ensure the weapon system is authorized to operate on joint, service, or allied communications networks. - Safety confirmation and verification testing, preparation and approvals of System Safety Risk Assessments, issuance of hazard classifications and safety releases, insensitive munitions approvals and waivers, and independent oversight and support in the areas of reliability, availability, and maintainability (RAM) and quality assurance. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A.			
Title: THAAD Layered Homeland Defense Prototype Development	0.000	0.000	139.000
Articles:	-	-	-
Description: The THAAD Layered Homeland Defense Prototype Development effort supports the development and demonstration of interceptor improvements resulting in a prototype to enhance THAAD support of Contiguous United States (CONUS) Defense as part of the Layered Homeland Defense strategy. This effort will develop prototype software and hardware and perform a series of demonstrations to prove the technologies to support a FY 2023 Development Decision. Demonstrations will be performed both at the component level and in a combined THAAD Layered Homeland Defense Prototype. ***FY 2020 Plans:*** N/A. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Initiate development of the THAAD Layered Homeland Defense Prototype effort. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides for the initiation of the development for the THAAD Layered Homeland Defense Prototype effort.			
Accomplishments/Planned Programs Subtotals	224.495	194.752	360.233

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD O&M*	87.560	99.819	99.626	-	99.626	106.849	112.696	115.435	120.094	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,025.804	425.863	348.433	-	348.433	341.446	328.736	374.844	425.603	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	57.972	25.137	7.768	-	7.768	72.388	74.306	60.179	19.877	Continuing	Continuing

Remarks

D. Acquisition Strategy

The THAAD program awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for THAAD development. The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee. The discrete task orders allow management and tracking of development work.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Terminal High Altitude Area Defense (THAAD) Development - Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	802.867	66.592	Nov 2018	68.933	Nov 2019	111.455	Nov 2020	-		111.455	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - IT Program Support	C/CPAF	Northrup Grumman : AL, AK, CA, CO, HI, NM, VA	7.294	3.037	Jan 2019	2.870	Nov 2019	2.889	Nov 2020	-		2.889	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - MDA Program Support	MIPR	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	11.248	0.000		2.500	Dec 2019	2.470	Dec 2020	-		2.470	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Models & Simulations	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	222.047	22.624	Dec 2018	31.191	Dec 2019	29.607	Dec 2020	-		29.607	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Requirements and Design	C/CPAF	Boeing : AL	14.981	3.660	Dec 2018	2.801	Dec 2019	4.917	Dec 2020	-		4.917	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Software IV&V	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, Al	0.000	0.000		0.000		4.504	Nov 2020	-		4.504	Continuing	Continuing	Continuing
Terminal High Altitude Area Defense (THAAD) Development - Software Support (GOVT)	MIPR	US Army Research, Development, Engineering Command (RDECOM) : Huntsville, AL	8.864	5.283	Nov 2018	0.000		0.000		-		0.000	0.000	14.147	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Terminal High Altitude Area Defense (THAAD) Development - THAAD Radar Improvements	SS/CPAF	Raytheon : MA	10.000	0.000		0.000		0.000		-		0.000	0.000	10.000	0.000
Terminal High Altitude Area Defense (THAAD) Development - Verification and Assessment	C/CPFF	TEAMS SE&I : AL / CO	12.240	2.615	Dec 2018	2.005	Dec 2019	1.052	Nov 2020	-		1.052	Continuing	Continuing	Continuing
USINDOPACOM JEON - Advanced Capability Development	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	90.785	57.004	Dec 2018	30.100	Dec 2019	0.000		-		0.000	0.000	177.889	0.000
USINDOPACOM JEON - MDA Program Support	Various	MDA : Huntsville, AL	0.509	0.000		0.000		0.000		-		0.000	0.000	0.509	0.000
USINDOPACOM JEON - OGA JEON Support (GOVT)	MIPR	US Army Tank Automotive Research, Development, and Engineering Center (TARDEC), Army Test and Evaluation Command (ATEC) : Warren, MI / Huntsville, AL	9.263	3.696	Dec 2018	3.200	Dec 2019	3.200	Dec 2020	-		3.200	Continuing	Continuing	Continuing
THAAD Layered Homeland Defense Prototype Development - THAAD Layered Homeland Defense Prototype Development	Various	Various : Various	0.000	0.000		0.000		139.000	Dec 2020	-		139.000	Continuing	Continuing	Continuing
		Subtotal	1,190.098	164.511		143.600		299.094		-		299.094	Continuing	Continuing	N/A

Remarks

N/A.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Program Operations	Various	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	285.516	47.101	Oct 2018	43.801	Nov 2019	47.864	Nov 2020	-		47.864	Continuing	Continuing	Continuing
Project Redwood- Details at a Higher Classification - Special Programs	SS/FP	N/A : N/A	83.865	11.556	Oct 2018	4.430	Nov 2019	10.493	Nov 2020	-		10.493	Continuing	Continuing	Continuing
THAAD Program Support - Mission Support	MIPR	ATEC / SMDC / AMRDEC / MDA : WSMR, NM / Huntsville, AL	32.699	1.327	Nov 2018	2.921	Dec 2019	2.782	Dec 2020	-		2.782	Continuing	Continuing	Continuing
THAAD Program Support - Prime Contractor Support	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	0.600	0.000		0.000		0.000		-		0.000	0.000	0.600	0.000
THAAD Program Support - Prior year no longer funded in the FYDP	Various	Various : Various	136.579	0.000		0.000		0.000		-		0.000	0.000	136.579	0.000
		Subtotal	539.259	59.984		51.152		61.139		-		61.139	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,729.357	224.495		194.752		360.233		-		360.233	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
THAAD Software Build 3.2 - Remote Launcher Part 1 (USINDOPACOM JEON Phase 3)	▲						
THAAD Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration (USINDOPACOM JEON) Critical Design Review		△					
THAAD Software Build 5.0 - Expanded Regional Defense System Requirement Review (SRR)			△				
THAAD Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration (USINDOPACOM JEON)			△				
THAAD Software Build 5.0 - Expanded Regional Defense Critical Design Review (CDR)				△			
THAAD Software Build 5.0 - Expanded Regional Defense					△		
THAAD Layered Homeland Defense Prototype Development - Development Decision					☆		

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD07 / *THAAD*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
THAAD Software Build 3.2 - Remote Launcher Part 1 (USINDOPACOM JEON Phase 3)	4	2019	4	2019
THAAD Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration (USINDOPACOM JEON) Critical Design Review	2	2020	2	2020
THAAD Software Build 5.0 - Expanded Regional Defense System Requirement Review (SRR)	1	2021	1	2021
THAAD Software Build 4.0 - THAAD/Missile Segment Enhancement (MSE) Integration (USINDOPACOM JEON)	2	2021	2	2021
THAAD Software Build 5.0 - Expanded Regional Defense Critical Design Review (CDR)	2	2022	2	2022
THAAD Software Build 5.0 - Expanded Regional Defense	2	2023	2	2023
THAAD Layered Homeland Defense Prototype Development - Development Decision	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC07: *Cyber Operations*	12.674	6.087	13.580	9.806	-	9.806	12.325	8.544	4.595	5.286	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A.

A. Mission Description and Budget Item Justification

Cyber Operations sustain MDA Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities; analysis of validation results, risk assessments; reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for MDA THAAD mission systems; and supports THAAD certification to operate in the BMDS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	6.087	13.580	9.806
Articles:	-	-	-

Description: Funding in this project sustains MDA Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, monitoring and tracking of Cybersecurity mitigations, and all other activities necessary to comply with the Federal Information Security Management Act (FISMA).

Recurring efforts include:
- Conduct cybersecurity/information assurance engineering and architecture planning for THAAD information technology systems.
- Develop and testing cybersecurity/information assurance control measures for BMDS THAAD systems.
- Develop THAAD RMF for DoD Information Technology Certification and accreditation packages.
- Support CVT of THAAD mission, test, and training systems.
- Develop Plan of Action and Milestones (POA&Ms) to resource and remediate information assurance deficiencies.
- Conduct annual information assurance reviews on the THAAD enclaves to assess compliance in implementing and maintaining Information Assurance (IA) controls.
- Perform Information Assurance Vulnerability Alert (IAVA) to mitigate potential system vulnerabilities.
- Update THAAD software and hardware to ensure compliance with DoD Weapon System Information Assurance Programs.
- Continue THAAD Weapon System software development efforts consistent with DoD cybersecurity requirements which were previously covered under THAAD Development, in order to correlate cyber software activities with realigned funding.

Specific and/or unique accomplishments to each FY are as follows:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: - Improve software development efforts for more robust cyber security for both offense and defense to address the advanced threat in order to align with Agency and USD(R&E) cyber security priority ***FY 2021 Plans:*** - Continue software development efforts for more robust cybersecurity for both offense and defense to address the advanced threat in order to align with Agency and USD(R&E) cybersecurity priorities. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional plus up for Cybersecurity Enhancements.			
Accomplishments/Planned Programs Subtotals	6.087	13.580	9.806

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD O&M*	87.560	99.819	99.626	-	99.626	106.849	112.696	115.435	120.094	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,014.068	425.863	348.433	-	348.433	341.446	328.736	374.844	425.603	Continuing	Continuing
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	57.972	25.137	7.768	-	7.768	72.388	74.306	60.179	19.877	Continuing	Continuing

Remarks

D. Acquisition Strategy

The THAAD program awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for THAAD development. The ACD contract is comprised of over 40 separate task orders with varying contract types such as firm fixed price, fixed price incentive firm, cost plus incentive fee, and cost plus fixed fee. The discrete task orders allow management and tracking of development work.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPFF	Torch Technologies : Various MDA Locations	3.154	0.960	Nov 2018	0.903	Dec 2019	0.761	Dec 2020	-		0.761	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Security Engineering	SS/CPFF	LMSSC : Sunnyvale, CA/Huntsville, AL	9.520	5.127	Jan 2019	12.677	Nov 2019	9.045	Dec 2020	-		9.045	Continuing	Continuing	Continuing
		Subtotal	12.674	6.087		13.580		9.806		-		9.806	Continuing	Continuing	N/A

Remarks

N/A.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.674	6.087		13.580		9.806		-		9.806	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC07 Completed Cyber Operations	✦	✦	✦	✦	✦																							
MC07 Planned Cyber Operations						✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MC07 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC07 Completed Cyber Operations	1	2019	1	2020
MC07 Planned Cyber Operations	2	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD06: *Patriot Advanced Capability-3 (PAC-3)*	153.370	144.054	90.404	26.198	-	26.198	1.251	1.274	1.300	1.326	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of the USINDOPACOM JEON PATRIOT Launch on Remote capability in FY 2020.

A. Mission Description and Budget Item Justification

PAC-3 is an operational, land-based weapon built upon the proven U.S. Army Phased Array Tracking Radar Intercept on Target (PATRIOT) air and missile defense infrastructure. The Army is responsible for production and further development of the PAC-3 System and Missile Segment Enhancements (MSE); MDA remains responsible for any BMDS interoperability and integration efforts. Lower Tier Project Office (LTPO) will utilize MDA funds to further the integration of PATRIOT with the BMDS.

This project includes LTPO's portion of the USINDOPACOM JEON including:
1) PATRIOT launch on remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize MSE's full kinematic capability
2) THAAD/MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: General Support	0.454	1.204	1.198
Articles:	-	-	-
Description: MDA funds PATRIOT participation in BMDS interoperability integration efforts. Activities support the day-to-day tasking that is leveraged upon LTPO by MDA based on the Transfer and Transition Plan Annex L. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A.			
Title: USINDOPACOM JEON - LTPO	143.600	89.200	25.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-
Description: This accomplishment fully funds LTPO's portion of the USINDOPACOM JEON including PATRIOT Launch on Remote and THAAD/MSE integration Part 1. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Completes and delivers PATRIOT Launch on Remote to utilize THAAD's capability to detect and track threat ballistic missiles at longer ranges and utilize PAC-3 MSE full kinematic capability - Continues THAAD / MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability ***FY 2021 Plans:*** - Completes and delivers THAAD/MSE Integration Part 1 that integrates MSE launchers and missiles into the THAAD weapon system enabling a more tightly integrated upper/lower tier defensive capability. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of the USINDOPACOM JEON PATRIOT Launch on Remote capability in FY 2020.			
Accomplishments/Planned Programs Subtotals	144.054	90.404	26.198

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD O&M*	87.560	99.819	99.626	-	99.626	106.849	112.696	115.435	120.094	Continuing	Continuing
• 0208866C: MD07: *THAAD Procurement*	1,025.804	425.863	348.433	-	348.433	341.446	328.736	374.844	425.603	Continuing	Continuing
• 0604876C: *Ballistic Missile Defense Terminal Defense Segment Test*	57.972	25.137	7.768	-	7.768	72.388	74.306	60.179	19.877	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

D. Acquisition Strategy

The planned acquisition strategy for U.S. Army's Phased Array Tracking Radar Intercept on Target (PATRIOT) support is to provide Military Interdepartmental Purchase Requests (MIPR) to the U.S. Army Lower-Tier Program Office (LTPO) to further the integration of PATRIOT with the BMDS.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USINDOPACOM JEON - LTPO - USINDOPACOM JEON - LTPO	MIPR	Lower Tier Project Office : Huntsville, AL	143.600	143.600	Dec 2018	89.200	Dec 2019	25.000	Dec 2020	-		25.000	0.000	401.400	0.000
		Subtotal	143.600	143.600		89.200		25.000		-		25.000	0.000	401.400	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
General Support - General Support	MIPR	Lower Tier Project Office : Huntsville, AL	9.770	0.454	Nov 2018	1.204	Nov 2019	1.198	Nov 2020	-		1.198	Continuing	Continuing	Continuing
		Subtotal	9.770	0.454		1.204		1.198		-		1.198	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	153.370	144.054		90.404		26.198		-		26.198	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD06 Completed Patriot Advanced Capability-3 (PAC-3) General Support	✦	✦	✦	✦	✦																							
MD06 Planned Patriot Advanced Capability-3 (PAC-3) General Support						✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
MD06 USINDOPACOM JEON - LTPO										△																		

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD06 / *Patriot Advanced Capability-3 (PAC-3)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD06 Completed Patriot Advanced Capability-3 (PAC-3) General Support	1	2019	1	2020
MD06 Planned Patriot Advanced Capability-3 (PAC-3) General Support	2	2020	4	2025
MD06 USINDOPACOM JEON - LTPO	2	2021	2	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	95.158	8.733	8.025	16.390	-	16.390	13.495	12.154	10.490	12.435	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	8.733	8.025	16.390
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	8.733	8.025	16.390

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various : VA	3.500	0.000		1.473	Oct 2019	0.000		-		0.000	0.000	4.973	0.000
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	6.857	0.132	Jul 2019	0.120	Jul 2020	0.000		-		0.000	0.000	7.109	0.000
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	Various : MDA Multi: AL, CO, CA, VA,	14.049	0.550	Oct 2018	3.401	Oct 2019	0.000		-		0.000	0.000	18.000	0.000
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	3.455	0.037	Apr 2019	0.000		0.000		-		0.000	0.000	3.492	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, VA	62.359	7.650	Aug 2019	3.031	Dec 2019	16.390	Dec 2020	-		16.390	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	1.423	0.364	Jan 2019	0.000		0.000		-		0.000	0.000	1.787	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	3.515	0.000		0.000		0.000		-		0.000	0.000	3.515	0.000
		Subtotal	95.158	8.733		8.025		16.390		-		16.390	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	95.158	8.733		8.025		16.390		-		16.390	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603881C / *Ballistic Missile Defense Terminal Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	5,378.266	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
MD08: *Ground Based Midcourse*	5,195.525	725.790	1,186.995	919.589	-	919.589	710.948	662.265	696.270	987.209	Continuing	Continuing
MC08: *Cyber Operations*	52.262	34.472	63.407	44.824	-	44.824	34.378	35.086	32.041	31.399	Continuing	Continuing
MD40: *Program-Wide Support*	130.479	30.054	53.314	39.892	-	39.892	30.799	29.215	39.281	49.928	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2020 to FY 2021 reflects the delay of the Sea-Based X-Band Radar (SBX) In-Flight Interceptor Communication System (IFICS) Data Terminal (IDT) modernization from FY 2021 to FY 2024 to incorporate a phased array design, postponement of Hawaii IDT, the completion of Ground-based Midcourse Defense (GMD) Communications Network (GCN) material purchases in FY 2020, and the completion of the planning, analysis & assessment of critical infrastructure cybersecurity.

The FY 2021 funding request was reduced by $2.1 million during DWR to reduce Discrimination efforts.

A. Mission Description and Budget Item Justification

The GMD element of the Missile Defense System (MDS) provides combatant commands (CCMDs) with a continuously available (24 hours a day, 7 days a week, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The GMD capability consists of Ground Based Interceptor (GBI), GMD Fire Control system (GFC), GCN, IDT and ground Launch Support Systems (LSS). Each GBI delivers a single kill vehicle to defeat threat warheads in space during the midcourse phase of the ballistic trajectory. The GFC consists of fire control nodes in Fort Greely, Alaska and Missile Defense Integration and Operations Center (MDIOC) Colorado Springs, Colorado. IDTs are currently located in Fort Greely, Alaska (FGA): Vandenberg Air Force Base, California; Eareckson Air Station, Alaska; and Fort Drum, New York. The GMD capability leverages integration of MDS sensors across the globe. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute flight testing, modernize the GMD ground system, provide fire control and communications, reliability testing and upgrades to sustain the current fleet, develop GBI software enhancements that improve reliability, capability, and discrimination, improve GMD models and simulations (M&S), and participate with other MDS assets in system ground tests. The Missile Defense Agency (MDA) will continue development efforts in support of the delivery 64 operational silos, located at Fort Greely, Alaska (60 GBIs) and Vandenberg Air Force Base, California (4 GBIs).

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	803.359	1,156.506	829.451	-	829.451
Current President's Budget	790.316	1,303.716	1,004.305	-	1,004.305
Total Adjustments	-13.043	147.210	174.854	-	174.854
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	147.210			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-13.585	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.542	0.000	174.854	-	174.854

Change Summary Explanation

Increase in FY 2020 provides the enacted congressional net increase of $147 million. $180 million increase provides for a more robust GBI reliability and Service Life Extension Program (SLEP) until replaced with NGI. $24 million increase provides for planning, analysis & assessment of MDS critical infrastructure cybersecurity. Advances Agency's compliance with DOD Cybersecurity Discipline Implementation Plan to protect MDA IT systems in the highly-contested cybersecurity threat environment. $57 million reduction eliminates RKV specific performance from GMD Fire Control Software.

Increase in FY 2021 provides $96 million for EKV engineering, improving software performance, product sustainment, and purchase completion/delivery of two additional CE-II Block 1/C2 GBIs due to termination of the RKV program. $78 million funds the definitized contract value for the Development and Sustainment Contract which exceeded the government cost estimate used in prior submission.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD08: *Ground Based Midcourse*	5,195.525	725.790	1,186.995	919.589	-	919.589	710.948	662.265	696.270	987.209	Continuing	Continuing
Quantity of RDT&E Articles	44	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2020 to FY 2021 reflects the delay of the SBX IFICS IDT modernization from FY 2021 to FY 2024 to incorporate a phased array design, postponement of Hawaii IDT, and the completion of GMD GCN material purchases in FY 2020.

A. Mission Description and Budget Item Justification

GMD includes development and delivery of GMD Ground Systems, GBIs, Systems Engineering and Program Management. Development objectives for GMD include: improve homeland defensive capability against an evolving threat that is increasing both in number of missiles and complexity of threat payloads, execute Flight Tests, modernize the GMD ground system provides improved fire control and communications, develop GBI software enhancements that improve reliability and discrimination, improve GMD M&S, and participate with other MDS assets in system ground tests. GMD will continue the effort to develop and field improved standalone and integrated MDS discrimination capabilities, both of which will improve the System's ability to identify lethal reentry vehicles and non-lethal threat objects for enhanced interceptor performance.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Ground Based Interceptor	91.211	263.399	211.572
Articles:	-	-	-

Description: The GBI program develops improvements to enhance reliability, counter emerging threats, and increase system performance for fielded GBIs. The GBI reliability program conducts the analysis and testing necessary to characterize the reliability and service life of the GBI Fleet. The data generated from the reliability program allows the Program Office to manage the GBI fleet, develop design improvements, develop fleet maintenance strategies, and extend interceptor service life. MDA engineering uses this data to develop battle simulations for the ground test program; and by the Warfighter in developing tactics, techniques, and procedures. The GBI program has multiple planned software builds to better utilize off-board sensor data providing improved on-board discrimination capabilities to select the most lethal object in the threat scene.

Recurring work:
-Conduct key Exo-atmospheric Kill Vehicle (EKV) engineering assessments to document current performance/capability and identify potential risk areas to assess and improve overall KV reliability for the Warfighter
-Collect Reliability, Availability, Maintainability and Testability (RAM-T) data and analysis of performance metrics on the Operational System in order to continuously improve the system for the Warfighter

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue Probabilistic Risk Assessment (reliability model) development to assess the GBI design enabling improvements to overall GBI reliability for Warfighter defense of the homeland -Continue Stockpile Reliability Program (SRP) functional testing of naturally aged GBI subsystems and components removed from previously fielded GBIs during upgrade/modification to understand performance and aging characteristics in order to establish life limits, achieve GBI maintenance cost savings, and build Warfighter confidence in aging GBIs -Conduct rocket motor propellant studies to extend the service life of limited life items in order to achieve cost savings on GBI lifecycle maintenance and further build Warfighter confidence in aging GBIs -Develop software development to improve system robustness and reliability -Sustain the capability to develop and test replacement components and to upgrade the GBI fleet Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Complete termination of RKV-associated development and C2+ booster development addressing obsolescence -Initiate interceptor integration, emplacement and checkout to support Flight Test Ground-based Midcourse Defense BVT-03 which demonstrates the 2/3 stage selectable capability -Continue five booster acquisition to support flight testing and spares to ensure the number of fielded GBIs does not decrease through the FYDP -Continue to develop, test and field interceptor software upgrades with improved mid-term discrimination capability and capabilities to improve EKV performance reliability for known issues in order to enhance system capability against robust threat systems -Continue to use the EKV Hardware-in-the-Loop 10V Chamber for operational analysis of emerging threats, discrimination improvements performance, pre-mission testing and post flight analysis and reconstruction in accordance with the Integrated Master Test Plan (IMTP) to reduce execution risks and gain confidence that capabilities performed as expected -Continue flight test rotation program of fielded GBIs by upgrading kill vehicles and boosters, adding the necessary Non-Tactical Equipment to support the IMTP requirements -Deliver CE-II Block 1 payload level spares to support delivery of two new GBIs which improve the reliability of the fielded GBI fleet -Deliver one CE-II Block I EKV/ C2 GBI. This GBI replaces an older GBI increasing average fleet reliability and sustaining fleet capacity ***FY 2021 Plans:*** -Complete interceptor integration, emplacement and checkout to support Flight Test Ground-based Midcourse Defense BVT-03 which demonstrates the 2/3 stage selectable capability			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Complete acquisition of five boosters to support flight testing and to ensure the number of fielded GBIs does not decrease through the FYDP -Initiate integration and fielding of two GBIs using two CE-II Block 1 EKVs and two C2 boosters. These GBIs replace older GBIs increasing average fleet reliability and sustaining fleet capacity. The removed GBIs become available for ground or flight testing and spares -Complete development and testing of EKV software 11.0 which provides improved salvo performance and incorporates additional feature data from MDS sensors to improve discrimination performance -Initiate development and testing of EKV software 12.0 which enhances performance against new threats -Conduct EKV Hardware-in-the-Loop 10V Chamber testing with EKV 11.0 and EKV 23.2 to assess performance against emerging threats and discrimination improvements -Conduct 10V Chamber testing with EKV 23.2 for BVT-03 post flight analysis and reconstruction to gain confidence that capabilities are performing as expected -Initiate preparation of a removed GBI for an intercept flight test in FY 2023. This preparation will include integration of a range termination and telemetry kit ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects the completion of a flight test boost vehicle in FY 2020 for GBI integration to support Flight Test Ground-based Midcourse Defense BVT-03.			
Title: Ground Systems & Fire Control	263.059	374.996	307.810
Articles:	-	-	-
Description: The GMD Ground Systems enable control and operation of the GMD Element as part of the MDS. Ground Systems consists of the GMD Fire Control system, GCN, IDT and Launch Site Components (LSC) (silos, silo interface vaults [SIVs]). These components collect and process sensor data, perform mission planning and fire control, command the launch of ground based interceptors, communicate with interceptors in flight, and provide environmental support for ground based interceptors during peacetime. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Continue development and production of the IDT technology upgrades to mitigate obsolescence -Continue IDT End-to-End Test to demonstrate communication between the EKV and the GMD Ground System -Continue GCN Modernization efforts to support GMD system expansion and emerging requirement, enhance/maintain Cybersecurity posture, and mitigate hardware and software obsolescence			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Complete development and delivery of Ground Systems 8 software build to BMDS ground testing. Ground Systems 8 software incorporates 2/3 stage GBI capability, integrates Long Range Discrimination Radar (LRDR) with GMD fire control, and incorporates new discrimination data from SBX -Continue development and testing of the Ground Systems 9 software build that provides additional discrimination improvements and implements BMDS System Track. BMDS System Track fuses data from multiple sensors and provides GMD with improved track accuracy and additional discrimination features -Continue system upgrades to the Readiness & Control building in Fort Greely, Alaska. The upgrades will maximize shielded protection to vital systems and provide more operational space for the Warfighters -Continue development, testing and integration of FGA Missile Field 4 and new Launch Support System with GMD Ground Systems to increase Silo capacity and modernize Silo Interface Vault equipment in existing Silos			
FY 2021 Plans: -Develop the Phased Array IDT antenna to enable on demand communication with additional interceptors throughout flight with increased frequency of communication events. This will enable kill vehicles to provide additional target scene information to GMD Fire Control enabling enhanced situational awareness for the Warfighter and improved battle management. This upgrade addresses obsolescence with the current IDT by replacing aged equipment and processors -Field a replacement programmable modem and receiver/transmitter for the IDT to increase communications bandwidth and enable multiple waveforms to communicate with existing and future interceptors. This upgrade addresses obsolescence with the current IDT by replacing aged equipment -Continue to develop the Fort Greely Communication Center to improve communication redundancy -Field GCN modernization efforts to support FGA Missile Field 4, improve Cybersecurity posture, and replace aging hardware and software that is no longer supportable -Field Ground Systems 8 software build. Ground Systems 8 software incorporates 2/3 stage GBI capability, integrates LRDR with GMD fire control, and incorporates new discrimination data from SBX -Continue development and testing of the Ground Systems 9 software build that provides additional discrimination improvements and implements BMDS System Track. BMDS System Track fuses data from multiple sensors and provides GMD with improved track accuracy and additional discrimination features -Continue development, testing and integration of FGA Missile Field 4 and new Launch Support System with GMD Ground Systems to increase Silo capacity and modernize Silo Interface Vault equipment in existing Silos			
FY 2020 to FY 2021 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
The decrease from FY 2020 to FY 2021 reflects the delay of the SBX IFICS IDT modernization from FY 2021 to FY 2024 to incorporate a phased array design, postponement of Hawaii IDT, and the completion of GMD GCN material purchases in FY 2020.			
Title: Systems Engineering and Program Management	311.864	306.139	318.696
Articles:	-	-	-
Description: GMD Systems Engineering and Program Management provides essential engineering and program management functions for the development and fielding of the GMD Weapon System. GMD Systems Engineering delivers the key processes and products such as, concept definition, system design and software IV&V for development, integration, and delivery of new GMD capabilities and updates to the fielded GMD Weapon System. GMD Systems Engineering manages the GMD Technical Baseline and GMD Operational Baseline ensuring the rigorous engineering processes and controls are in place to deliver capabilities building Warfighter confidence with a continued focus on improving GMD Weapon System reliability; increasing GMD engagement capability and capacity to outpace emerging threats; and increasing the speed of delivery by reducing development timelines. Key GMD Systems Engineering functions include: -Lead GMD system design to include planning and execution of GMD milestone technical reviews with objective evidence satisfying review entrance and exit criteria -Continue requirements development, engineering analysis, and interface development supporting GMD and BMDS integration -Direct the integration of component capabilities into the GMD weapons system and into the overarching MDS -Develop and update the GMD Architecture Model, which provides a visualization of the complex GMD Weapon System -Develop and update GMD performance and interface requirements which document the desired new GMD capabilities and/or updates to the fielded GMD Weapon System -Develop and update BMDS Flight Test/Ground Test, and GMD test requirements to meet the desired new GMD capabilities and/ or updates to the fielded GMD Weapon System -Develop and update GMD discrimination capabilities to increase GMD engagement capability and deliver the capacity to outpace emerging threats -Verify GMD system performance and interface requirements, ensuring the actual performance and functions of the developed products meet the desired capabilities -Analyze GMD performance and contribution to overall MDS performance to enable incremental development and detailed design of GMD Weapon System capabilities -Perform Quick Response Analyses for Real-World Events, Department of Defense Requests for Information/Analyses, and Warfighter Requests for Information/Analyses			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue M&S development, integration, and verification, validation and accreditation (VV&A) to assess component and system performance in support of technical assessments -Develop GMD M&S products supporting GMD Weapon System development, trade studies, detailed design analyses, test planning, and verification -Develop disciplined processes that perform GMD Software and Firmware development, assurance, acquisition, reliability, and obsolescence as well as Independent Verification and Validation (IV&V) -Develop and execute disciplined configuration management processes which document the release, control, and management of the GMD Baseline technical data acquisition, reliability, and obsolescence as well as IV&V -Develop GMD Weapon System laboratories delivering integrated testing data supporting performance assessments, requirements verification, and fielding decisions -Execute GMD Technical Direction Agent activities to serve as a technical advisor to GMD, the MDA Director for Engineering, and the MDA Director, delivering independent assessments/analyses, unbiased and objective defensive weapon system constructive assistance, advice, and counsel on technical issues and product development Program Management provides for prime contractor management of all GMD development and sustainment activities to assure technical content delivery in line cost, schedule, and performance objectives. This effort includes program and business management, program administration, subcontract management, technical and testing oversight, verification of hardware and software development, quality/safety/mission assurance, integrated logistics support, and infrastructure to develop, test and sustain the GMD system and components. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Execute Increment 6B Preliminary Design Review -Execute Increment 6B Critical Design Review -Deliver Increment 6B architectural models -Deliver updated interfaces that support Increment 6B new capabilities including LRDR and 2/3 stage selectable booster -Deliver performance assessments to support element and component technical reviews associated with Increment 6B development -Develop and deliver accredited GMD M&S products to support performance assessments, ground tests and flight tests -Update GMD Performance Specifications as required to maintain alignment to BMDS Specifications -Deliver Increment 8 GMD Performance Specification -Continue development of discrimination improvements to enhance GMD performance against existing and emerging threats			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue to conduct government-led, software IV&V on all industry software and firmware deliveries -Develop or modify GMD models and supporting M&S components to meet system-level and enterprise M&S infrastructure requirements for both the Ground Test re-architecture and all-Digital BMDS M&S architecture ***FY 2021 Plans:*** -Execute Increment 6B.2 Preliminary Design Review and Critical Design Review incorporating new Discrimination function and integration of space-based kill assessment -Update the GMD Architecture Model incorporating key content for GMD Increment 6C -Update the GMD performance and interface requirements supporting allocated capabilities in GMD Increments 6B.2, 6C, 7 and beyond; conduct performance analyses on those capabilities -Update the GMD verification approaches for GMD performance and interface requirements to support Increment 6B Critical Design Review -Conduct Quick Response Analyses for Real-World Events, Department of Defense Requests for Information/Analyses, and Warfighter Requests for Information/Analyses -Develop and update GMD M&S products supporting GMD performance analyses, BMDS Flight Tests, and BMDS Ground Test -Develop/deliver GMD models and supporting M&S components to meet system-level and enterprise M&S test infrastructure requirements -Expand the GMD M&S Laboratory hardware strings -Upgrade the M&S cybersecurity infrastructure -Develop/deliver GMD M&S verification and validation objective evidence products supporting accreditation decisions -Perform SW IV&V and Assurance to improve the quality of the software supporting Increments 6B.2, 6C and 7 -Develop discrimination improvements to increase GMD engagement capability and deliver the capacity to outpace emerging threats -Develop/deliver GMD Weapon System laboratory hardware for HWIL integrated testing data supporting performance assessments, requirements verification, and fielding decisions -Establish a Government GMD Weapon System HWIL laboratory ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the M&S and System Engineering & Integration efforts for Increment 6 and future increments. Investment in hardware for a hardware-in-the-loop organic government laboratory facility to conduct maintenance, sustainment, upgrade testing on Increment 6 and future increments, and testing of GMD ground segment and AUR subassemblies included in the lab architecture.			
Title: Program Operations	59.656	62.461	58.576
Articles:	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Program Operations provides for government management of the GMD program. This effort provides: -Technical, business, acquisition, configuration management and integration activities to ensure the GMD program meets cost, schedule, and performance goals -Ensure program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process -Internal Agency program reviews to measure program progress against the six MDA approved baselines -Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety (QSMA) in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs -Sustainment of core infrastructure and unified communications services to accomplish the GMD mission Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: GBI Service Life Extension Program (SLEP)	0.000	180.000	22.935
Articles:	-	-	-
Description: The GMD SLEP enables upgrades to the existing EKVs and boost vehicles to improve performance, reliability, and extend service life so that the fielded GBI fleet remains viable until replaced by NGI. ***FY 2020 Plans:*** -Develop the execution plan for SLEP -Establish contracts to execute SLEP -Restart and requalify EKV and boost vehicle vendor production lines -Initiate production of SLEP kits ***FY 2021 Plans:*** -Continue requalification of EKV and boost vehicle vendor production lines			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue production of SLEP kits ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the initial SLEP investment in FY 2020 via Congressional add.			
Accomplishments/Planned Programs Subtotals	725.790	1,186.995	919.589

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0203882C: MD08:: *GMD Procurement*	405.464	285.471	0.000	-	0.000	0.000	10.225	2.130	36.400	Continuing	Continuing
• 0208866C: MD08: *Midcourse Defense O&M*	139.204	153.218	158.054	-	158.054	175.511	179.368	219.013	169.852	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604874C: *Improved Homeland Defense Interceptors*	407.858	515.000	664.138	-	664.138	921.349	1,339.439	856.712	1,258.000	Continuing	Continuing
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	72.634	98.139	67.071	-	67.071	63.240	61.200	79.139	33.282	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	5.754	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.754

Remarks

D. Acquisition Strategy

The GMD program will continue to follow testing, development, and evolutionary acquisition through incremental development. The Agency acquisition strategy ensures GMD components are upgraded to improve both All-Up System (AUS) performance and AUR performance in order to retain the proven GMD contribution to the integrated MDS. This acquisition approach reduces obsolescence risk, provides opportunities for incremental capability improvements, and allows decision makers to make informed trades between cost, schedule, and performance while exploring improved operational and technological capabilities.

GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract included development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities.

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On January 31, 2018, the DSC Extension was awarded to the Boeing Company with a period of performance through 1QFY2024. The DSC Extension includes supporting test, engineering, software, and performance based logistics scope. The DSC structure breaks out major efforts into separate Contract Line Item Numbers with each having incentive fees under the Cost Plus Incentive Fee contract.

GM is also implementing a more robust Program Board structure allowing more Government insight and decisions into the technical baseline and has changed business processes for greater Government involvement in Program decisions. In addition, GM utilizes Government laboratory M&S, and analysis capabilities to augment Boeing's efforts.

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Based Interceptor - Additional Boosters	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	122.686	26.292	Nov 2018	106.379	Nov 2019	65.104	Nov 2020	-		65.104	Continuing	Continuing	Continuing
Ground Based Interceptor - All Up Round Development	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	16.965	Nov 2018	0.000		0.000		-		0.000	0.000	16.965	0.000
Ground Based Interceptor - Booster Development	C/CPIF	Boeing : AL/AK/AZ CA/CO/TX/VA	125.000	0.000		0.000		0.000		-		0.000	0.000	125.000	0.000
Ground Based Interceptor - Configuration 2 CBAU Booster Development	C/CPIF	Boeing : AL/AK/AZ CA/CO/TX/VA	54.550	0.000		0.000		0.000		-		0.000	0.000	54.550	0.000
Ground Based Interceptor - EKV Spares	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	6.811	0.000		0.000		0.000		-		0.000	0.000	6.811	0.000
Ground Based Interceptor - Flight Rotations for BMDS Testing	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	73.950	0.000		12.578	Nov 2019	0.000		-		0.000	0.000	86.528	0.000
Ground Based Interceptor - GBI Prime Product Support	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	362.240	19.492	Nov 2018	42.511	Nov 2019	38.916	Nov 2020	-		38.916	Continuing	Continuing	Continuing
Ground Based Interceptor - GBI Relocations & Emplacements	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	0.000		0.000		20.933	Nov 2020	-		20.933	Continuing	Continuing	Continuing
Ground Based Interceptor - Government Reliability Program	MIPR	CCDC / Redstone Arsenal, AL : NSWC Crane, IN	22.732	6.628	Nov 2018	10.331	Nov 2019	4.068	Nov 2020	-		4.068	Continuing	Continuing	Continuing
Ground Based Interceptor - Ground Based Interceptors #48-58 (CE-II)	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	716.580	0.000		0.000		0.000		-		0.000	0.000	716.580	0.000
Ground Based Interceptor - Interceptor Manufacturing Support	MIPR	NASA MSFC& CCDC, HSV, AL Draper Laboratory, MA; : Vanguard, HSV, AL	18.009	1.812	Nov 2018	21.156	Nov 2019	18.086	Nov 2020	-		18.086	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Based Interceptor - Kill Vehicle Space Chamber Testing	MIPR	AEDC : Tullahoma, TN	0.000	0.000		6.213	Nov 2019	6.338	Nov 2020	-		6.338	Continuing	Continuing	Continuing
Ground Based Interceptor - Operational Spares	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	28.516	0.446	Nov 2018	0.000		0.000		-		0.000	0.000	28.962	0.000
Ground Based Interceptor - Parts Testing	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.000	0.000		8.575	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Based Interceptor - Prime Interceptor Manufacturing & Lab Support	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	68.088	1.139	Nov 2018	4.099	Nov 2019	3.655	Nov 2020	-		3.655	Continuing	Continuing	Continuing
Ground Based Interceptor - Prime Reliability Program	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	40.532	8.674	Nov 2018	33.349	Nov 2019	5.960	Nov 2020	-		5.960	Continuing	Continuing	Continuing
Ground Based Interceptor - Software Maintenance & Updates	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	88.111	9.763	Nov 2018	18.208	Nov 2019	48.512	Nov 2020	-		48.512	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Fort Drum IDT	MIPR	MDA/AL : /VA/NY	0.576	0.000		0.000		0.000		-		0.000	0.000	0.576	0.000
Ground Systems & Fire Control - Government Missile Field 4 (20 Silos)	MIPR	MDA : AL/VA	5.575	6.207	Nov 2018	3.953	Nov 2019	4.307	Nov 2020	-		4.307	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Government Software Development	MIPR	CCDC : Redstone Arsenal, AL	10.962	0.000		3.045	Nov 2019	2.371	Nov 2020	-		2.371	Continuing	Continuing	Continuing
Ground Systems & Fire Control - MF-1: two silos to ensure the number of fielded GBIs does not decrease through the FYDP	C/CPIF	Boeing : AL/AK/AZ/ CA/CO/VA	0.000	14.958	Nov 2018	0.000		0.000		-		0.000	0.000	14.958	0.000
Ground Systems & Fire Control - Phased Array IDTs	TBD	Competitive Contract Award : TBD	0.000	0.000		14.269	Nov 2019	18.044	Nov 2020	-		18.044	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Systems & Fire Control - Prime CLE Re-Architecture	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	46.609	0.000		0.000		0.000		-		0.000	0.000	46.609	0.000
Ground Systems & Fire Control - Prime Communications Infrastructure	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	7.924	2.044	Nov 2018	1.882	Nov 2019	0.298	Nov 2020	-		0.298	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime Fort Drum IDT	C/CPIF	Boeing AL : CO/NY/VA	10.063	0.000		0.000		0.000		-		0.000	0.000	10.063	0.000
Ground Systems & Fire Control - Prime Ground Systems Software Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	426.017	141.048	Nov 2018	172.829	Nov 2019	198.721	Nov 2020	-		198.721	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime MF-1 Repair and Refurbishment	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	38.925	0.000		0.000		0.000		-		0.000	0.000	38.925	0.000
Ground Systems & Fire Control - Prime Missile Field 4 (20 Silos)	C/CPIF	Boeing : AL/AK/AZ/CA/CO/VA	71.588	28.507	Nov 2018	15.523	Nov 2019	7.615	Nov 2020	-		7.615	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime On Demand Communications	C/CPFF	Boeing : AL/AK/AZ/CA/CO/TX/VA	0.000	5.820	Nov 2018	36.217	Nov 2019	9.530	Nov 2020	-		9.530	Continuing	Continuing	Continuing
Ground Systems & Fire Control - Prime Technology Refresh	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	357.055	64.475	Nov 2018	127.278	Nov 2019	66.924	Nov 2020	-		66.924	Continuing	Continuing	Continuing
GBI Service Life Extension Program (SLEP) - GBI SLEP	TBD	Contract Award : TBD	0.000	0.000		180.000	Jan 2020	22.935	Nov 2020	-		22.935	Continuing	Continuing	Continuing
		Subtotal	2,703.099	354.270		818.395		542.317		-		542.317	Continuing	Continuing	N/A

Remarks

N/A

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Government Discrimination Improvements	MIPR	FFRDC/UARC : AL	16.925	2.483	Nov 2018	3.456	Nov 2019	3.519	Nov 2020	-		3.519	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government EKV HWIL Tests in Space Chamber	MIPR	AEDC : Tullahoma, TN	33.693	6.303	Nov 2018	5.707	Nov 2019	0.000		-		0.000	0.000	45.703	0.000
Systems Engineering and Program Management - Government Modeling and Simulation	MIPR	SED and Morrow Labs : Redstone Arsenal/AL	105.275	26.581	Nov 2018	26.048	Nov 2019	30.172	Nov 2020	-		30.172	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Government Systems Engineering & Integration	MIPR	CCDC : HSV/AL	117.336	60.092	Nov 2018	64.965	Nov 2019	68.322	Nov 2020	-		68.322	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Information Management & Technology Ops	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	38.375	12.415	Nov 2018	12.477	Nov 2019	12.565	Nov 2020	-		12.565	Continuing	Continuing	Continuing
Systems Engineering and Program Management - M&S Element Improvements	C/CPIF	Boeing : AL/CA/CO/ VA	0.000	0.000		2.798	Nov 2019	0.000		-		0.000	0.000	2.798	0.000
Systems Engineering and Program Management - M&S Industry Support	C/CPAF	Northrop Grumman : Al, VA	2.539	0.000		0.000		0.000		-		0.000	0.000	2.539	0.000
Systems Engineering and Program Management - Prime Design, Readiness, Analysis and Reporting	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	14.521	9.151	Nov 2018	0.000		0.000		-		0.000	0.000	23.672	0.000
Systems Engineering and Program Management - Prime Discrimination Improvements	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	83.734	40.338	Nov 2018	0.000		0.000		-		0.000	0.000	124.072	0.000

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Prime EKV HWIL Tests in Space Chamber	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	70.656	0.000		0.000		0.000		-		0.000	0.000	70.656	0.000
Systems Engineering and Program Management - Prime Modeling and Simulation	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	201.359	14.298	Nov 2018	17.935	Nov 2019	48.598	Nov 2020	-		48.598	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime Program Management	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	322.240	53.812	Nov 2018	61.606	Nov 2019	61.022	Nov 2020	-		61.022	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Prime System Engineering and Integration	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	395.356	32.287	Nov 2018	52.949	Nov 2019	30.088	Nov 2020	-		30.088	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis	MIPR	Various : AL/VA	28.339	1.921	Nov 2018	1.851	Nov 2019	45.617	Nov 2020	-		45.617	Continuing	Continuing	Continuing
Systems Engineering and Program Management - Systems Engineering & Analysis - CSS Support	C/CPFF	TEAMS : AL	20.216	6.607	Nov 2018	3.510	Nov 2019	0.000		-		0.000	0.000	30.333	0.000
Systems Engineering and Program Management - Systems Engineering & Analysis – FFRDC / UARC	MIPR	Various : AL/VA	10.844	3.454	Nov 2018	4.742	Nov 2019	0.000		-		0.000	0.000	19.040	0.000
Systems Engineering and Program Management - Systems Engineering & Analysis – Industry Support	C/CPIF	Boeing : AL	25.003	6.011	Nov 2018	6.410	Nov 2019	0.000		-		0.000	0.000	37.424	0.000
Systems Engineering and Program Management -	C/CPIF	Boeing : AL/CA/CO/VA	25.431	12.737	Nov 2018	15.497	Nov 2019	0.000		-		0.000	0.000	53.665	0.000

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering and Program Management - Discrimination Engineering & Analysis															
Systems Engineering and Program Management - Systems Engineering and Program Management M&S Support	Allot	MDA : AL/VA	48.182	6.285	Nov 2018	7.760	Nov 2019	0.000		-		0.000	0.000	62.227	0.000
Systems Engineering and Program Management - Technical Direction Agent	MIPR	AL/CA/GA/MA : MD/ NM/UT/VA	55.906	17.089	Nov 2018	18.428	Nov 2019	18.793	Nov 2020	-		18.793	Continuing	Continuing	Continuing
Program Operations - Contract Support Services	C/CPFF	Various : AL/AK/CA/ CO/VA	459.124	19.589	Nov 2018	20.873	Nov 2019	20.126	Nov 2020	-		20.126	Continuing	Continuing	Continuing
Program Operations - FFRDC Support	MIPR	MIT/LL : AL/VA/CO	51.371	1.977	Nov 2018	2.215	Nov 2019	2.261	Nov 2020	-		2.261	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	294.858	29.958	Oct 2018	34.562	Oct 2019	31.503	Oct 2020	-		31.503	Continuing	Continuing	Continuing
Program Operations - Information Technology Services	MIPR	MDA : AL/CA/VA/ CO/AK	6.203	2.403	Nov 2018	2.527	Nov 2019	2.375	Oct 2020	-		2.375	Continuing	Continuing	Continuing
Program Operations - Other Govt Agencies	MIPR	Various : AL/VA/FL/ CO	53.426	4.168	Nov 2018	0.930	Nov 2019	0.948	Nov 2020	-		0.948	Continuing	Continuing	Continuing
Program Operations - Safety and Quality	MIPR	MDA : AL/AK/CA/VA	0.583	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Operations - Travel	MIPR	MDA : AL/VA	10.931	1.561	Oct 2018	1.354	Oct 2019	1.363	Oct 2020	-		1.363	Continuing	Continuing	Continuing
		Subtotal	2,492.426	371.520		368.600		377.272		-		377.272	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5,195.525	725.790		1,186.995		919.589		-		919.589	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	MD08 / *Ground Based Midcourse*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
CLE Re-architecture	✦	✦	✦	✦																								
Communications Infrastructure	✧	✧	✧	✧	✧	✧	✧	✧																				
Ground Based Interceptors Rotation and Upgrades	✧	✧	✧	✧	✧	✧	✧	✧																				
Technology Refresh	✧	✧	✧	✧	✧	✧	✧	✧																				
GCN Modernization	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
Acquisition of Five C2 Boost Vehicles	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧														
Ground Systems Software 8 Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧										
Missile Field 4/1 Modernization/Expansion	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧						
Stockpile Reliability Program Testing	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
IDT Modernization	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧				
Phased Array IDT				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Ground Systems Software 9 Development				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧					
BVT-03 Interceptor Integration, Checkout and Emplacement				✧	✧	✧	✧	✧	✧																			
EKV SW 11.0 Development and Testing				✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧									
Ground Systems Software 8 Development (FQT)								✧																				
Fort Greely Communications Center											✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
EKV SW 12.0 Development and Testing											✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧					
Upgrade, Integrate and Emplace Intercept Flight Test												✧	✧	✧	✧	✧	✧											

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD08 / *Ground Based Midcourse*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
CLE Re-architecture	1	2019	4	2019
Communications Infrastructure	1	2019	4	2020
Ground Based Interceptors Rotation and Upgrades	1	2019	4	2020
Technology Refresh	1	2019	4	2020
GCN Modernization	1	2019	4	2023
Acquisition of Five C2 Boost Vehicles	1	2019	2	2022
Ground Systems Software 8 Development	1	2019	2	2023
Missile Field 4/1 Modernization/Expansion	1	2019	2	2024
Stockpile Reliability Program Testing	1	2019	4	2025
IDT Modernization	1	2019	4	2024
Phased Array IDT	4	2019	4	2025
Ground Systems Software 9 Development	4	2019	3	2024
BVT-03 Interceptor Integration, Checkout and Emplacement	4	2019	1	2021
EKV SW 11.0 Development and Testing	4	2019	3	2023
Ground Systems Software 8 Development (FQT)	4	2020	4	2020
Fort Greely Communications Center	3	2021	4	2023
EKV SW 12.0 Development and Testing	3	2021	3	2024
Upgrade, Integrate and Emplace Intercept Flight Test	4	2021	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC08: *Cyber Operations*	52.262	34.472	63.407	44.824	-	44.824	34.378	35.086	32.041	31.399	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2020 to FY 2021 reflects the $24 million Congressional add in FY 2020 for planning, analysis & assessment of Missile Defense System (MDS) critical infrastructure cybersecurity.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) Cyber Operations provide cybersecurity and cyber resiliency to maintain and operate all mission and mission support systems.

GMD systems must maintain Network and System Certification and Accreditation for operation on all GMD networks and nodes. Cybersecurity and Cyber Resiliency efforts hardens the GMD weapon system against a cyber-attack and reduces system vulnerabilities. The GMD strategy implements cybersecurity and cyber resiliency systems throughout the lifecycle to flow requirements to the Ground Based Interceptor and GMD Ground Systems to influence system development.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	6.813	8.237	8.492
Articles:	-	-	-
Description: The GMD Weapon System maintains a defensive cyber posture through analysis of system software and hardware. By conducting annual cybersecurity reviews, all GMD systems are evaluated to ensure the systems are authorized per the Risk Management Framework (RMF) to assess compliance in implementing and maintaining cybersecurity controls. Develops GMD DoD RMF Assessment and Authorization packages, necessary to ensure all GMD networks and nodes maintain authority to operate. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Implement the GMD Cybersecurity Risk Process across all systems to allow Program Management to execute risk-based decisions on cybersecurity controls -Continue assessing, implementing, documenting, and validating up to 512 cybersecurity control families (1935 security protections and control enhancements) for 25 representative systems which are comprised of 250,000 computing and logic bearing components supporting the GMD Development, Test, Training, and Operational systems -Continue ensuring compliance with security mandates to maintain continued authorization to operate			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue protecting the GMD systems through the incorporation of a qualified cybersecurity workforce ***FY 2021 Plans:*** -Implement the GMD Cybersecurity Risk Process across all systems to execute risk-based decisions on cybersecurity controls -Assess, implement, document, and validate up to 512 cybersecurity control families (1935 security protections and control enhancements) for 25 representative systems comprising 250,000 computing and logic bearing components to support the GMD Development, Test, Training, and Operational systems -Ensure compliance with security mandates to maintain continued authorization to operate -Ensure the cyber workforce is trained and qualified -Support modification of Installation Support Agreements for assigned real property to ensure Facility-Related Control Systems, supporting MDA facilities, are cyber-secure per DoDI 8510.01 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides increased implementation of the GMD Cybersecurity Risk process across all systems to allow Program Management to execute risk-based decisions on cybersecurity controls.			
Title: Cyber Security and Cyber Resiliency	27.659	55.170	36.332
Articles:	-	-	-
Description: Cybersecurity and Cyber Resiliency efforts harden the GMD weapon system against a cyber-attack and reduces system vulnerabilities. The GMD strategy implements cybersecurity and cyber resiliency systems throughout the lifecycle to flow requirements to the Ground Based Interceptor and GMD Ground Systems to influence system development. Early cyber testing is completed to identify vulnerabilities and fixes early in the design process. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Continue implementing necessary upgrades to enhance the cybersecurity posture of the GMD operational environments and it's supporting information systems and networks while remaining responsive to active or emerging cyber threats against GMD -Implement robust cyber resiliency in GMD systems by developing system level requirements that flow to Ground Systems and Interceptor components to modify designs so GMD systems can operate under cyber-attacks. This level of cybersecurity design will require recurring testing and training for Warfighter and computer network defense operators to address the resilient capability against changing cyber threats -Develop cybersecurity processes and procedures that will provide operators, maintainers, and Warfighter specific steps to recognize and react to cyber-attacks			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Develop and execute quarterly cybersecurity training scenarios which will allow fire control operators and network defenders to train through a cyber-contested environment while in an engagement scenario -Execute GM specific penetration testing on multiple components in an effort to identify capability flaws -Develop training curriculum for Fire Control Operators and Cyber Incident Responders to test TTPs and new cyber defense capabilities -Conduct GM Program Cybersecurity Risk Assessments on all vulnerabilities and deficiencies -Continue development Tactics, Techniques, and Procedures (TTPs) to address cybersecurity incidents and responses -Support modification of Installation Support Agreements (ISA's) for assigned real property to ensure Facility-Related Control Systems that support MDA facilities are cyber secure per DoDI 8510.01 -Conduct Cybersecurity training of personnel to include incorporating basic cybersecurity guidance into facility acquisition projects and advanced cybersecurity training for facility cybersecurity personnel			
FY 2021 Plans: -Implement robust cyber resiliency in the GMD weapon systems by developing system level requirements that flow to component level designs, allowing the GMD system to operate in a cyber-contested environment -Support testing on developmental systems in a virtualized environment by integrating cyber test events allowing execution of specific cyber threat vectors on developmental software in an effort to identify capability flaws that will be assessed through the cyber risk process -Tests Cooperative Vulnerability and Penetration Assessment (CVPA) to discover unknown vulnerabilities and determine effectiveness of mitigations from development level cyber testing -Tests Support Adversarial Assessment penetration to determine effectiveness of cyber-attacks in an operational environment along with the effectiveness of the operational and technical mitigations implemented from developmental cyber testing -Implements software and hardware fixes to address weaknesses found during testing -Develop intermediate cybersecurity processes and procedures that provide operators, maintainers, and Warfighter specific steps to recognize and react to cyber-attacks, thus advancing the operational cyber resiliency through the defensive cyber operations capability -Develop and test a new Computer Network Defense system that improves the operators ability to detect and respond to real-time cyber events -Develop and execute quarterly cybersecurity training scenarios allowing fire control operators and network defenders to train in a cyber-contested environment while in a kinetic engagement scenario -Provide training opportunities for Fire Control Operators and Cyber Incident Responders to test Tactics Techniques and Procedures to improve resiliency to a cyber-attack			
FY 2020 to FY 2021 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Decrease from FY 2020 to FY 2021 reflects the $24 million Congressional add in FY 2020 for planning, analysis & assessment of MDS critical infrastructure cybersecurity.			
Accomplishments/Planned Programs Subtotals	34.472	63.407	44.824

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0203882C: MD08: *Midcourse Defense O&M*	139.204	153.218	158.054	-	158.054	175.511	179.368	219.013	169.852	Continuing	Continuing
• 0203882C: MD08: *GMD Procurement*	405.464	285.471	0.000	-	0.000	0.000	10.225	2.130	36.400	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604874C: *Improved Homeland Defense Interceptors*	407.858	515.000	664.138	-	664.138	921.349	1,339.439	856.712	1,258.000	Continuing	Continuing
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	72.634	98.139	67.071	-	67.071	63.240	61.200	79.139	33.282	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	5.754	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.754

Remarks

D. Acquisition Strategy

The Development and Sustainment Contract (DSC) with the Boeing Company as lead is used to design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient cyber protections exist. The Technical, Engineering, Advisory, and Management Support (TEAMS) contract which includes Booz Allen Hamilton, Decisive Analytics, and Parsons along with FFRDC MITRE personnel is used to ensure Network and System Certification and Accreditation requirements are met.

The Integrated Research and Development for Enterprise Solutions (IRES) contract with Jacobs Engineering Group as lead is used to provide cyber related equipment, licenses and support

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Note 1: GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011 to the Boeing Company. This contract included development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities.

Note 2: On January 31, 2018, the DSC Extension was awarded to the Boeing Company with a period of performance through 1QFY2024. The DSC Extension includes supporting test, engineering, software, and performance based logistics scope. The DSC structure breaks out major efforts into separate Contract Line Item Numbers with each having incentive fees under the Cost Plus Incentive Fee contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Civilian Salaries	MIPR	MDA : AL/CA/CO	3.520	1.218	Nov 2018	1.280	Nov 2019	1.329	Nov 2020	-		1.329	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contract Support Services	C/CPFF	Booz Allen Hamilton, AL, Decisive Analytics, AL : Torch Technologies, AL Parsons, AL	17.462	5.595	Nov 2018	6.957	Nov 2019	7.163	Nov 2020	-		7.163	Continuing	Continuing	Continuing
Cyber Security and Cyber Resiliency - Cybersecurity	C/CPAF	Jacobs, AL,CO Boeing, AL, CO : MITRE, AL	14.901	4.076	Nov 2018	2.309	Nov 2019	2.253	Nov 2020	-		2.253	Continuing	Continuing	Continuing
Cyber Security and Cyber Resiliency - Facility-Related Control Systems Contract Method	MIPR	Booz Allen Hamilton : AL, VA	0.000	0.000		0.914	Nov 2019	0.931	Nov 2020	-		0.931	Continuing	Continuing	Continuing
Cyber Security and Cyber Resiliency - GMD Cybersecurity Program	C/CPIF	Boeing : AL/AK/CA/CO	6.812	18.378	Nov 2018	40.139	Nov 2019	16.739	Nov 2020	-		16.739	Continuing	Continuing	Continuing
Cyber Security and Cyber Resiliency - Ground Systems Software Cybersecurity	C/CPIF	Boeing AL/AK/AZ : CA/CO/VA	9.567	5.205	Nov 2018	11.808	Nov 2019	16.409	Nov 2020	-		16.409	Continuing	Continuing	Continuing
		Subtotal	52.262	34.472		63.407		44.824		-		44.824	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	52.262	34.472		63.407		44.824		-		44.824	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GMD Cybersecurity Mitigation Monitoring and Tracking	✧	✧	✧	✧	✧	✧	✧	✧																				
GMD Cybersecurity Program Policy / Risk Management	✧	✧	✧	✧	✧	✧	✧	✧																				
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/Submission	✧	✧	✧	✧	✧	✧	✧	✧																				
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	✧	✧	✧	✧	✧	✧	✧	✧																				
BMDS Cybersecurity Policy Development	✧	✧	✧	✧	✧	✧	✧	✧																				
Network and System Certification and Accreditation	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cybersecurity and Cyber Resiliency	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cooperative Vulnerability Penetration Assessment (CVPA)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Adversarial Assessment (AA)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Computer Network Defense (CND)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MC08 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GMD Cybersecurity Mitigation Monitoring and Tracking	1	2019	4	2020
GMD Cybersecurity Program Policy / Risk Management	1	2019	4	2020
GMD Information Assurance Certification and Accreditation (C&A) Package Preparation/ Submission	1	2019	4	2020
GMD Transition to Cybersecurity Risk Management Framework (CRMF)	1	2019	4	2020
BMDS Cybersecurity Policy Development	1	2019	4	2020
Network and System Certification and Accreditation	1	2019	4	2025
Cybersecurity and Cyber Resiliency	1	2019	4	2025
Cooperative Vulnerability Penetration Assessment (CVPA)	1	2019	4	2025
Adversarial Assessment (AA)	1	2019	4	2025
Computer Network Defense (CND)	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	130.479	30.054	53.314	39.892	-	39.892	30.799	29.215	39.281	49.928	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	30.054	53.314	39.892
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	30.054	53.314	39.892

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various : Multi: AK, AL, CA, VA	3.860	3.060	May 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Facilities and Maintenance SRM	MIPR	Various : Multi: AK, AL, CA, HI, NY, VA	0.000	0.000		0.000		2.652	Jan 2021	-		2.652	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	16.797	0.427	Jul 2019	0.698	Jul 2020	0.000		-		0.000	0.000	17.922	0.000
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	MDA : Multi: AK, AL, CA, CO, VA	51.772	26.567	Oct 2018	28.885	Oct 2019	29.919	Oct 2020	-		29.919	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AK, AL, CO, CA, HI, VA	26.298	0.000		0.000		0.319	Oct 2020	-		0.319	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL,CA, CO, HI, VA	7.660	0.000		23.731	Nov 2019	6.202	Jul 2021	-		6.202	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations, Sustainment and GPC	C/FFP	Various : Multi: AK, AL, CA, HI, NY, VA	0.000	0.000		0.000		0.800	Dec 2020	-		0.800	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	24.092	0.000		0.000		0.000		-		0.000	0.000	24.092	0.000
		Subtotal	130.479	30.054		53.314		39.892		-		39.892	Continuing	Continuing	N/A

Remarks

Support is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	130.479	30.054		53.314		39.892		-		39.892	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603882C / *Ballistic Missile Defense Midcourse Defense Segment*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,581.299	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
MD11: *BMDS Radars*	1,477.753	360.338	311.998	269.199	-	269.199	552.234	633.753	555.360	571.096	Continuing	Continuing
MC11: *Cyber Operations*	8.995	6.053	28.506	1.558	-	1.558	1.580	1.614	1.191	5.390	Continuing	Continuing
MD40: *Program-Wide Support*	94.551	16.368	11.784	11.200	-	11.200	22.885	21.172	18.152	17.106	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019/outyears: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

Decrease from FY 2020 to FY 2021 reflects FY 2020 Congressional plus up for AN/TPY-2 High Altitude Electromagnetic Pulse (HEMP) Hardening and the completion of USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) requirements.

The FY 2021 funding request was reduced by $12.3 million during DWR to reduce Discrimination efforts.

The FY 2021 funding request was reduced by $1.917 million during DWR to postpone HDR-Hawaii.

A. Mission Description and Budget Item Justification

The Missile Defense System (MDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of MDS weapon systems, such as Ground-Based Midcourse Defense (GMD), Aegis Ballistic Missile Defense (BMD), and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides early warning, midcourse and terminal missile defense threat data. This data enables layered detection and tracking of missile targets, providing fire-control quality position, velocity, and discrimination data through Ground-Based Midcourse Defense Fire Control (GFC), or Command and Control, Battle Management and Communications (C2BMC).

Overlapping coverage of geographically diverse sensors provides improved threat track data, reduces the impact of the loss of any one sensor, and reduces the potential impact of countermeasures. The extended coverage and accuracy provided by a network of layered sensors increases the defensive footprint and reduces the number of target engagements required, thereby conserving interceptor inventory and maintaining a high probability of successful engagement. Networked forward-based sensors enable C2BMC to pair the best sensor coverage with the best available weapon system to provide the most effective defense against missile threats.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*

This program element includes MDS threat discrimination improvements, which will enhance MDS effectiveness against the evolving adversary threat. The result will be a MDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. MDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) Program Elements.

The BMD Sensors Program contributes to regional and homeland missile defense through the development, delivery and deployment/redeployment of Army Navy/ Transportable Radar Surveillance and Control (AN/TPY-2) radars for operations or tests. AN/TPY-2 radars can be configured to operate either as a THAAD Fire Unit Radar (terminal mode) or Forward-Based Radar. These radars are transportable and add flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of missile flight. Through the MDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable remote Standard Missile (SM)-3 engagements by Aegis BMD, and to cue deployed THAAD and U.S. and partner Patriot batteries.

The MDS sensor network includes: the COBRA DANE Radar at Eareckson Air Station, Alaska, the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland for defense of the homeland. The Clear Ultra High Frequency Early Warning Radar (EWR), at Clear Air Force Station, AK, and the Cape Cod EWR, at Cape Cod Air Force Station, MA, are also being upgraded to include missile defense functionality against long-range threats in addition to their existing Missile Warning and Space Surveillance missions. Upgrade activities began in CY 2012 and are now projected to be completed in CY 2020 due to current UEWR operational configuration emergency maintenance required by AF Space Command that blocked access to the radar sites for operational testing. The addition of the Clear UEWR and Cape Cod UEWRs to the MDS sensor architecture improves MDS sensor coverage and provides new engagement options against long-range missile threats from Northeast Asia and Southwest Asia respectively.

This program element also supports planned radar deployments including the Long Range Discrimination Radar (LRDR) in Alaska.

The Sea Based X-Band Radar (SBX) is currently deployed in the Pacific Ocean.

Cyber Operations sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments, reviews of Plans of Action and Milestones (POA&Ms), and alignment and integration to the Tier 2 Cybersecurity Service Provider (CSSP) for the Sensors mission system.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	385.375	283.487	296.098	-	296.098
Current President's Budget	382.759	352.288	281.957	-	281.957
Total Adjustments	-2.616	68.801	-14.141	-	-14.141
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	68.801			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-4.964	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	2.348	0.000	-14.141	-	-14.141

Change Summary Explanation

Increase in FY 2020 reflects Congressional plus ups for Cyber Security requirements and High altitude Electromagnetic Pulse (HEMP) hardening efforts, as well as a reduction to modeling and simulations.

Decrease in FY 2021 reflects a reduction in discrimination efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD11: *BMDS Radars*	1,477.753	360.338	311.998	269.199	-	269.199	552.234	633.753	555.360	571.096	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects FY 2020 Congressional plus up for AN/TPY-2 High Altitude Electromagnetic Pulse (HEMP) Hardening and the completion of USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) requirements.

A. Mission Description and Budget Item Justification

The MDS Radars project includes development of future AN/TPY-2, COBRA DANE, LRDR, Sea Based X-Band (SBX), and UEWR capabilities through system engineering; software development; and testing support.

Modeling and Simulation (M&S) efforts include enhanced sensor models, development of Radio Frequency scene generators, integration of digital simulations into the Missile Defense System (MDS) M&S architecture, and Verification, Validation, and Accreditation of radar models. United States Indo-Pacific Command (USINDOPACOM) Joint Emerging Operational Needs Statement (JEONS) provides rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. This project also funds participation and support for MDS element ground and flight test campaigns and Warfighter games and exercises.

This project provides development of discrimination advanced algorithms for MDS radars to counter evolving threats. The discrimination improvement effort will develop and field integrated Element capabilities to improve MDS ability to identify lethal and non-lethal objects. Sensors will continue development of discrimination improvement mid-term design and test support for MDS radars and far term trade analysis and planning.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Basic Development Program	27.194	28.742	26.031
Articles:	-	-	-
Description: The Basic Development Program includes development and testing of software maintenance updates to address software trouble reports identified on fielded SW versions and flight/ground test events. Software maintenance updates also includes annual cybersecurity certifications and accreditations, testing for vulnerabilities, and third party assessments of all sensors systems. Software improvement efforts also include optimization of increased processing capabilities. The Basic Development Program also provides analysis of software performance during flight and ground testing to support Materiel Release for software deliveries. The Materiel Release Closure Plan for the AN/TPY-2 ensures the Reliability, Availability, and Maintainability (RAM) Program promotes reliability growth in the suite of AN/TPY-2 radars via product improvements.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: BMDS Radars Modeling & Simulation (M&S)	21.892	40.319	57.279
Articles:	-	-	-
Description: BMDS Radars M&S efforts include enhanced sensor models, development and maintenance of Radio Frequency (RF) scene generators, integration of digital simulations into the Missile Defense System (MDS), M&S architecture, and Verification, Validation, and Certification (VV&C) of radar models. This effort includes support for technical and performance assessments using Open Systems Architecture Sensor Models (OSM), Open Systems Architecture Signal Injectors (OSI) and other models/tools, as well as development and sustainment of Digital and Hardware in the Loop (HWIL) representations of various simulations and models to include the tactical versions of AN/TPY-2, LRDR, SBX, UEWR, and COBRA DANE Upgrade (CDU). This effort includes support for tactical requirements verification, including development and VV&C of models for testing electronic protection and objective debris mitigation algorithms. This project also supports war games, Warfighter exercises and training, and execution of element-level ground test campaigns, as well as the development of M&S frameworks and truth models required to anchor M&S. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Initiate development of additional capabilities in high fidelity digital models for AN/TPY-2 and SBX - Initiate Validation of high fidelity digital models for SBX - Initiate Validation of Multi-band Electronic Attack Digital Injection Capability (MEDIC) - Initiate End-to-end Digital Integrated System-level Simulation (EDISS) requirements development - Initiate Ground Test Integrated System Simulation (GTISS)requirements development ***FY 2021 Plans:*** - Continue development of EDISS (End-to-end Digital Integrated System-level Simulation), called Early Digital Product (EDP) - Continue EDISS requirements development			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Initiate EDISS software development and conduct spiral In-Progress Reviews - Initiate EDISS M&S Integration, Test, and Verification, Increment Acceptance Reviews - Initiate Software Development of EDISS Full Digital Product (FDP), Increments 1 and 2 - Initiate systems engineering for FDP Inc 1, initiate systems engineering for FDP Inc 2, including System Requirements Review and System Functional Review - Initiate software development for FDP Inc 1, including Spiral In-Progress Reviews - Initiate integration and testing for FDP Inc 1 - Initiate Phase 1 of GTISS (Ground Test Integrated System-level Simulation) improvements to the MDA Ground Test Architecture: - Continue GTISS Phase 1 requirements development - Initiate GTISS Phase 1 software development - Initiate GTISS Phase 1 M&S Integration, Test, and Verification - Initiate Engineering and Development of GTISS Phase 2 - Initiate GTISS Phase 2 software development, including in-progress technical reviews - Initiate Integration and Test GTISS Phase 2 M&S - Initiate GTISS Phase 3 Functional Analysis and System Design - Initiate GTISS Phase 3 requirements analysis and functional analysis, develop system design - Initiate GTISS Phase 3 Systems Engineering Technical Reviews - Continue development and validation of Multi-band Electronic Attack Digital Injection Capability (MEDIC) - Initiate development of additional capabilities in high fidelity digital models for AN/TPY-2 and SBX - Initiate validation of high fidelity digital models for AN/TPY-2 - Continue validation of high fidelity digital models for SBX ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects an increase for the incremental capability development of high-fidelity models for integration with both End-to-End Digital Integrated System-level Simulation (EDISS) and the Ground Test Integrated System-level Simulation (GTISS) programs. Activities include delivery and integration support for the Early Digital Product (EDP), software development for Full Digital Product (FDP) Increment 1, development and integration for GTISS Phase 1, development and technical reviews for GTISS Phase 2, and functional analysis and system design for GTISS Phase 3.			
Title: Capability Development Program	218.200	103.973	135.434
Articles:	-	-	-
Description: The Capability Development Program provides engineering support to enable compliance with BMD System Specification threat capabilities and addresses advanced threats. This task includes the redesign of select components to address			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
obsolescence and improve reliability of the system. This task continues electronic protection and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors. This effort develops the Post Intercept Assessment (PIA) capability for SBX and UEWRs. It develops, designs, and tests sensor mid-term discrimination improvements for X-Band radars, to include SBX threat discrimination improvements. This effort funds participation in far-term discrimination improvement threat model specifications and develops discrimination and countermeasure mitigation capability development. Additional software development activities include support to Patriot launch on THAAD capability, X86 performance optimization to enhance processing speed, and developmental information system enhancements. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Initiate expanded active sensor bias and full sensor bias reporting - Initiate threat updates and verification, core standards system engineering, required updates to models and simulation, and performance assessments ***FY 2021 Plans:*** - Initiate development of sensor mid-term discrimination improvements for X-Band radars, to include SBX threat discrimination improvements - Initiate development of sensor electronic protection for SBX - Initiate additional development of sensor electronic protection for AN/TPY-2 and LRDR and objective debris mitigation development efforts to reduce or eliminate the effect of corporate clutter and electronic attack on sensors - Continue expanded active sensor bias and full sensor bias reporting - Continue threat updates and verification, core standards system engineering, required updates to models and simulation, and performance assessments ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 initiates electronic protection efforts for SBX, provides additional electronic protection capabilities for AN/TPY-2 and LRDR, and the development of sensor mid-term discrimination improvements for X-band radars to include SBX threat discrimination improvements. It also reflects the transfer of weapon system specific cyber development efforts from Budget Project MC11, Cyber Operations, Network/System Assessment and Authorizations (A&A) to Budget Project MD11, MDS Radars, Capability Development.			
Title: Sensors Directorate Operations	57.428	50.892	49.566
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Program Operations provides strategic planning, program integration, contracting, acquisition, engineering, financial management, internal reviews and audits, and program assessments for the Sensors Program Office. Recurring activities include: - Provide technical and business management support activities to provide critical program status and decision quality data - Ensure Sensors program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process - Conduct internal program reviews to measure program progress against the six Missile Defense Agency approved baselines - Continue a Mission Assurance and Manufacturing Engineering Program to include Quality, Configuration Management, Manufacturing, Engineering, and Safety in all phases of the system life cycle, throughout the supply chain, and at all levels of assembly emphasizing high yield rates which minimize test and rework costs - Provide Quality Safety and Mission Assurance (QSMA) operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Upgrade Clear Early Warning Radar	6.424	3.172	0.889
Articles:	-	-	-
Description: Upgrade of Clear Early Warning Radar and Cape Cod Early Warning Radar includes adaptation of hardware and software to UEWR infrastructure, support to MDS communications and architecture work and installation at site. This project also includes preparation and removal of legacy equipment at each UEWR site. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue operations and sustainment activities post operational acceptance to include interim contractor logistics support at Clear Air Force Station (AFS) ***FY 2021 Plans:*** -Complete operations and sustainment activities post operational acceptance to include interim contractor logistics support at Clear Air Force Station (AFS) ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the completion of remaining interim contractor logistics support at Clear Air Force Station (AFS)			
Title: USINDOPACOM Joint Emerging Operational Needs Statement (JEONS)	29.200	15.900	0.000
Articles:	-	-	-
Description: Rapid deployment of software upgrades to optimize performance against increasing threats and improve regional integration. Phase 1 provides enhanced discrimination, increases search plan optimization, and updates Position, Navigation, and Timing and Regional Mission Data. Phase 2 will improve debris mitigation to increase raid performance against threats, improve debris tracks on radar resources, and provide search plan upgrades that increase search acquisition and support remote launcher capabilities. Phase 3 provides additional increased search plan capabilities, implementation of the DoD Regional Clock, remote launcher upgrades to integrate AN/TPY-2 with PATRIOT and THAAD systems, and improves proficiencies against advanced threats in complex environments. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Initiate expanded THAAD/MSE integration (Part II) in support of the USINDOPACOM Joint Emerging Operational Needs Statement (JEONS). ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) requirements			
Title: High Altitude Electromagnetic Pulse (HEMP) Hardening	0.000	69.000	0.000
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: This effort develops, designs, and tests High-Altitude Electromagnetic Pulse (HEMP) upgrade capabilities for Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Forward Based Mode (FBM) radar sites. ***FY 2020 Plans:*** - Conduct design efforts, prototype development, and developmental testing for FBM site equipment HEMP upgrades and commercial power interface at USINDOPACOM FBM sites - Conduct site survey and planning efforts for five FBM sites - Conduct Hardened Transportable Terminal modifications and shelter design - Acquire two systems for commercial power interface for USINDOPACOM FBM sites - Acquire systems for HEMP upgrades at FBM sites - Purchase HEMP hardened communications power generation equipment for FBM sites - Modify one USINDOPACOM FBM site to enable emplacement of Army generators ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects FY 2020 Congressional plus up for AN/TPY-2 High Altitude Electromagnetic Pulse (HEMP) Hardening.			
Accomplishments/Planned Programs Subtotals	360.338	311.998	269.199

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C MD11: *BMDS Radars Program O&M*	166.849	227.192	176.868	-	176.868	207.938	223.274	288.336	287.631	Continuing	Continuing
• 0208866C MD11: *BMDS Sensors Procurement*	13.585	10.046	0.000	-	0.000	5.593	22.145	17.065	17.009	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Radar Development Contract (RDC) awarded on Nov 1, 2017 supports the Sensors Directorate's X-Band Radars (XBR). Missile Defense System (MDS) capability and performance requirements, which underpin continuing XBR development requirements include, but are not limited to, the Army/Navy Transportable Radar Surveillance and Control (AN/TPY-2) radar and the Sea-Based X-Band (SBX) radar. These requirements stem directly from formal Warfighter requirements as developed in the United States Strategic Command (USSTRATCOM)-led Warfighter Involvement Process (see USSTRATCOM Special Instruction (SI) 538-3, Missile Defense Warfighter Involvement Process, June 25, 2008). Achievable requirements documented in the Prioritized Capabilities List (PCL) and Modification and Fielding Requirements List (MFRL) are documented in MDA's Achievable Capabilities List (ACL) and translated via the MDS architecture and system specifications into flow-down requirements, characteristics, and capability needs for individual MDS program specifications, and ultimately are approved through the systems engineering and

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

baseline change management process for MDS programs to execute. The RDC supports the XBRs for product improvement, including developmental upgrades of software and development of hardware and software to meet enhanced capabilities and risk reduction measures; warfighter support, including wargames and exercise support; engineering services, including engineering support for delivered and accepted radars to facilitate maintenance efforts which may include, but are not limited to, hardware obsolescence studies, hardware redesign, technology insertion and refurbishment; MDS test subject matter expert (SME) support; modeling and simulation SME support; and cybersecurity. These support activities are for all AN/TPY-2 radars, in the Forward Based Mode (FBM) and Terminal Mode (TM), and the SBX Radar to include the Weather Air Search Radar (WxASR) located on the SBX platform.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Basic Development Program - Material Release Get Well Plan - AMCOM	MIPR	AMCOM : AL	0.000	0.283	Oct 2018	0.285	Nov 2019	0.290	Nov 2020	-		0.290	Continuing	Continuing	Continuing
Basic Development Program - Basic Development - SBX	SS/CPAF	Raytheon : MA	0.000	0.000		2.000	Nov 2019	2.000	Nov 2020	-		2.000	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance AN/TPY-2	SS/CPAF	Raytheon : MA	22.675	3.862	Nov 2018	4.230	Nov 2019	3.131	Nov 2020	-		3.131	Continuing	Continuing	Continuing
Basic Development Program - Information Assurance SBX	SS/CPAF	Raytheon : MA	1.078	0.225	Oct 2018	0.000		0.000		-		0.000	0.000	1.303	0.000
Basic Development Program - Material Release Get Well Plan - ATEC	MIPR	ATEC : AL	0.000	0.715	Nov 2018	0.820	Nov 2019	0.697	Nov 2020	-		0.697	Continuing	Continuing	Continuing
Basic Development Program - Material Release Get Well Plan - CCDC	SS/CPAF	CCDC AVMC : AL	16.565	1.084	Nov 2018	1.250	Dec 2019	1.125	Nov 2020	-		1.125	0.000	20.024	0.000
Basic Development Program - Sys Integration & Tech Assessments	MIPR	CCDC AVMC : AL	23.459	2.824	Nov 2018	3.132	Nov 2019	2.100	Nov 2020	-		2.100	0.000	31.515	0.000
Basic Development Program - X-Band Software Enhancements/ Development	SS/CPAF	Raytheon : AL	109.713	18.201	Nov 2018	17.025	Feb 2020	16.688	Nov 2020	-		16.688	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development	SS/CPFF	Raytheon : MA, CO	144.205	13.952	Nov 2018	23.906	Jan 2020	41.871	Jan 2021	-		41.871	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - M&S Development-LM	SS/CPIF	Lockheed Martin : NJ	0.000	0.000		0.000		2.600	Nov 2020	-		2.600	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BMDS Radars Modeling & Simulation (M&S) - VV&A of Models	MIPR	CCDC AVMC : AL	53.318	5.905	Dec 2018	13.946	Dec 2019	10.300	Dec 2020	-		10.300	Continuing	Continuing	Continuing
BMDS Radars Modeling & Simulation (M&S) - Warfighter Exercises	SS/CPFF	Raytheon : MA	12.337	2.035	Feb 2019	2.467	Mar 2020	2.508	Feb 2021	-		2.508	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection - GTRI	SS/CPFF	GTRI : GA	0.000	0.521	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection - PRIME	C/CPAF	Raytheon : MA	0.000	18.315	Nov 2018	0.000		29.354	Nov 2020	-		29.354	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination - CCDC	MIPR	CCDC AVMC : AL	0.000	8.214	Nov 2018	0.000		6.200	Nov 2020	-		6.200	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination - MITRE	FFRDC	MITRE : AL	0.000	3.187	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development - CCDC	MIPR	CCDC AVMC : AL	0.000	10.390	Nov 2018	0.000		8.850	Nov 2020	-		8.850	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development - JHU	FFRDC	John Hopkins University : MD	0.000	4.408	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Capability Development Program - AN/TPY-2 Capability Development - PRIME	SS/CPAF	Raytheon : MA	191.571	14.071	Nov 2018	20.416	Nov 2019	21.279	Nov 2020	-		21.279	Continuing	Continuing	Continuing
Capability Development Program - Electronic Protection - CCDC	MIPR	CCDC AVMC : AL	22.556	2.948	Nov 2018	5.209	Oct 2019	4.500	Nov 2020	-		4.500	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Development Program - Enhanced Discrimination	C/CPAF	Raytheon : MA	124.718	141.524	Jan 2019	60.360	Jan 2020	42.515	Jan 2021	-		42.515	Continuing	Continuing	Continuing
Capability Development Program - Enhanced Discrimination - LM	SS/CPIF	Lockheed Martin : NJ	0.000	5.922	Jan 2019	0.000		6.670	Dec 2020	-		6.670	Continuing	Continuing	Continuing
Capability Development Program - Network and Infrastructure Services	C/CPAF	Jacobs Engineering : AL, MA	0.000	0.000		0.000		6.290	Nov 2020	-		6.290	Continuing	Continuing	Continuing
Capability Development Program - Post Intercept Assessment (PIA)	C/CPAF	Raytheon : MA	10.400	0.000		5.200	Dec 2019	0.000		-		0.000	0.000	15.600	0.000
Capability Development Program - SBX Capability Development - includes Post Intercept Assessment (PIA)	SS/CPAF	Raytheon : MA	0.000	8.700	Jan 2019	11.788	Mar 2020	4.776	Jan 2021	-		4.776	Continuing	Continuing	Continuing
Capability Development Program - UEWR Capability Development - includes Post Intercept Assessment (PIA)	SS/CPAF	Raytheon : MA	0.000	0.000		1.000	Jun 2020	5.000	Jun 2021	-		5.000	Continuing	Continuing	Continuing
Sensors Directorate Operations - Army Hybrid Program Office	MIPR	SMDC : AL	7.833	1.086	Dec 2018	1.258	Dec 2019	2.035	Dec 2020	-		2.035	Continuing	Continuing	Continuing
Sensors Directorate Operations - Civilians/ Travel	Various	MDA : AL, VA, MA	178.883	24.723	Oct 2018	19.512	Oct 2019	19.201	Oct 2020	-		19.201	Continuing	Continuing	Continuing
Sensors Directorate Operations - Contractor Service Support	Various	Various : Various	224.180	18.330	Nov 2018	18.267	Oct 2019	18.850	Oct 2020	-		18.850	Continuing	Continuing	Continuing
Sensors Directorate Operations - FFRDC/ UARC	SS/CPAF	CSS, APL, LL, OGA, GTRI, MITRE : AL,MA, VA, MD, GA	99.458	4.753	Nov 2018	7.815	Nov 2019	7.815	Nov 2020	-		7.815	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Sensors Directorate Operations - Network and Infrastructure Services	C/CPAF	Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	41.788	5.822	Feb 2019	2.000	Jan 2020	0.292	Jan 2021	-		0.292	Continuing	Continuing	Continuing
Sensors Directorate Operations - Other Govt Agencies	MIPR	Various : Various	35.349	2.714	Feb 2019	2.040	Feb 2020	1.373	Feb 2021	-		1.373	Continuing	Continuing	Continuing
Upgrade Clear Early Warning Radar - Facilities Site Activation/Admin Comms	MIPR	Various : AL, MA, AK	7.449	0.390	Dec 2018	0.000		0.000		-		0.000	0.000	7.839	0.000
Upgrade Clear Early Warning Radar - Radar Upgrade -- Prime Contractor	C/CPAF	Raytheon : MA	124.418	6.034	Jan 2019	3.172	Jan 2020	0.889	Jan 2021	-		0.889	Continuing	Continuing	Continuing
USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) - Software Enhancements/ Development	C/CPAF	Raytheon : MA	25.800	29.200	Jan 2019	15.900	Jan 2020	0.000		-		0.000	0.000	70.900	0.000
High Altitude Electromagnetic Pulse (HEMP) Hardening - FBM Site Modifications	MIPR	Various : Various	0.000	0.000		5.800	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing
High Altitude Electromagnetic Pulse (HEMP) Hardening - Hardened Transportable Terminal (HTT) Shelter and Modifications	MIPR	US Army : Various	0.000	0.000		7.000	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing
High Altitude Electromagnetic Pulse (HEMP) Hardening - Power Distribution Centers (PDC) and Commercial Power	C/TBD	Various : Various	0.000	0.000		39.600	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
High Altitude Electromagnetic Pulse (HEMP) Hardening - Power Distribution System (PDS) Development and Integration	SS/CPAF	Raytheon : MA	0.000	0.000		16.600	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	1,477.753	360.338		311.998		269.199		-		269.199	Continuing	Continuing	N/A

Remarks

Note: Clear Early Warning Upgrade Program includes upgrade of the Cape Cod EWR.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

Operations and sustainment of Upgraded Early Warning Radar (UEWR), COBRA DANE (CD), and Army Navy/Transportable Radar Surveillance and Control (AN/TPY-2) Radars Contract Logistics Support (CLS) are Operations and Maintenance (O&M) Defense-Wide appropriations and are described in the Missile Defense Agency (MDA) O-Documents.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,477.753	360.338		311.998		269.199		-		269.199	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603884C / *Ballistic Missile Defense Sensors*	MD11 / *BMDS Radars*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTI-03 (OTA, OT Intercept Flight Test)	▲																											
FTG-11 (OT) (GM, OT Intercept Flight Test)		▲																										
FTT-23 (TH, DT Intercept Flight Test)				▲																								
(EX) EAGLE RESOLVE 20						△																						
(EX) AIR AND MISSILE DEFENSE EXERCISE 21								△																				
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)									△																			
SNG-S-D-4									◇																			
FTT-21 (TH, DT Intercept Flight Test)										△																		
SNG-S-H-4												◇																
SNG-A-D-3													◇															
SNG-S-D-5													◇															
SNG-U-D-4													◇															
SNG-C-D-2													◇															
(EX) EAGLE RESOLVE 22														△														
SNG-U-H-3														◇														
FTT-25 (TH Intercept Flight Test)															△													
(EX) AIR AND MISSILE DEFENSE EXERCISE 22															✧	✧												
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																△												
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)																△												
SNG-A-H-5																◇												
SNG-A-D-4																	◇											
SNG-U-H-4																	◇											
SNG-C-D-3																	◇											
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)																	△											

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTT-24 (TH, DT Intercept Flight Test)																			△									
SNG-A-H-4																				◇								
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																				△								
FTX-28 E1-E3 (TH, DT Target Only Flight Test)																				△								
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																				△								
SNG-S-D-6																					✧	✧						
(EX) EAGLE RESOLVE 24																						△						
FTT-22 (TH Intercept Flight Test)																							△					
SNG-S-H-5																							✧	✧				
FTO-04 (GM, OT Intercept Flight Test)																									△			
SNG-A-D-6																											◇	
SNG-A-H-6																											◇	
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
SNG-S-D-4	1	2021	1	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
SNG-S-H-4	4	2021	4	2021
SNG-A-D-3	1	2022	1	2022
SNG-S-D-5	1	2022	1	2022
SNG-U-D-4	1	2022	1	2022
SNG-C-D-2	1	2022	1	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
SNG-U-H-3	2	2022	2	2022
FTT-25 (TH Intercept Flight Test)	3	2022	3	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	3	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
SNG-A-H-5	4	2022	4	2022
SNG-A-D-4	1	2023	1	2023
SNG-U-H-4	1	2023	1	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD11 / *BMDS Radars*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SNG-C-D-3	1	2023	1	2023
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	1	2023	1	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
SNG-A-H-4	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
FTX-28 E1-E3 (TH, DT Target Only Flight Test)	4	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
SNG-S-D-6	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024
FTT-22 (TH Intercept Flight Test)	3	2024	3	2024
SNG-S-H-5	3	2024	4	2024
FTO-04 (GM, OT Intercept Flight Test)	1	2025	1	2025
SNG-A-D-6	3	2025	3	2025
SNG-A-H-6	3	2025	3	2025
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC11: *Cyber Operations*	8.995	6.053	28.506	1.558	-	1.558	1.580	1.614	1.191	5.390	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional plus up of $20.3 million in FY 2020 for critical AN/TPY-2 Cybersecurity requirements and the transfer of weapon system specific cyber development efforts from Budget Project MC11, Cyber Operations, Network/System Assessment and Authorizations (A&A) to Budget Project MD11, BMDS Radars, Capability Development.

A. Mission Description and Budget Item Justification

Sustain the Department of Defense Instruction (DoDI) 8510.01 Risk Management Framework (RMF) for DoD Information Technology (IT) requirement for the MDA Sensors Directorate and conduct Security Control Assessments (SCA) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&M) for MDA Sensors mission systems. It also includes support for external cybersecurity assessments and penetration testing of the Sensors mission systems, both in laboratory Element Cybersecurity Experiments and in ground test activities, in accordance with the Director, Operational Test and Evaluation (DOT&E) directive and the Integrated Master Test Plan (IMTP). It maintains the Assessment and Authorization (A&A) data repository, capturing the RMF documentation (artifacts, validation results, Cybersecurity Risk Assessment results, cybersecurity scorecard, and Authorizing Official (AO) authorization decisions) and POA&M for all MDA information systems. This project supports the alignment, development, and implementation of an integrated Tier 2 Cyber Security Service Provider (CSSP) capability on the Sensors mission systems IAW the DoD Cybersecurity Discipline Implementation Plan and DoDI 8530.01 Cybersecurity Activities Support to DoD Information Network Operations.

Provides the monitoring, prioritization, and tracking of Cybersecurity mitigation detailed in Information Technology security POA&Ms. The activities include preparation of A&A documentation and accreditation recommendations to the MDA Senior Information Security Officer (SISO)/Security Control Assessor (SCA) and Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission; test; and administrative systems. These activities are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	6.053	28.506	1.558
Articles:	-	-	-
Description: Cyber Operations funds Sensors Directorate Information System Security Manager (ISSM) civilian salaries and cybersecurity engineering and architecture planning for program information technology systems. This project plans and tests the cybersecurity controls for the Missile Defense System (MDS) and maintains Sensors Risk Management Framework (RMF) authorizations for Sensors-managed information systems, conducts Controls Validation Testing (CVT)/ Security Controls Assessment (SCA) of sensors mission and support systems and provides and maintains Plans of Action and Milestones (POA&M)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
to mitigate cybersecurity deficiencies. Cyber Operations conducts annual cybersecurity program reviews on the Sensors enclaves to assess compliance in implementing and maintaining controls. This effort supports the alignment, development, and implementation of an integrated Tier 2 Cyber Security Service Provider (CSSP) capability on the Sensors mission systems IAW the DoD Cybersecurity Discipline Implementation Plan and DoDI 8530.01 Cybersecurity Activities Support to DoD Information Network Operations. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue critical AN/TPY-2 Cyber Mission Systems Development & Engineering - Continue Cyber Mission Support Systems Development & Engineering - Improve Risk Management Framework (RMF) - Continue Computer Network Defense (CND) operations sustainment ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add of $20.3 million in FY 2020 for critical AN/TPY-2 Cybersecurity requirements and the transfer of weapon system specific cyber development efforts from Budget Project MC11, Cyber Operations, Network/System Assessment and Authorizations (A&A) to Budget Project MD11, BMDS Radars, Capability Development.			
Accomplishments/Planned Programs Subtotals	6.053	28.506	1.558

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing
• 0901598C: *Management HQ - MDA*	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - AN/TPY 2 CSSP Development and Implementation	SS/CPAF	Raytheon : MA	0.000	0.000		6.334	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - AN/TPY 2 Cybersecurity Compliance	SS/CPAF	Raytheon : MA	0.000	0.000		7.082	Jan 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services (Booz Allen) - Consolidated in Contract Support Services	C/CPFF	Booz Allen Hamilton : AL, CO, VA	3.230	1.904	Nov 2018	0.000		0.000		-		0.000	0.000	5.134	0.000
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services (Torch Technologies) - Consolidated in Contract Support Services	C/CPFF	Torch Technologies : AL, CO, VA	2.007	0.634	Jan 2019	0.000		0.000		-		0.000	0.000	2.641	0.000
Network / System Certification and Accreditation (C&A) - Civilian Salaries/Travel	Various	MDA : AL, CO, VA	0.931	0.324	Oct 2018	0.297	Oct 2019	0.333	Oct 2020	-		0.333	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contract Support Services	Various	MDA : Various	0.000	0.000		3.559	Oct 2019	1.225	Oct 2020	-		1.225	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) -	SS/CPAF	Raytheon : MA	2.827	3.191	Jan 2019	6.687	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cybersecurity Supply Chain Compliance															
Network / System Certification and Accreditation (C&A) - LRDR Cybersecurity Compliance	SS/FPIF	Lockheed Martin : NJ	0.000	0.000		3.221	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - SBX Cybersecurity Compliance	MIPR	Military Sealift Command : VA	0.000	0.000		1.326	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	8.995	6.053		28.506		1.558		-		1.558	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	8.995	6.053		28.506		1.558		-		1.558	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Transition to Cyber Security Risk Management Framework (RMF)	✦																											
Risk Management Framework (RMF) Assessment and Authorization (A&A) package preparation and submission	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cyber Security Program Policy / Risk Management	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cyber Security Mitigation Monitoring and Tracking	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
BMDS Cyber Security Policy Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Integrated Cyber Security Service Provider					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MC11 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Transition to Cyber Security Risk Management Framework (RMF)	1	2019	1	2019
Risk Management Framework (RMF) Assessment and Authorization (A&A) package preparation and submission	1	2019	4	2025
Cyber Security Program Policy / Risk Management	1	2019	4	2025
Cyber Security Mitigation Monitoring and Tracking	1	2019	4	2025
BMDS Cyber Security Policy Development	1	2019	4	2025
Integrated Cyber Security Service Provider	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	94.551	16.368	11.784	11.200	-	11.200	22.885	21.172	18.152	17.106	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency program elements (PEs) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	16.368	11.784	11.200
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	16.368	11.784	11.200

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various Multi: : AL, CO, CA, VA	0.000	0.000		0.000		11.200	Nov 2020	-		11.200	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	8.348	0.075	Jul 2019	0.177	Jul 2020	0.000		-		0.000	0.000	8.600	0.000
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi:AL,VA	11.247	0.000		2.234	Jul 2020	0.000		-		0.000	0.000	13.481	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	59.825	16.293	Mar 2019	9.373	Aug 2020	0.000		-		0.000	0.000	85.491	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	15.131	0.000		0.000		0.000		-		0.000	0.000	15.131	0.000
		Subtotal	94.551	16.368		11.784		11.200		-		11.200	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	94.551	16.368		11.784		11.200		-		11.200	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603884C / *Ballistic Missile Defense Sensors*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	2,564.899	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
MD24: *System Engineering & Integration*	999.907	205.845	164.291	160.678	-	160.678	147.997	147.202	156.300	162.148	Continuing	Continuing
MT23: *Enabling - Test*	74.213	38.699	59.029	49.293	-	49.293	45.398	49.007	49.922	52.408	Continuing	Continuing
MD28: *Intelligence & Security*	233.183	46.628	43.851	42.501	-	42.501	42.698	43.312	46.345	52.063	Continuing	Continuing
MD30: *BMD Information Management Systems*	488.004	76.997	84.525	84.753	-	84.753	85.475	80.309	81.248	83.249	Continuing	Continuing
MC30: *Cyber Operations*	62.165	97.405	117.100	64.659	-	64.659	67.264	68.130	69.815	71.257	Continuing	Continuing
MD31: *Modeling & Simulation*	267.102	79.982	88.487	107.710	-	107.710	88.557	77.761	70.661	69.913	Continuing	Continuing
MC31: *Engineering Cyber Operations*	10.263	20.559	23.618	35.709	-	35.709	22.911	25.706	25.689	27.007	Continuing	Continuing
MD32: *Quality, Safety, and Mission Assurance*	266.350	28.190	29.986	30.269	-	30.269	30.578	31.258	32.181	32.846	Continuing	Continuing
MD40: *Program-Wide Support*	163.712	20.550	23.562	23.808	-	23.808	21.937	21.897	28.702	31.784	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add to MC30 for Cyber Security Enhancements, partially offset by the FY 2021 increases in MD31 and MC31 to provide modeling and simulation software development and testing for the End-to-end Digital Integrated System-level Simulation Early Digital Product, planning and requirements determination for the Full Digital Product, full funding for Cyber Assistance Teams (CATs) and Cyber Engineering to provide System-level analysis, cyber assessments, Adversarial Assessments, and Cyber Vulnerability Penetration Assessments (CVPAs) to support Component-level cybersecurity.

The FY 2021 funding request was reduced by $2.5 million during DWR to reduce Discrimination efforts.

The funding request for FY 2021 includes Joint Emergent Operational Need (JEON) PC-0021 requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*

A. Mission Description and Budget Item Justification

The Missile Defense System (MDS) Enabling Programs provide critical products and processes needed to combine element missile defense capabilities into a single, integrated and layered System to evaluate existing and provide new defensive capabilities against the emerging threats. Specifically, the Enabling Programs:
- Assess architecture alternatives to address advanced threats, define MDS functional requirements, conduct Analyses of Alternatives (AoA) for the DoD, and provide engineering requirements, execution support, and pre- and post-mission analysis for System-level tests
- Provide validated models and simulations for System assessment
- Assess System performance (through data collection and analysis) and deliver capabilities to the Warfighter
- Provide multi-disciplinary security and intelligence support for acquisition, development, test, and deployment of current and future MDS capabilities
- Identify potential threats and vulnerabilities to MDA and the MDS and develop and implement strategies to mitigate those risks
- Provide Information Management tools and products supporting the development of MDS capabilities while safeguarding networks and critical program information
- Provide MDA secure communication networks, IT systems, special purpose processing nodes, operations and monitoring centers, and disaster recovery and continuity of operations requirements
- Evaluate quality, technical safeguards, and mission assurance effectiveness
- Assess System ability to maintain integrity and superiority with advances in technology development

This Program Element also funds MDS threat discrimination capability development to enhance MDS effectiveness against the evolving adversary threat. The end result will be a MDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. MDS threat discrimination development is funded from the Enabling (0603890C); Midcourse (0603882C); BMD Sensors (0603884C); BMD Command, Control, Battle Management and Communications (C2BMC) (0603896C); and Aegis BMD (0603892C) PEs.

B. Program Change Summary ($ in Millions)	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**
Previous President's Budget	620.831	571.507	603.672	-	603.672
Current President's Budget	614.855	634.449	599.380	-	599.380
Total Adjustments	-5.976	62.942	-4.292	-	-4.292
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	62.942			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-11.142	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	5.166	0.000	-4.292	-	-4.292

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*

Change Summary Explanation

Increase of $62.942 million in FY 2020 reflects the Congressional plus up for Cyber Engineering (planning, analysis, and assessment) required to provide cybersecurity assessments of BMDS critical infrastructure Control Systems (CS) operations, selected sensors, weapons, and C2BMC systems. Conducts Cyber Visum exercises to identify resiliency issues that must be resolved by BMDS design changes.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD24: *System Engineering & Integration*	999.907	205.845	164.291	160.678	-	160.678	147.997	147.202	156.300	162.148	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

System Engineering & Integration (SE&I) defines, designs, tests and integrates the BMDS, and provides analysis, decision support and planning activities for real-world operations to the National Command Authority, Joint Staff, Military Services, Combatant Commanders, Operational Test Agencies, Director of Operational Test and Evaluation, Allies, and others.

The SE&I Major Program Goals are:
- Plan, design, develop, integrate, and test a layered MDS that provides the required performance
- Provide system-level engineering support to the MDS Elements, and lead collaborative cross-Element, cross-Component engineering
- Analyze architecture alternatives and new technologies, and develop requirements to respond to the proliferation of short and medium range ballistic missiles
- Provide a more effective missile defense capability for U.S. deployed forces, allies, and partners, and enhance homeland defense
- Develop discrimination improvements for the Homeland and Regional Defense missions
- As technical authority for Integrated Air and Missile Defense (IAMD), provide a consistent, disciplined systems engineering process using a multi-Service team to integrate Joint IAMD systems
- Provide technical direction to Element and Component developers and provide System-level forums to track, assess, and improve hardware and software reliability
- Identify BMDS capabilities and limitations
- Develop performance assessment requirements, verify BMDS performance through testing, and conduct assessments to form the basis for technical capability declarations in support of fielding decisions
- Identify Critical Engagement Conditions and data required to develop the test campaigns to demonstrate MDS performance
- Define the test objectives necessary to anchor System-level models and simulations, enable independent verification and validation
- Identify System issues occurring in ground and flight tests and lead the effort to resolve them
- Ensure the BMDS is complementary to and interoperable with North Atlantic Treaty Organization (NATO) and other theater systems
- Develop anti-tamper approaches to enable international fielding

The MDS discrimination improvements and countermeasures mitigation effort will develop and field integrated Element capabilities to improve the capability to identify lethal reentry vehicles and non-lethal threat objects. SE&I will conduct analysis and engineering to specify the MDS functional, performance, and interface requirements for achieving the improved capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Requirements and Design	53.251	30.736	33.133
Articles:	-	-	-
Description: The Requirements and Design effort develops the BMD System level requirements and specifications and drives the integration of the BMDS. Requirements and Design allocates requirements to BMDS Elements and adjudicates Element level specifications to provide required capabilities for the Warfighter. - Define BMDS technical content expectations and develop system requirements to address evolving threats - Develop and allocate functional performance, interface, and design suitability requirements to Programs, in collaboration with BMDS element engineers - Deliver system technical baseline updates to document integrated system build content as identified in the R-4 summary - Identify and resolve technical disconnects through the requirements trace process and element certifications; conduct engineering analyses and perform trade studies - Participate in Element Requirements Reviews - Develop Specification Change Notices (SCN) for future requirements changes, to include mitigation strategies to address BMDS Discrepancy Reports - Ensure accurate reporting of Element functionality and software / hardware integration in the BMDS Accountability Report (BAR) and Director's Program Reviews - Assess and add emerging threats to MDA's lethality prediction models - Incorporate updates to lethality assessments, collateral effects, and consequences of intercept into the BMDS Lethality Program Plan Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete system requirements and interface definition for additional sensors. ***FY 2021 Plans:*** - Develop BMD System-level requirements to address advanced threats ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Integrated Air and Missile Defense (IAMD)	15.538	15.981	17.052
Articles:	-	-	-
Description: The IAMD effort provides a consistent, disciplined systems engineering process using a joint service systems engineering team to develop the technical requirements necessary to support integration of joint service IAMD systems, implementing capabilities required by the Geographic Combatant Commands. This effort includes systems engineering analysis,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
development of technical and interface control requirements and documents, definition of candidate Joint IAMD increments, and configuration control across the joint systems. IAMD provides improved performance such as an improved air picture to enable engagement coordination decision making, increase battlespace, and improve track continuity. Additional efforts will address critical joint Command and Control and interoperability needs such as integrated fire control. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete IAMD Increment 2 Joint Planning and Combat ID engineering efforts - Conduct engineering required to address critical Joint Command and Control and interoperability needs, including Joint Integrated Fire Control (IFC) ***FY 2021 Plans:*** - Conduct engineering investigations and evaluation of Advanced Association Algorithms to improve overall joint IAMD Tracking Capabilities - Conduct analysis into existing and emerging IAMD capabilities to ensure they are appropriately represented during BMD and IAMD wargames/exercises - Continue engineering activities supporting critical Joint Command and Control and interoperability needs: -- Continue to advance improvements in combat identification integration and interoperability among Joint Integrated Air and Missile Defense systems and the ability to represent these advanced capabilities within a engineering level Modeling and Simulation environment -- Working with the Joint Staff Joint Integrated Air and Missile Defense Organization (JIAMDO), translate identified Engagement Coordination Initial Capability Document requirements into to technical requirements for implementation within Services and Agency existing and developing programs of record to improve Engagement Coordination and implement advanced fire control capabilities across the Joint Integrated Air and Missile Defense kill-chain ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: System-Level Verification and Assessment	31.183	25.369	23.082
Articles:	-	-	-
Description: This activity funds BMD System Assessment and Verification, Validation, and Accreditation (VV&A) activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling & simulation. - Develop and manage assessment plans and requirements for BMDS capability increments: -- Map assessment requirements to data collection venues (i.e., ground tests, flight tests, and exercises)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Evaluate current Modeling & Simulation (M&S) capability to address assessment requirements, and provide recommendations for new or improved M&S - Maintain assessment documentation per the R-4 summary - Conduct extensive analysis of data collected in BMDS ground and flight test events to characterize BMDS interoperability and performance, and anchor models and simulations - Identify mitigation approaches for system performance issues uncovered during the course of analysis and assessment - Monitor development and recommend improvements to the simulation enterprise based on an evaluation of the validity of Component, Element and System-level models (and frameworks) and participation in assessment activities and Modeling and Simulation events - Continue VV&A activities to meet and maintain Hardware-in-the-Loop (HWIL) model accreditation in accordance with the HWIL Accreditation plan - Conduct assessments of BMD System capabilities and limitations prior to capability delivery decisions - Produce independent assessments of each incremental BMDS Capability Delivery to support fielding readiness determinations - Verify BMDS performance against specified requirements, and produce BMDS verification reports - Maintain M&S VV&A database and toolkit - Maintain verification data for BMD System Specification Change Notices - Recommend solutions to improve assessment confidence, including M&S and testing issue resolutions Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Conduct VV&A for the initial BMDS end-to-end Digital simulation ***FY 2021 Plans:*** - Conduct VV&A and assessment of the Long Range Discrimination Radar (LRDR) ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Knowledge Centers	13.757	14.138	14.319
Articles:	-	-	-
Description: Knowledge Centers serve as independent technical advisors to MDA program offices in the C2BMC, Interceptor, Space, and Sensor areas to support development of technical approaches and improve reliability. - Provide Federally Funded Research and Development Centers (FFRDC) and University Affiliated Research Centers (UARC) subject matter expertise, to include reach-back capability as needed, for Element program managers:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Provide Subject Matter Expertise and analytical support for Independent Review Teams, mission assurance assessments, Failure Review Boards and Failure Investigation Teams -- Identify and provide recommendations to mitigate technical risks, including innovative and unconventional approaches -- Promote knowledge sharing between external technical sources and MDA - Perform independent technical assessments of critical System and Element program issues: -- Define element knowledge points (KPs), establish closure criteria, and provide closure recommendations -- Continue to provide System and Element performance assessments - Conduct assessments of emerging technologies as required Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Future Concepts and Planning	22.895	13.288	13.632
Articles:	-	-	-
Description: This activity funds MDS architecture and future concept development, and efforts and studies to address the emergent threat, including DoD Analyses of Alternatives (AoA). - Participate in designated Office of the Secretary of Defense (OSD) activities or analyses, as directed by Congress - Perform MDS capability gap analysis, and analyze and document architecture alternatives and/or new technologies to address gaps - Develop Initial Requirements Documents (IRDs) to establish functional, performance and integration planning requirements for next generation weapons and sensors to counter future threats - Identify architecture alternatives that improve MDS performance and are complementary to and interoperable with North Atlantic Treaty Organization (NATO) systems and theaters around the world - Conduct technology development reviews for future/follow-on MDS Element development efforts - Update concept capability documentation based on architectural options, trade studies, and technology development experiments - Maintain and update Phased Implementation Plan to document integrated requirements for improvements to, or augmentations of, current system capabilities			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Develop Preliminary Specification Change Notices for selected future MDS capabilities and technologies - Maintain a dialog with the Warfighter community for all MDS engineering and technical issues -- Inform Warfighter development of the Prioritized Capabilities List (PCL) by providing relevant System data -- Develop updates to the Achievable Capabilities List (ACL) as required - Lead collaborative effort to improve foreign partners' understanding of existing system capabilities, architectural performance and operational concepts of the BMDS Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Deliver the 2020 Achievable Capabilities List ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: System Engineering, Engineering Analysis and Quick Response Team	9.219	10.497	11.300
Articles:	-	-	-
Description: This task provides rapid response, high quality systems engineering analysis products and supporting technical data to address external and internal Agency inquiries and decisions: - Conduct system level analyses to support ongoing MDS Architecture and Systems Engineering efforts - Analyze expected performance of BMDS Architecture options: -- Analyze and predict the performance of future MDS capabilities -- Provide technical assessments, and collaborate with BMDS Elements to define and track technical performance measures - Respond to Warfighter, Combatant Command (CCMD) and congressional requests for information and analysis - Provide analytical support for real-world events - Maintain analysis parameters database and standards per the R4 summary to ensure consistency - Develop analytical data to respond to information requests from MDA and DoD leadership Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Discrimination	26.446	23.334	19.478
Articles:	-	-	-
Description: MDA designs, develops, tests, and delivers MDS discrimination improvements and countermeasures mitigation capabilities to address emerging adversary countermeasures. MDA is focused on providing the Warfighter with capability improvements to identify Reentry Vehicles (RVs) within a threat missile complex in the presence of decoys and with advanced capabilities to address other countermeasures. SE&I will lead and integrate the Discrimination program across the entire MDS, establish performance goals for the technology development phase, and develop functional, performance, and interface requirements to address the threat. SE&I will establish ground and flight test requirements, and develop updated high fidelity threat models to support analysis and testing activities. Other activities include: - Perform systems engineering support for discrimination and counter-countermeasures analysis and assessments - Provide technical support for fielding improved discrimination capabilities Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Provide technical support for fielding discrimination capability in BMDS Increment 6B/6C - Conduct deep dive analysis on impact of new discrimination techniques on MDS engagement performance - Develop prototype modeling techniques of Electronic Attack for definition and validation of initial requirements - Develop Electronic Attack/Electronic Protection models and interfaces to current analysis environment to support performance analysis and technique assessment - Define operational concepts for improved Counter-countermeasure techniques and technologies and develop required models and tools to estimate MDS impact and performance improvements - Assess discrimination planning and reporting of BMDS Midterm Increment 6C Technical Capability Declaration - Develop models and simulations for reactive/responsive Electronic Attack, objective debris mitigation, electro-optical/infrared improvements, and high fidelity scene generation - Develop Preliminary Change Notice, Functional Specification Change Notice, Performance Specification Change Notice, and Document Change Notice for discrimination improvements, Electronic Protection, and Objective Debris Mitigation ***FY 2021 Plans:*** - Perform discrimination systems engineering support for counter-countermeasures analysis, and assessments			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide technical support for fielding improved discrimination capability - Conduct analysis on predicted performance of advanced algorithm development for definition of initial requirements - Develop Electronic Attack models to support MDS requirements definition for Electronic Protection techniques - Define operational concepts for improved counter-countermeasure techniques and technologies - Assess discrimination planning and reporting for BMDS Increment 6C Technical Capability Declaration - Develop models and simulations for reactive/responsive Electronic Attack, objective debris mitigation, electro-optical/infrared improvements, advanced/dynamic threat, and high fidelity scene generation - Develop updated high fidelity threat models - Develop Preliminary Change Notice, Functional Specification Change Notice, Performance Specification Change Notice, and Document Change Notice for discrimination improvements, Electronic Protection, and Objective Debris Mitigation ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Reduction from FY 2020 to FY 2021 reflects a refinement of Discrimination efforts to provide capabilities depicted in BMDS increments.			
Title: Risk Management	8.138	7.497	7.820
Articles:	-	-	-
Description: The Risk Management task identifies BMDS element and component technical risks, and tracks status and risk mitigation progress. - Convene and chair Risk Management Working Group - Execute the risk management and mission readiness working group process - Maintain a risk database using the Failure Reporting and Corrective Action System - Review and approve program element risks, on quarterly basis Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Anti-Tamper & Engineering Manufacturing Readiness Level Development	5.824	5.065	5.269
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: This task develops anti-tamper approaches to inhibit reverse engineering of critical technologies, and oversees the use of Engineering and Manufacturing Readiness Levels (EMRLs) to assess Element, Component, or System maturity. - Develop anti-tamper approaches to enable international fielding, support coalition warfare, and extend the effective operational life of the System - Engage and support the Services in understanding and transitioning BMDS Element Anti-Tamper activities - Participate in Element reviews to assess proposed Anti-Tamper solutions and assist programs in developing and implementing Anti-Tamper detection and response technologies to mitigate risk - Monitor application of EMRLs to evaluate engineering and manufacturing maturity of BMDS elements, systems, and components - Assess and report readiness of MDA development efforts for transition to production Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Manufacturing and Producibility	7.496	4.686	4.914
Articles:	-	-	-
Description: This activity supports a system-level manufacturing and producibility team to address materials, key component, and subsystem design and development to reduce cycle time, part count, and risk. This activity also supports a system-level reliability team to reduce risk of test failures and performance shortcomings and drive reliability into system and component designs. - Assess Missile Defense industrial base and determine critical manufacturing technologies -- Conduct assessments of critical component supply base and update critical technologies database -- Collaborate with national security space components on investment strategies for critical technologies -- Develop engineering management tool to characterize industrial base risks - Utilize supply chain risk identification and mitigation tracking system to mitigate manufacturing supply issues for critical components - Assess the effectiveness of reliability programs for each MDA Product (Radar, Launcher, Missile/Interceptor, etc.) to achieve/ sustain required reliability - Perform reliability, composite risk, and probability of mission success assessments for flight tests - Identify failure trends/modes and evaluate impact on the Probability of Mission Success; evaluate potential corrective actions			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Provide element/program scorecard data to support reliability evaluations/assessments - With Logistics Support, develop MDA Reliability and Logistic Policies/Plans to promote integrated sustainability efforts - Ensure that Missile Defense products have achieved the required maturity in Reliability, Availability, and Maintainability (RAM) to support the transition from MDA to the appropriate service organization; provide RAM expertise as needed to Element Program Offices - Provide updates to MDA RAM policy and guidance Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: USINDOPACOM JEON Capability	12.098	13.700	10.679
Articles:	-	-	-
Description: In conjunction with the Lower Tier Project Office (LTPO), for a United States Indo-Pacific Command (USINDOPACOM) Joint Emergent Operational Need (JEON), provide system-level engineering activities to develop, test and deploy an integrated solution for upper tier/lower tier integration by achieving enhanced interoperability between the Terminal High Altitude Area Defense (THAAD) and PATRIOT capabilities, including: -- Develop threat updates to inform requirements -- Develop functional, performance, and interface requirements -- Develop test requirements -- Update Modeling and Simulation (M&S) frameworks and core truth models -- Provide M&S integration for testing, and provide Wargame and training support -- Develop requirements for capability assessments -- Provide test and performance analysis -- Perform Element integration Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of the JEON effort.			
Accomplishments/Planned Programs Subtotals	205.845	164.291	160.678

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing

Remarks

D. Acquisition Strategy

In order to optimize the performance of the BMDS, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution. Products and Services will be acquired by competitive means to the extent that is possible and practical.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and Design - Reqts & Design - Lethality Spt - FFRDC/ UARC	MIPR	Various : CA	2.451	1.455	Nov 2018	0.963	Nov 2019	0.978	Nov 2020	-		0.978	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Lethality Spt - CSS	C/CPAF	TEAMS : NC	2.217	0.111	Nov 2018	0.604	Nov 2019	0.672	Nov 2020	-		0.672	Continuing	Continuing	Continuing
Requirements and Design - BMDS ground test infrastructure improvements	Various	Various (GWAC) : AL, CO	0.000	16.353	Jan 2019	0.000		0.000		-		0.000	0.000	16.353	0.000
Requirements and Design - Previous Year Reqts & Design Content No Longer in FYDP	Various	Various : Various	17.503	0.000		0.000		0.000		-		0.000	0.000	17.503	0.000
Requirements and Design - Reqts & Design	C/CPFF	TEAMS : AL, VA	40.189	3.992	Nov 2018	4.646	Nov 2019	6.126	Nov 2020	-		6.126	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - FFRDC/UARC 1	MIPR	ORNL : TN	1.375	0.453	Nov 2018	0.406	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - FFRDC/UARC 2	MIPR	MITRE : VA	3.391	1.985	Nov 2018	1.219	Nov 2019	1.245	Nov 2020	-		1.245	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - HAENS Spt	MIPR	NSWC Crane : IN	1.922	1.813	Nov 2018	0.498	Nov 2019	0.508	Nov 2020	-		0.508	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and Design - Reqts & Design - Industry	C/CPFF	Boeing : AL	115.366	7.231	Nov 2018	7.136	Nov 2019	6.742	Nov 2020	-		6.742	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - MDA	Allot	MDA : AL, VA	55.487	7.384	Oct 2018	8.289	Oct 2019	7.716	Nov 2020	-		7.716	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - OGA	MIPR	AMRDEC : AL	9.521	1.566	Nov 2018	2.275	Nov 2019	2.376	Nov 2020	-		2.376	Continuing	Continuing	Continuing
Requirements and Design - Reqts & Design - Post Intercept Assessment	Various	Various : Various	6.900	3.934	Nov 2018	4.700	Nov 2019	6.355	Nov 2020	-		6.355	Continuing	Continuing	Continuing
Requirements and Design - Systems Engineering Improvements	Various	Various : VA, AL, CO	3.467	4.519	Nov 2018	0.000		0.000		-		0.000	0.000	7.986	0.000
Requirements and Design - Threat engineering	MIPR	Various : AL, VA, MD	3.508	2.455	Jan 2019	0.000		0.000		-		0.000	0.000	5.963	0.000
Integrated Air and Missile Defense (IAMD) - IAMD - OGA	MIPR	AMRDEC : AL	8.767	6.097	Nov 2018	4.720	Nov 2019	4.862	Nov 2020	-		4.862	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Support	C/CPFF	TEAMS : AL, VA, CO	5.388	0.900	Nov 2018	0.898	Nov 2019	1.609	Nov 2020	-		1.609	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - IAMD - Various	MIPR	DoD Activities : Various	43.624	8.541	Nov 2018	10.363	Nov 2019	10.581	Nov 2020	-		10.581	Continuing	Continuing	Continuing
Integrated Air and Missile Defense (IAMD) - Previous Year IAMD Content No Longer in FYDP	Various	Various : AL, VA, MD	6.520	0.000		0.000		0.000		-		0.000	0.000	6.520	0.000
System-Level Verification and Assessment - Previous Year Sys V&A content no longer in the FYDP	Various	Various : Various	8.545	3.691	Dec 2018	0.000		0.000		-		0.000	0.000	12.236	0.000
System-Level Verification and Assessment - Sys V&A - CSS	C/CPFF	TEAMS : AL	9.777	2.514	Nov 2018	4.221	Nov 2019	2.685	Nov 2020	-		2.685	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 1	MIPR	Aerospace : CA	19.924	1.650	Nov 2018	1.800	Nov 2019	1.825	Nov 2020	-		1.825	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 2	MIPR	JHU/APL : MD, VA	12.058	0.000		0.000		1.245	Nov 2020	-		1.245	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 3	MIPR	GTRI : AL	0.000	1.461	Nov 2018	1.150	Nov 2019	1.175	Nov 2020	-		1.175	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 6	MIPR	MIT/LL : MA	21.298	0.000		1.450	Nov 2019	1.000	Nov 2020	-		1.000	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - FFRDC/UARC 7	MIPR	MITRE : VA	19.784	1.526	Nov 2018	1.623	Nov 2019	1.641	Nov 2020	-		1.641	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - M&S Accreditation	Various	AMRDEC : AL	2.000	12.244	Nov 2018	6.873	Dec 2019	2.836	Nov 2020	-		2.836	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - MDA	Allot	MDA : VA, AL	9.657	2.594	Nov 2018	4.806	Oct 2019	6.326	Oct 2020	-		6.326	Continuing	Continuing	Continuing
System-Level Verification and Assessment - Sys V&A - OGA	MIPR	AMRDEC : AL	11.480	2.775	Nov 2018	2.490	Nov 2019	2.375	Nov 2020	-		2.375	Continuing	Continuing	Continuing
System-Level Verification and Assessment - V&A Industry Support	C/CPFF	Boeing : AL	17.500	2.728	Nov 2018	0.956	Nov 2019	1.974	Nov 2020	-		1.974	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 5	MIPR	Draper : VA	0.000	0.579	Nov 2018	0.652	Nov 2019	0.665	Nov 2020	-		0.665	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 1	MIPR	Aerospace : CA	14.973	0.289	Nov 2018	1.865	Nov 2019	1.902	Nov 2020	-		1.902	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 2	MIPR	MIT/LL : MA	9.027	0.984	Nov 2018	1.069	Nov 2019	1.090	Nov 2020	-		1.090	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 3	FFRDC	MITRE : VA	9.108	1.332	Nov 2018	1.084	Nov 2019	1.106	Nov 2020	-		1.106	Continuing	Continuing	Continuing

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Knowledge Centers - KC - FFRDC/UARC 4	FFRDC	JHU/APL : VA	7.955	0.959	Nov 2018	0.714	Nov 2019	0.728	Nov 2020	-		0.728	Continuing	Continuing	Continuing
Knowledge Centers - KC - FFRDC/UARC 7	MIPR	GTRI : GA	4.649	0.483	Nov 2018	0.377	Nov 2019	0.385	Nov 2020	-		0.385	Continuing	Continuing	Continuing
Knowledge Centers - KC - MDA	Various	MDA : AL, VA	35.275	4.101	Oct 2018	4.264	Oct 2019	3.315	Oct 2020	-		3.315	Continuing	Continuing	Continuing
Knowledge Centers - KC - TEAMS	C/CPFF	TEAMS : AL	3.276	2.632	Nov 2018	2.708	Nov 2019	2.144	Nov 2020	-		2.144	Continuing	Continuing	Continuing
Knowledge Centers - KC - Various	MIPR	Various : Various	7.438	2.398	Dec 2018	1.405	Dec 2019	2.984	Dec 2020	-		2.984	Continuing	Continuing	Continuing
Knowledge Centers - Previous Year KC Content No Longer In FYDP	Various	Various : AL, AK, CA, CO, HI, NM, VA	3.032	0.000		0.000		0.000		-		0.000	0.000	3.032	0.000
Future Concepts and Planning - Future Concepts - Architecture CSS	C/CPFF	TEAMS : AL, VA	13.726	4.243	Nov 2018	5.212	Nov 2019	4.987	Nov 2020	-		4.987	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Architecture Support	Various	Various : VA, AL	12.053	0.339	Nov 2018	1.000	Nov 2019	1.000	Nov 2020	-		1.000	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 1	MIPR	SNL : CA	3.458	0.028	Nov 2018	0.406	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 3	MIPR	MIT/LL : MA	4.699	0.000		0.406	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - FFRDC / UARC 5	MIPR	MITRE : VA	2.922	1.179	Nov 2018	0.488	Nov 2019	0.498	Nov 2020	-		0.498	Continuing	Continuing	Continuing
Future Concepts and Planning - Future	MIPR	Aerospace : CA	4.456	0.576	Nov 2018	0.406	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Concepts - FFRDC / UARC 6															
Future Concepts and Planning - Future Concepts - Industry	C/CPFF	Boeing : AL	32.976	1.820	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Support	Allot	MDA : VA / AL	13.552	6.643	Oct 2018	5.370	Oct 2019	5.902	Oct 2020	-		5.902	Continuing	Continuing	Continuing
Future Concepts and Planning - Future Concepts - Technology	Various	Various : Various	0.000	8.067	Dec 2018	0.000		0.000		-		0.000	0.000	8.067	0.000
Future Concepts and Planning - Previous Year Future Concepts - No Longer in FYDP	Various	Various : Various	32.925	0.000		0.000		0.000		-		0.000	0.000	32.925	0.000
Future Concepts and Planning - Previous Year Hypersonic Defense Content	Various	Various : Various	7.200	0.000		0.000		0.000		-		0.000	0.000	7.200	0.000
System Engineering, Engineering Analysis and Quick Response Team - Previous Year Sys Engrg, QRT - No Longer In FYDP	Various	Various : Various	1.295	0.000		0.000		0.000		-		0.000	0.000	1.295	0.000
System Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS	C/CPFF	TEAMS : AL	38.463	1.957	Nov 2018	2.105	Nov 2019	2.680	Nov 2020	-		2.680	Continuing	Continuing	Continuing
System Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - CSS 2	C/CPFF	SAIC : VA, AL	25.993	5.630	Nov 2018	7.800	Nov 2019	7.956	Nov 2020	-		7.956	Continuing	Continuing	Continuing
System Engineering, Engineering Analysis and Quick Response Team -	C/CPFF	Boeing : VA, AL	0.000	0.492	Nov 2018	0.592	Nov 2019	0.664	Nov 2020	-		0.664	Continuing	Continuing	Continuing

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Sys Engrg, QRT - Industry Spt															
System Engineering, Engineering Analysis and Quick Response Team - Sys Engrg, QRT - MDA	Various	MDA : VA, AL	3.818	1.140	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination - Discrimination - CSS	C/CPFF	TEAMS : AL	17.225	6.120	Nov 2018	6.600	Nov 2019	5.771	Nov 2020	-		5.771	Continuing	Continuing	Continuing
Discrimination - Discrimination - Industry	C/CPAF	Boeing : AL, VA	37.515	10.787	Nov 2018	14.898	Nov 2019	11.906	Nov 2020	-		11.906	Continuing	Continuing	Continuing
Discrimination - Discrimination - Support	Allot	MDA : AL, VA	28.752	3.983	Oct 2018	1.836	Oct 2019	1.801	Oct 2020	-		1.801	Continuing	Continuing	Continuing
Discrimination - Discrimination - Various	Various	Various : AL, VA	28.648	5.556	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Discrimination - Prior Year Discrimination Improvements no longer funded in FYDP	Various	Various : Various	27.219	0.000		0.000		0.000		-		0.000	0.000	27.219	0.000
Risk Management - Risk Mgt - Analysis	Various	MDA : VA, AL	25.170	6.862	Oct 2018	6.585	Oct 2019	6.929	Oct 2020	-		6.929	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - Analysis Spt	C/CPAF	TEAMS : AL	3.696	0.276	Nov 2018	0.302	Nov 2019	0.268	Nov 2020	-		0.268	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - FFRDC/UARC	MIPR	MITRE : VA	5.412	1.000	Nov 2018	0.610	Nov 2019	0.623	Nov 2020	-		0.623	Continuing	Continuing	Continuing
Risk Management - Risk Mgt - ICT	C/CPAF	Northrop Grumman : AL, AK, CA, CO, HI, NM, VA	2.125	0.000		0.000		0.000		-		0.000	0.000	2.125	2.125
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper	Various	Various : AL, VA, CO	0.000	1.048	Nov 2018	1.097	Dec 2019	0.237	Dec 2020	-		0.237	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT &	MIPR	AMRDEC : AL	0.000	0.000		0.261	Dec 2019	0.264	Nov 2020	-		0.264	Continuing	Continuing	Continuing

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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EMRL - Anti-Tamper OGA Support															
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - Anti-Tamper Support	MIPR	NSWC Crane : IN	6.979	0.232	Nov 2018	0.256	Dec 2019	0.264	Nov 2020	-		0.264	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - AT & EMRL - MDA	Allot	MDA : AL, VA	25.944	4.544	Oct 2018	3.451	Nov 2019	4.504	Oct 2020	-		4.504	Continuing	Continuing	Continuing
Anti-Tamper & Engineering Manufacturing Readiness Level Development - Prior Year AT & EMRL no longer funded in FYDP	Various	Various : Various	2.983	0.000		0.000		0.000		-		0.000	0.000	2.983	0.000
Manufacturing and Producibility - Core Standards	C/CPFF	Boeing : AL	4.813	1.211	Nov 2018	1.653	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility	Allot	MDA : AL	3.898	1.721	Oct 2018	0.819	Nov 2019	3.152	Oct 2020	-		3.152	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - CSS	C/CPFF	TEAMS : AL, VA	0.000	1.503	Nov 2018	0.498	Nov 2019	0.967	Nov 2020	-		0.967	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - OGA Support	MIPR	AMRDEC : AL	9.990	1.172	Nov 2018	1.716	Nov 2019	0.645	Nov 2020	-		0.645	Continuing	Continuing	Continuing
Manufacturing and Producibility - Mfg and Producibility - Various	Various	Various : AL	0.000	1.889	Dec 2018	0.000		0.150	Nov 2020	-		0.150	Continuing	Continuing	Continuing
Manufacturing and Producibility - Previous Year Mfg and Producibility - No Longer In FYDP	Various	Various : Various	1.450	0.000		0.000		0.000		-		0.000	0.000	1.450	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USINDOPACOM JEON Capability - CSS	C/CPFF	TEAMS : VA, AL	0.652	2.913	Nov 2018	0.920	Dec 2019	1.340	Nov 2020	-		1.340	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - FFRDC/UARC	MIPR	MITRE : VA	0.528	0.406	Nov 2018	0.407	Dec 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - Framework, Truth Models	Various	Various : CO, AL	1.064	1.303	Nov 2018	1.942	Dec 2019	0.622	Nov 2020	-		0.622	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - Industry Support	C/CPFF	Boeing : AL, VA	2.106	0.000		0.000		0.000		-		0.000	0.000	2.106	0.000
USINDOPACOM JEON Capability - Industry Support - IRES	C/CPAF	Northrop Grumman : AL, VA	2.445	2.363	Nov 2018	2.335	Dec 2019	1.818	Nov 2020	-		1.818	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - OGA	MIPR	AMRDEC : AL	0.984	2.052	Nov 2018	1.232	Dec 2019	1.443	Nov 2020	-		1.443	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - Systems Engineering	Various	MDA Various : VA, AL, CO	1.179	2.271	Nov 2018	1.979	Dec 2019	1.025	Nov 2020	-		1.025	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - Test & Performance Analysis	Various	Various : VA, AL	3.268	0.790	Nov 2018	4.210	Dec 2019	3.200	Nov 2020	-		3.200	Continuing	Continuing	Continuing
USINDOPACOM JEON Capability - UARC	MIPR	JHU / APL : MD, VA	3.974	0.000		0.675	Dec 2019	0.816	Nov 2020	-		0.816	Continuing	Continuing	Continuing
		Subtotal	999.907	205.845		164.291		160.678		-		160.678	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	999.907	205.845		164.291		160.678		-		160.678	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Update to BMD SDD - 1Q FY 2019	▲																											
BMD SS - 1Q FY 2019	▲																											
E/CCA 1Q - FY 2019	▲																											
Element Design Reviews - FY 2019		▲																										
Update to BMD SDD- 3Q FY 2019			▲																									
BMD SS - 3Q FY 2019			▲																									
E/CCA 4Q - FY 2019				▲																								
Update to BMD SDD - FY 2020					▲																							
Update Achievable Capabilities List - FY 2020						△																						
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2020						△																						
SEP Update - FY 2020						△																						
BMD SS - FY 2020						△																						
BMDS Engineering Review - FY 2020							△																					
Update to IMAP - 3Q FY 2020							△																					
Update MIP - FY 2020								△																				
E/CCA - 4Q - FY 2020								△																				
Update to BMD SDD - FY 2021									△																			
Update MIP - FY 2021									△																			
BMD SS - FY 2021										△																		
Update to IMAP - FY 2021										△																		
BMDS Engineering Review - FY 2021											△																	
E/CCA - 4Q FY 2021												△																
Update to BMD SDD - FY 2022													△															
Update MIP - FY2022													△															

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603890C / *BMD Enabling Programs*	MD24 / *System Engineering & Integration*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Update Achievable Capabilities List - FY 2022													△															
Updates to IMAP -FY 2022													△															
SEP Update FY 2022													△															
BMD SS - FY 2022													△															
BMDS Engineering Review - FY 2022														△														
E/CCA - 4Q FY 2022															△													
Update MIP - FY 2023																△												
Update to BMD SDD - FY 2023																△												
BMD SS - FY 2023																	△											
Update to IMAP - FY 2023																	△											
E/CCA - 4Q - FY 2023																			△									
Update MIP - FY 2024																				△								
Update to BMD SDD - FY 2024																				△								
BMD SS - 2024																				△								
Update Achievable Capabilities List - FY 2024																					△							
Update to IMAP - FY 2024																					△							
SEP Update - FY 2024																					△							
E/CCA - 4Q - FY 2024																							△					
Update MIP - FY 2025																								△				
Update to BMD SDD - FY 2025																								△				
BMD SS - 2025																								△				
Update to IMAP - FY 2025																									△			
E/CCA - 4Q - FY 2025																												△

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Update to BMD SDD - 1Q FY 2019	1	2019	1	2019
BMD SS - 1Q FY 2019	1	2019	1	2019
E/CCA 1Q - FY 2019	1	2019	1	2019
Element Design Reviews - FY 2019	2	2019	2	2019
Update to BMD SDD- 3Q FY 2019	3	2019	3	2019
BMD SS - 3Q FY 2019	3	2019	3	2019
E/CCA 4Q - FY 2019	4	2019	4	2019
Update to BMD SDD - FY 2020	1	2020	1	2020
Update Achievable Capabilities List - FY 2020	2	2020	2	2020
Technical Objectives & Goals / Effectiveness Metrics Standard Updates - FY 2020	2	2020	2	2020
SEP Update - FY 2020	2	2020	2	2020
BMD SS - FY 2020	2	2020	2	2020
BMDS Engineering Review - FY 2020	3	2020	3	2020
Update to IMAP - 3Q FY 2020	3	2020	3	2020
Update MIP - FY 2020	4	2020	4	2020
E/CCA - 4Q - FY 2020	4	2020	4	2020
Update to BMD SDD - FY 2021	1	2021	1	2021
Update MIP - FY 2021	1	2021	1	2021
BMD SS - FY 2021	2	2021	2	2021
Update to IMAP - FY 2021	2	2021	2	2021
BMDS Engineering Review - FY 2021	3	2021	3	2021
E/CCA - 4Q FY 2021	4	2021	4	2021
Update to BMD SDD - FY 2022	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD24 / *System Engineering & Integration*

Events	Start		End	
	Quarter	Year	Quarter	Year
Update MIP - FY2022	1	2022	1	2022
Update Achievable Capabilities List - FY 2022	2	2022	2	2022
Updates to IMAP -FY 2022	2	2022	2	2022
SEP Update FY 2022	2	2022	2	2022
BMD SS - FY 2022	2	2022	2	2022
BMDS Engineering Review - FY 2022	3	2022	3	2022
E/CCA - 4Q FY 2022	4	2022	4	2022
Update MIP - FY 2023	1	2023	1	2023
Update to BMD SDD - FY 2023	1	2023	1	2023
BMD SS - FY 2023	2	2023	2	2023
Update to IMAP - FY 2023	2	2023	2	2023
E/CCA - 4Q - FY 2023	4	2023	4	2023
Update MIP - FY 2024	1	2024	1	2024
Update to BMD SDD - FY 2024	1	2024	1	2024
BMD SS - 2024	1	2024	1	2024
Update Achievable Capabilities List - FY 2024	2	2024	2	2024
Update to IMAP - FY 2024	2	2024	2	2024
SEP Update - FY 2024	2	2024	2	2024
E/CCA - 4Q - FY 2024	4	2024	4	2024
Update MIP - FY 2025	1	2025	1	2025
Update to BMD SDD - FY 2025	1	2025	1	2025
BMD SS - 2025	1	2025	1	2025
Update to IMAP - FY 2025	2	2025	2	2025
E/CCA - 4Q - FY 2025	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT23: *Enabling - Test*	74.213	38.699	59.029	49.293	-	49.293	45.398	49.007	49.922	52.408	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) 21.1 and the completion of hardware purchase and installation in the BID Lab in FY 2020.

A. Mission Description and Budget Item Justification

The Enabling Test project includes the System Engineering & Integration (SE&I) that drives Ballistic Missile Defense System (BMDS) test planning, execution, and post-test analysis and assessment, and the Modeling & Simulation (M&S) tools and framework required to prepare for and execute ground and flight tests.

SE&I allocates test requirements to individual test events, designs test architectures, defines target requirements, and generates ground and flight test scenarios to collect data essential for model validation and system verification. SE&I works with the Service Operational Test Agencies (OTA) to incorporate operational test requirements into BMDS events to ensure the incremental capability being transferred to the Warfighter will be operationally effective, suitable, and survivable. The resulting data ensures BMDS requirements are being met by the system under test and confirms proper BMD System operation. It also helps to anchor system and element M&S for use in simulations to characterize System performance across the battle space, including areas where no live-fire-testing is performed.

Engineering ground test (GT) responsibilities include System performance sensitivity analysis; scenario design and optimization; analysis to mitigate test data collection risks; test architecture certification analysis; and test result analysis. Flight test (FT) responsibilities include pre-mission scenario analysis to identify and mitigate test execution risk in advance; range safety analysis; mission analysis during test execution; extensive post-mission analysis; and event analysis reporting products. These efforts inform senior leaders' decisions on MDS development and evolution and underpin the capability declarations that deliver new capabilities to the Warfighter.

Pre-mission predictions use the test framework and Hardware in the Loop (HWIL) and digital models of the test configuration to exercise system interfaces, calculate expected System performance, and gauge readiness for test execution. Post-mission, MDA uses test results to anchor System and element M&S and provide confidence in their ability to correctly predict System behavior and performance.

Reliability, Availability and Maintainability data collected through BMDS test events increases confidence in System performance over the entire lifecycle. SE&I documents any abnormal System behavior observed during tests and alerts MDA to issues with test article reliability. SE&I leads test failure review boards, identifies data collection shortfalls, and reallocates objectives to future test events as needed until all required model validation data is collected. The Failure Reporting, Analysis, and Corrective Action System provides a framework to investigate test failures and anomalies and identify solutions that will ultimately improve System performance and reliability.

MDA's M&S systems and products provide the Agency, the Warfighter, and the OTA with the capability to evaluate individual System components and the overall M&S system-of-systems. MDA validates and accredits System-level models and simulations to support accurate and comprehensive assessments. M&S System and product

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

testing follows the test program outlined in MDA's IMTP and serves as a necessary precursor to conducting System-level testing. Resources for the planning, design, execution and management of this testing are provided in accordance with the BMDS Test Policy, as listed in the most current version of the IMTP.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Engineering and Analysis	35.048	35.773	31.725
Articles:	-	-	-

Description: The Engineering and Analysis effort provides essential System ground and flight test event planning, execution, and evaluation activities for each test event:
- Design test architecture, define test objectives and evaluation criteria, define target requirements, and generate ground and flight test scenarios appropriate to the data collection requirements to assess System performance and anchor Models and Simulations (M&S)
- Produce threat data for System ground and flight tests
- Coordinate with BMDS Operational Test Agency (OTA) to address test issues, disposition them, coordinate them, and recommend action plans to achieve closure
- Deliver HWIL M&S integration test cases
- Conduct M&S HWIL Integration Benchmarking and integrate the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event architecture
- Integrate, test, and deliver end-to-end System-level simulations supporting ground test missions
- Deploy and maintain M&S System Interface Units (SIUs) for testing
- Analyze System-level interoperability
- Conduct modeling and technical analysis for Combatant Command wargames and exercises
- Utilize M&S for pre-test assessment, post-test review, and M&S updates
- Provide test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure
- Analyze test results to identify verification and validation data collection shortfalls and reassign objectives to future test events as required
- Document test observations for System-level test anomalies and coordinate the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS)
- Upgrade test analysis tools in concert with the MDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE.

FY 2021 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) 21.1.			
Title: Continuous Integration and Agile Test (CI/CAT)	3.651	13.293	11.263
Articles:	-	-	-
Description: Provide test planning, analysis, M&S integration, M&S execution, and post-event analysis for integrated ground testing. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Execute pre-CI/CAT Sprint activities: -- Develop and documented ground test sprint requirements -- Develop scenario designs for sprints -- Provide M&S integration -- Provide pre-mission analysis for ground test sprints - Execute agency ground test plan in accordance with new CONOPS and maintain integration across concurrent ground test and flight test activities ***FY 2021 Plans:*** - Execute agency ground test plan in accordance with approved IMTP and maintain integration across concurrent ground test and flight test activities ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of activation efforts in FY 2020.			
Title: Continuous Development & Integration (CDI) Environment	0.000	9.963	6.305
Articles:	-	-	-
Description: Provide a Continuous Development and Integration (CDI) environment, allowing MDS Elements to integrate new tactical and M&S software to be tested ahead of a ground test event. CDI will provide a venue for early test of MDS Element and System upgrades, reducing risk of anomalies during HWIL integration and execution, and impacts of testing delays due to test configuration rework. This is a critical enabler to achieve the planned Continuous Integration/Continuous Agile Testing (CI/CAT) schedule and tempo. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Procure additional hardware to enable pre-event integration - Initiate expansion of BMDS Integration and Development (BID) Lab to replicate the System in order to meet evolving IMTP cadence - Conduct early integration activities such as scenario refinement, framework capability, and early checkout of Element software for GT-21 Sprints ***FY 2021 Plans:*** - Conduct Early Integration activities such as scenario refinement and early checkout of Element software for GT-22 Sprints ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of hardware purchase and installation in the BID Lab in FY 2020.			
Accomplishments/Planned Programs Subtotals	38.699	59.029	49.293

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing

Remarks

D. Acquisition Strategy

In order to optimize System performance, MDA leverages the nation's engineering Centers of Excellence at government agencies and Military Services, FFRDCs, UARCs, and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution. MDA will acquire products and services by competitive means to the extent practical.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Analysis - Engineering & Analysis - CSS Support	C/CPFF	TEAMS : AL	4.534	2.211	Nov 2018	5.131	Nov 2019	5.229	Nov 2020	-		5.229	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - FFRDC	MIPR	Aerospace : AL	1.122	0.304	Nov 2018	0.406	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : VA, AL	14.573	4.435	Nov 2018	7.201	Nov 2019	7.314	Nov 2020	-		7.314	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - Integration Support CSS	C/CPAF	COLSA : AL, CO	20.270	1.474	Nov 2018	0.000		0.000		-		0.000	0.000	21.744	0.000
Engineering and Analysis - Engineering & Analysis - Non-MDA Element Support for IMTP Events	Various	Various : AL, CO	0.000	1.838	Dec 2018	7.641	Nov 2019	3.651	Nov 2020	-		3.651	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	26.642	18.476	Nov 2018	14.856	Nov 2019	14.567	Nov 2020	-		14.567	Continuing	Continuing	Continuing
Engineering and Analysis - Engineering & Analysis - OGA Support - NME	MIPR	LTPO : AL	1.202	3.085	Nov 2018	0.000		0.000		-		0.000	0.000	4.287	0.000
Engineering and Analysis - Engineering & Analysis - Technical Support	C/CPAF	Northrop Grumman : VA, AL	2.559	2.995	Nov 2018	0.000		0.000		-		0.000	0.000	5.554	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Analysis - Engineering & Analysis - Test Engineering Support	Various	Various : AL, CO, VA	3.311	0.230	Nov 2018	0.538	Nov 2019	0.549	Nov 2020	-		0.549	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT M&S Integration	Various	Various : AL, CO	0.000	0.000		7.673	Dec 2019	6.113	Dec 2020	-		6.113	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT Test & Performance Analysis	Various	Various : AL, CO	0.000	0.000		4.567	Dec 2019	4.076	Dec 2020	-		4.076	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CI/CAT Test Requirements Development	C/CPFF	TEAMS : AL, CO	0.000	0.000		1.053	Nov 2019	1.074	Nov 2020	-		1.074	Continuing	Continuing	Continuing
Continuous Integration and Agile Test (CI/CAT) - CSS	Various	Various : Various	0.000	1.962	Nov 2018	0.000		0.000		-		0.000	0.000	1.962	0.000
Continuous Integration and Agile Test (CI/CAT) - Hardware	C/CPFF	TBE : AL	0.000	1.689	Nov 2018	0.000		0.000		-		0.000	0.000	1.689	0.000
Continuous Development & Integration (CDI) Environment - Continuous Development and Integration Environment	MIPR	AMRDEC : AL, CO	0.000	0.000		9.963	Dec 2019	6.305	Dec 2020	-		6.305	Continuing	Continuing	Continuing
		Subtotal	74.213	38.699		59.029		49.293		-		49.293	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
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Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	74.213	38.699		59.029		49.293		-		49.293	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
IMTP Engineering Inputs - 1Q - FY 2019	▲																											
IMTP Engineering Inputs - 3Q - FY 2019			▲																									
IMTP Engineering Inputs - 1Q - FY 2020					▲																							
IMTP Engineering Inputs - 3Q - FY 2020							△																					
IMTP Engineering Inputs - 1Q - FY 2021									△																			
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)										✧																		
IMTP Engineering Inputs - 2Q - FY 2021											△																	
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)											✧																	
IMTP Engineering Inputs - 1Q - FY2022													△															
IMTP Engineering Inputs - 3Q - FY 2022															△													
IMTP Engineering Inputs - 1Q - FY 2023																	△											
IMTP Engineering Inputs - 3Q - FY 2023																			△									
IMTP Engineering Inputs - 1Q - FY 2024																					△							
IMTP Engineering Inputs - 3Q - FY 2024																							△					
IMTP Engineering Inputs - 1Q - FY 2025																									△			
IMTP Engineering Inputs - 3Q - FY 2025																											△	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MT23 / *Enabling - Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
IMTP Engineering Inputs - 1Q - FY 2019	1	2019	1	2019
IMTP Engineering Inputs - 3Q - FY 2019	3	2019	3	2019
IMTP Engineering Inputs - 1Q - FY 2020	1	2020	1	2020
IMTP Engineering Inputs - 3Q - FY 2020	3	2020	3	2020
IMTP Engineering Inputs - 1Q - FY 2021	1	2021	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	2	2021	2	2021
IMTP Engineering Inputs - 2Q - FY 2021	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
IMTP Engineering Inputs - 1Q - FY2022	1	2022	1	2022
IMTP Engineering Inputs - 3Q - FY 2022	3	2022	3	2022
IMTP Engineering Inputs - 1Q - FY 2023	1	2023	1	2023
IMTP Engineering Inputs - 3Q - FY 2023	3	2023	3	2023
IMTP Engineering Inputs - 1Q - FY 2024	1	2024	1	2024
IMTP Engineering Inputs - 3Q - FY 2024	3	2024	3	2024
IMTP Engineering Inputs - 1Q - FY 2025	1	2025	1	2025
IMTP Engineering Inputs - 3Q - FY 2025	3	2025	3	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD28: *Intelligence & Security*	233.183	46.628	43.851	42.501	-	42.501	42.698	43.312	46.345	52.063	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Intelligence and Security program provides multi-disciplinary intelligence and security for the Missile Defense System (MDS) acquisition, development, test and deployment. The Intelligence and Security Major Program Goals are:
-- Ensure the Intelligence Community (IC) understands and fulfills MDA's current and future prioritized intelligence requirements; advocate Missile Defense test intelligence requirements; and work closely with the IC.
-- Leverage available National and DoD Counterintelligence resources. Ensure counterintelligence products and services are fully integrated into all RDT&E programs and activities to protect classified information and critical technologies and to protect Missile Defense Agency (MDA) and BMDS personnel, facilities, information and activities.
-- Define cybersecurity systems engineering requirements for MDS assets. Identify cybersecurity systems engineering and infrastructure intelligence requirements to focus IC collection, analysis and production to target MDA/MDS cyber vulnerabilities. Incorporate cybersecurity engineering requirements into the MDS systems engineering process.
-- Provide cross-Agency acquisition security oversight and support for the identification and protection of Critical Program Information (CPI), and evaluation and implementation of developing Supply Chain Risk Management (SCRM) requirements. Provide physical security for BMDS weapons/sensor system deployments, including Foreign Military Sales (FMS). Implement MDA's information security and declassification programs. Strengthen Test and Operations Security (OPSEC) across the Agency.

The Security and Intelligence Project captures five specific areas: 1) Intelligence 2) Counterintelligence 3) Cybersecurity Engineering 4) Program Protection, and 5) Threat Systems Engineering. Collectively, these efforts provide critical information regarding threat ballistic missile system capabilities; protection of personnel, activities, and technology from espionage and terrorism; and identification and mitigation of MDS system vulnerabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Intelligence	9.541	9.696	8.771
Articles:	-	-	-
Description: The Intelligence program provides expertise to develop intelligence products on threat system capabilities, and leverages unique intelligence-community developed, owned, and operated capabilities for the benefit and advocacy of the missile defense community. Program goals include: - Serve as designated intelligence broker between MDA and the Intelligence Community			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Maintain and communicate prioritized, specific Missile Defense intelligence requirements to the Intelligence Community -- Maintain a focused dialogue with members of the Intelligence Community to ensure understanding, urgency and context of MDA intelligence requirements - Provide Current, Technical, Acquisition, Collection and Cyber intelligence to the MDS throughout the acquisition life cycle - Maintain and update MDA's knowledge base of foreign ballistic missile threats, including development, enhancement, and population of the Missile Threat Portals with Intelligence Community produced documents at the appropriate security classification levels - Characterize all missile threat systems from adversaries for use by the MDA Systems Engineer, Program Managers, and Director for Test to perform modeling, simulation, and testing of the MDS - Maintain Missile Intelligence Secure Link (MISL) classified portal (full operational capability) Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Counterintelligence	8.018	7.051	7.496
Articles:	-	-	-
Description: The Counterintelligence Program detects, mitigates or neutralizes espionage, foreign intelligence collection activities and terrorist activities conducted for or on behalf of foreign powers, organizations, persons, or their agents directed against U.S. national security interests, or DoD/MDA and its personnel, information, material, facilities, and activities. Program goals include: - Serve as MDA Liaison with Federal, State and Local Law Enforcement and Counterintelligence (CI) Organizations to report and resolve incidents involving MDA personnel, information and technologies -- Engage National, Combatant Command and DoD CI resources to share and obtain threat information impacting MDA personnel, facilities, information, technologies, programs and activities, worldwide -- Provide CI, technical and cyber threat support to MDA flight tests, conferences, and deployment activities worldwide, including FMS Programs, to detect, deter, or neutralize criminal, terrorist and foreign intelligence collection threats targeting MDA and Missile Defense technologies, personnel, facilities and activities			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Execute life cycle replacement of outdated technical surveillance countermeasures and cyber forensics gear to employ the latest technologies during conferences, flight tests and other classified activities to detect, deter and prevent the loss or compromise of classified or sensitive information to foreign adversary collection activities - Conduct CI in Cyberspace activities to detect malicious and insider threat activities targeting MDA administrative and fire control networks - Conduct MDA Insider Threat Program to identify, deter and mitigate potential insider threats - Provide required CI Awareness and Reporting training to MDA workforce - Provide CI research and assistance for cyber forensics and analysis to identify insider and foreign entity cyber threats to MDA computer networks and Missile Defense fire control systems - Conduct CI research and analysis to produce CI threat products that address foreign intelligence, cyber and international terrorist threats to MDA personnel, facilities, information, systems and activities worldwide - Maintain technical surveillance countermeasures and cyber forensic gear to detect, identify and neutralize adversary collection platforms and capabilities used to gain unauthorized access to MDA classified and controlled unclassified information Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Cybersecurity Engineering Program	3.084	4.413	4.826
Articles:	-	-	-
Description: Cybersecurity is focused on developing designs and solutions to protect the MDS from existing and emerging cyber threats through coherent cybersecurity systems engineering. Program goals include: - Ensure Cybersecurity is integrated into the Acquisition Process - Assess the Cybersecurity Architecture to address gaps/disconnects, enhance interoperability, and realize efficiencies across all mission systems; define the "As Built" and "To Be" Cybersecurity Systems Engineering concepts to strengthen technical assessments and cybersecurity design solutions and implementation recommendations impacted by the change in requirements -- Develop and coordinate near-term and long-term engineering changes to the MDS -- Develop requirements for building cybersecurity into incremental MDS hardware and software builds -- Monitor allocation of these requirements to the Elements			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Recommend updates to the BMDS Core Standards, including Cyber-related requirements specified by the Agency, the Combatant Commanders (CCMDs), the DoD, and the Federal Government -- Perform cybersecurity systems engineering assessments for proposed BMD System Specification and interface changes and additions - Provide and recommend updates to cybersecurity systems engineering policy and guidance for MDS design and acquisition to enhance resiliency against cyber threats - Implement cybersecurity engineering resiliency techniques - Provide objectives and requirements for Cybersecurity testing - Provide independent cybersecurity reviews at critical engineering milestones - Provide information system security engineering by assessing cybersecurity requirements, design, and implementations and provide recommendations to address architecture gaps or shortfalls - Implement cyber threat mitigation strategies within MDS architecture, design, system requirements, and specifications documentation to ensure traceability to necessary components and interfaces that make up the Missile Defense mission - Coordinate evaluation of cybersecurity capability during System tests - Develop verification and assessment strategies for System cybersecurity requirements Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides required personnel to keep pace with evolving cybersecurity mission.			
Title: Program Protection	10.141	11.443	10.929
Articles:	-	-	-
Description: Protects Missile Defense information, Critical Program Information, technologies, and deploying systems; develops and coordinates Security Classification Guides; and performs declassification reviews to identify equities that warrant continued protection in order to preserve the technological advantage of the MDS. Program Protection also coordinates MDA intelligence, counterintelligence and security to help MDS test activities. Program goals include: - Perform reviews required for all Agency public release, security classification, and FOIA and Mandatory Declassification Reviews to ensure sensitive Missile Defense information is not inadvertently released into the public domain - Perform Information Security program management and oversee implementation by MDA programs			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Perform internal program reviews, policy oversight and implementation, and training to identify and fix deficiencies and protect critical information -- Collect information required for annual reports and communicate security posture to leadership - Provide security oversight for the Agency's classified contracts by drafting and coordinating DD254 "Contract Security Classification Specification" documents - Execute an effective SCRM program to prevent unmitigated risks from degrading the performance of components and systems across the BMDS supply chain - Provide dedicated on-site security and protection of Missile Defense resources and personnel at operational sites in Alaska, California and Colorado to ensure security protection coverage of MDS mission operations and test assets based in those regions - Perform systematic Declassification reviews on historical Agency information to prevent unauthorized disclosures due to automatic declassification requirements - Identify and integrate Physical Security requirements for overseas sites with existing or planned missile defense weapons or sensor systems to ensure protection of deployed sites - Provide effective physical protection to low density/high demand emerging Warfighter capability - Expand security activities to include FMS - Conduct program protection planning for the continuing assessment of candidate critical program information for Advanced Technology programs and reassessment of other MDA programs affected by technical baseline changes; ensure critical technologies embedded in missile defense systems are not vulnerable to compromise - Keep pace with mission growth in program protection, system security engineering, acquisition security, and SCRM Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Threat Systems Engineering	15.844	11.248	10.479
Articles:	-	-	-
Description: Threat Engineering provides representations of adversary missile capabilities based on available intelligence information, and develops, coordinates, and baselines MDS-level targets and countermeasures requirements to define target capabilities required to meet BMDS flight test objectives. Program goals include:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Develop threat definitions for system specifications -- Produce threat / scenario data for MDS development events -- Perform Threat Verification and Validation analysis to verify missile models meet specifications and are consistent with intelligence assessments - Produce Adversary Data Package (ADP) updates - Develop target requirements to ensure flight test targets meet operationally realistic conditions - Produce Target Assessment and Certification Reports - Assess threat representation of flight test targets - Develop target system specifications and guide targets requirements development, planning, and certification for MDS flight tests - Analyze flight test target performance relative to threat intelligence assessments to support target system verification and certification - Provide Technical Data for major reviews (System Requirements Reviews, Critical Design Reviews, etc.) - Complete Target Specification builds - Update MDA INS 5000.06, Target Class Capabilities and Requirements documents as necessary Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	46.628	43.851	42.501

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0305103C: *Cyber Security Initiative*	0.961	11.138	1.148	-	1.148	1.172	1.194	1.231	1.255	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution. Products and Services will be acquired by competitive means to the extent that is beneficial and practical.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intelligence - Intelligence Analysis & Support	Allot	MDA : VA, AL, CO	25.265	4.487	Oct 2018	3.668	Oct 2019	3.903	Oct 2020	-		3.903	Continuing	Continuing	Continuing
Intelligence - Intelligence Support	C/CPFF	TEAMS : AL, VA, CO	25.315	5.054	Nov 2018	5.714	Nov 2019	4.289	Nov 2020	-		4.289	Continuing	Continuing	Continuing
Intelligence - Intelligence Support - IT Maintenance	C/CPFF	Northrop Grumman : AL, CO	2.613	0.000		0.314	Nov 2019	0.579	Nov 2020	-		0.579	Continuing	Continuing	Continuing
Intelligence - Prior year Intelligence Support no longer funded in FYDP	Various	Various : Various	7.770	0.000		0.000		0.000		-		0.000	0.000	7.770	0.000
Counterintelligence - CI Analysis & Support	Allot	MDA : AL, CO, VA	10.508	3.688	Oct 2018	2.788	Oct 2019	2.852	Oct 2020	-		2.852	Continuing	Continuing	Continuing
Counterintelligence - CI Analysis and Support	C/CPFF	TEAMS : AL, CO, VA	19.459	4.067	Nov 2018	3.839	Nov 2019	4.211	Nov 2020	-		4.211	Continuing	Continuing	Continuing
Counterintelligence - CI Surveillance Gear	Various	Various : Various	0.797	0.263	Dec 2018	0.424	Dec 2019	0.433	Dec 2020	-		0.433	Continuing	Continuing	Continuing
Counterintelligence - Prior Year Counterintelligence Support no longer funded in FYDP	C/CPFF	MIDAESS : VA	1.069	0.000		0.000		0.000		-		0.000	0.000	1.069	0.000
Cybersecurity Engineering Program - Cybersecurity - FFRDC	FFRDC	Aerospace : CA, VA	3.663	0.000		0.000		0.000		-		0.000	0.000	3.663	0.000
Cybersecurity Engineering Program - Cybersecurity - FFRDC (2)	FFRDC	MITRE : VA, AL	3.858	0.000		0.000		0.000		-		0.000	0.000	3.858	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cybersecurity Engineering Program - Cybersecurity Engineering	Allot	MDA : VA, AL	14.153	2.090	Oct 2018	2.058	Oct 2019	2.103	Oct 2020	-		2.103	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity Engineering - Hardware	Various	Various : AL, CO, VA	0.000	0.000		1.107	Nov 2019	0.923	Nov 2020	-		0.923	Continuing	Continuing	Continuing
Cybersecurity Engineering Program - Cybersecurity Engineering CSS	C/CPFF	TEAMS : VA, AL	3.369	0.994	Nov 2018	1.248	Nov 2019	1.800	Nov 2020	-		1.800	Continuing	Continuing	Continuing
Program Protection - Declassification Analysis	C/CPFF	TEAMS : VA, AL	8.557	1.216	Nov 2018	2.096	Nov 2019	2.436	Nov 2020	-		2.436	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis	Allot	MDA : VA, AL	25.447	4.105	Oct 2018	3.733	Oct 2019	4.956	Oct 2020	-		4.956	Continuing	Continuing	Continuing
Program Protection - Program Protection Analysis & Support	C/CPFF	TEAMS : AL, AK, CA, CO, VA	23.540	4.572	Nov 2018	4.821	Nov 2019	3.122	Nov 2020	-		3.122	Continuing	Continuing	Continuing
Program Protection - Program Protection Support	Various	Various : AL, VA, CO	3.312	0.248	Nov 2018	0.793	Nov 2019	0.415	Nov 2020	-		0.415	Continuing	Continuing	Continuing
Threat Systems Engineering - Prior Year Threat Systems Engineering Support no longer funded in FYDP	Various	Various : AL, MD, VA	19.225	0.000		0.000		0.000		-		0.000	0.000	19.225	0.000
Threat Systems Engineering - Threat Systems Engineering	Allot	MDA : VA, AL, CO	19.028	3.557	Oct 2018	3.731	Oct 2019	3.604	Oct 2020	-		3.604	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering - CSS	C/CPFF	TEAMS : VA, AL	9.527	1.782	Nov 2018	4.672	Nov 2019	2.725	Nov 2020	-		2.725	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat	FFRDC	MIT/LL : MA	3.043	1.163	Nov 2018	1.219	Nov 2019	1.660	Nov 2020	-		1.660	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - FFRDC															
Threat Systems Engineering - Threat Systems Engineering - OGA	MIPR	Various : CA, VA, AL	0.000	7.669	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Threat Systems Engineering - Threat Systems Engineering - UARC	FFRDC	JHU/APL : MD	3.665	1.673	Nov 2018	1.626	Nov 2019	2.490	Nov 2020	-		2.490	Continuing	Continuing	Continuing
		Subtotal	233.183	46.628		43.851		42.501		-		42.501	Continuing	Continuing	N/A

Remarks
NASIC - National Air and Space Intelligence Center

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	233.183	46.628		43.851		42.501		-		42.501	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD28 Intelligence & Security	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
ADP - 2019			▲																									
Annual Declassification Review - 2019				▲																								
Adversary Data Package (ADP) - 2020								△																				
MDA OPSEC Report to USD(I) - 2020								△																				
Annual Declassification Review - 2020								△																				
Annual Report to Congress for SAPs (FY 2020)								△																				
Annual Report to Congress for SAPs (FY 2021)												△																
ADP - 2021												△																
Annual Declassification Review - 2021												△																
Annual Report to Congress for SAPs (FY 2022)																△												
ADP - 2022																△												
MDA OPSEC Report to USD(I) - 2022																△												
Annual Declassification Review - 2022																△												
Annual Report to Congress for SAPs (FY 2023)																				△								
ADP - 2023																				△								
Annual Declassification Review - 2023																				△								
ADP - 2024																					△							
MDA OPSEC Report to USD(I) - 2024																					△							
Annual Declassification Review - 2024																					△							
Annual Report to Congress for SAPs (FY 2024)																								△				
ADP - 2025																									△			
Annual Declassification Review - 2025																									△			
Annual Report to Congress for SAPs (FY 2025)																												△

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD28 Intelligence & Security	1	2019	4	2025
ADP - 2019	3	2019	3	2019
Annual Declassification Review - 2019	4	2019	4	2019
Adversary Data Package (ADP) - 2020	4	2020	4	2020
MDA OPSEC Report to USD(I) - 2020	4	2020	4	2020
Annual Declassification Review - 2020	4	2020	4	2020
Annual Report to Congress for SAPs (FY 2020)	4	2020	4	2020
Annual Report to Congress for SAPs (FY 2021)	4	2021	4	2021
ADP - 2021	4	2021	4	2021
Annual Declassification Review - 2021	4	2021	4	2021
Annual Report to Congress for SAPs (FY 2022)	4	2022	4	2022
ADP - 2022	4	2022	4	2022
MDA OPSEC Report to USD(I) - 2022	4	2022	4	2022
Annual Declassification Review - 2022	4	2022	4	2022
Annual Report to Congress for SAPs (FY 2023)	4	2023	4	2023
ADP - 2023	4	2023	4	2023
Annual Declassification Review - 2023	4	2023	4	2023
ADP - 2024	1	2024	1	2024
MDA OPSEC Report to USD(I) - 2024	1	2024	1	2024
Annual Declassification Review - 2024	1	2024	1	2024
Annual Report to Congress for SAPs (FY 2024)	4	2024	4	2024
ADP - 2025	1	2025	1	2025
Annual Declassification Review - 2025	1	2025	1	2025

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD28 / *Intelligence & Security*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Annual Report to Congress for SAPs (FY 2025)	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*				Project (Number/Name) MD30 / *BMD Information Management Systems*			
COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD30: *BMD Information Management Systems*	488.004	76.997	84.525	84.753	-	84.753	85.475	80.309	81.248	83.249	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The BMD Information Management Systems budget project funds information technology mission critical functions necessary for the efficient operations and safeguarding of BMD information in compliance with DoD policies and in keeping with the President's declaration on 29 May 2009, "cyber threat is one of the most serious economic and national security challenges we face as a nation". IT is critical to the day-to-day functions of MDA personnel to communicate (classified and unclassified) with each other, Congress, senior DoD and other U.S. government agency personnel, Combatant Commander's, NATO partners, and other industry partners. Communication among these organizations facilitates the MDA mission of developing and fielding an integrated BMDS to defend the United States, our deployed forces, allies, and friends against all ranges of enemy ballistic missiles in all phases of flight.

MDA information management systems capabilities support rigorous missile defense Research, Development, Test and Engineering (RDT&E) and facilitate the development of technologies to guard against evolving missile threat. Communications are vital for missile defense to continue a viable homeland defense against rogue threats and to provide the integration required to defend deployed forces, allies, and friends against theater threats. The BMD information management consists of MDA Special Purpose Processing Nodes (SPPNs), IT systems, data centers, operations and monitoring centers which are vital to support the strategic mission of the Agency and necessary to meet disaster recovery and continuity of operations requirements. This infrastructure is required to sustain access to the Secret Internet Protocol Router Network (SIPRNET), Non secure Internet Protocol Router Network (NIPRNET), MDA classified and unclassified networks, classified and unclassified video teleconferencing services, test and business knowledge data centers, and the Defense Research Engineering Network (DREN). These mission critical functions provide for the efficient operation and safeguarding of all agency information in locations supporting MDA around the world.

Project MD30 is aligned into the following inter-agency mission critical IT services and the associated plans in accordance with the Federal Information Technology Shared Services Strategy.

1. End User Support
2. Special Purpose Processing Nodes (SPPNs)
3. IT Planning and Solutions
4. Unified Communications
5. Portal and Data Services
6. Business Automation Services

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: End User Support	17.809	21.076	21.476
Articles:	-	-	-
Description: Provides IT operations, support and maintenance (24 hours a day, 7 days a week, 365 days a year) to over 10,500 MDA worldwide users (classified and unclassified) executing the Research, Development, Test and Engineering (RDT&E) mission. Services include Integrated Service Desk support (Help Desk and Client Support Services); management of hardware and software maintenance and licensing; and monitoring network activity to ensure users comply with DoD policies for the proper use of information systems. Services also include printing and copying; email and file; directory and authentication services. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Provides life-cycle management of over 190,000 IT assets including IT procurement, receiving, shipping/transportation, warehousing, transfers and disposal using the Defense Property Accountability System (DPAS). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Special Purpose Processing Nodes (SPPN)	10.964	11.632	4.340
Articles:	-	-	-
Description: Provides for the developmental engineering and operational strategies and concepts; and planning, design, implementation and maintenance for MDA Research, Development, Test and Evaluation (RDT&E) Special Purpose Processing Nodes (SPPNs) in Huntsville, AL and Colorado Springs, CO. The SPPN infrastructure consists of routers, switches, firewalls, compute, storage and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide. The SPPNs support dynamic and rapid modifications and reconfigurations of network infrastructure in support of RDT&E mission and event unique configurations. Funds provide for network operations and performance monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations (DR and COOP) rehearsals; Internet access management; and web filtering. Sustains core communications distribution services across the MDA Enterprise. Includes investments in equipment at end-of-life to comply with Federal and DoD mandated cybersecurity policies. Plan, engineer and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects a labor realignment from SPPN to the Unified Communications and the Portal and Data Services accomplishments for greater visibility and to align with new contract structure.			
Title: Information Technology (IT) Planning and Solutions	14.431	12.893	13.181
Articles:	-	-	-
Description: Provides IT engineering support for new requirements analysis, design, planning and implementation of IT solutions for real-world issues. Addresses the increasing demand for more complex IT products and highly specialized IT services. Manages the prioritization and integration of investments in the MDA IT Portfolio to ensure compliance with Federal and DoD polices. Supports the MDA Chief Information Officer Enterprise Architecture Board, Project Steering Committee and the Change Control Board. Ensures compliance with Federal Laws, DoD policies, directives and regulations including: Clinger-Cohen Act, the Federal Information Security Management Act (FISMA), and Office of Management and the Office of Management and Budget (OMB) IT budget reporting policies. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Unified Communications	16.973	18.667	23.187
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Provides for the management, operations and sustainment of classified and unclassified globally deployed video teleconferencing capabilities and equipment. Also includes unclassified desktop instant messaging, wireless services, and collaboration capabilities. Provides and implements engineering solutions for all unified communications services. Supports MDA global RDT&E mission for classified and unclassified voice and data circuits (wide area, local area and metropolitan area networks) and interfaces with the Defense Information System Network (DISN) Video Services Global (DVSG), the Defense Research and Engineering Network (DREN), Joint Service Provider (JSP) and commercial vendors. Maintenance agreements and licenses for MDA Enterprise network and telecommunications equipment (classified and unclassified mobile and desktop telephony devices). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects a labor realignment from the SPPN accomplishment to this accomplishemnt for greater visibility and to align with new contract structure.			
Title: Portal and Data Services	7.565	9.742	14.431
Articles:	-	-	-
Description: Provides for the management, operation and maintenance support for the classified and unclassified MDA Portal application and the IT portal infrastructure. The support includes web-based developmental engineering and operations, planning, design, application implementation, content management and training. Also provides MDA Privacy Office and Civil Liberties compliance and reporting, and manages data storage capacity to accommodate MDA users. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects a labor realignment from the SPPN and Business Automations accomplishments to this accomplishment for greater visibility and to align with new contract structure.			
Title: Business Automation Services	9.255	10.515	8.138
Articles:	-	-	-
Description: Provides for the management, operation and maintenance of enterprise business applications for the MDA community to access and share various sources of available data, information and knowledge and enable improved organization, retrieval, manipulation, and storage. Operate and maintain nine Defense Business Systems that meet the reporting requirements of Title 10 United States Code section 2222; these include portal-based Electronic Learning Management System (E-LMS), Program Resource Internet Database Environment (PRIDE), Information Management Program Activity control Tool (IMPACT), Standard Procurement System (SPS), Human Resource Tracking System/Personnel Tracking System (HRTS/PTS), TEAMMATE, E-TASKER, TASK MANAGEMENT TOOL (TMT) , Electronic Content and Records Tool (ECART). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects a labor realignment to the Portal and Data Services accomplishment for greater visibility and to align with new contract structure.			
Accomplishments/Planned Programs Subtotals	76.997	84.525	84.753

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603178C: *Weapons Technology*	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0603294C: *Common Kill Vehicle Technology*	55.549	13.600	11.058	-	11.058	10.996	11.052	11.290	11.563	Continuing	Continuing
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603913C: *Israeli Cooperative Programs*	300.000	300.000	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing
• 0901598C: *Management HQ - MDA*	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

This acquisition strategy to provide IT services for MDA consists of three MDA issued contracts. The Integrated Research and Development for Enterprise Solutions (IRES) provides IT design, engineering, implementation and sustainment services. The Research and Development Enterprise Collaboration Services (RECS) provides Video Teleconferencing, Portal, Data and Business Automation Services.

MDA issues multiple Military Interdepartmental Purchase Requests (MIPRs) for leased communications including the Defense Information Systems Agency (DISA), DREN and the US Army.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
End User Support - End User Consolidated Support Logistics/Asset Mgmt	C/CPFF	Venturi : AL, CO	0.000	0.514	Nov 2018	0.383	Nov 2019	0.350	Nov 2020	-		0.350	Continuing	Continuing	Continuing
End User Support - End User IT Software & Licenses	MIPR	Accenture : AL, AK, CA, CO, HI, NM, VA	0.000	0.000		0.000		0.982	Aug 2021	-		0.982	Continuing	Continuing	Continuing
End User Support - End User Civilian Pay	Allot	MDA Civilian Pay : AL, CO, NM, VA	18.046	3.117	Oct 2018	1.881	Oct 2019	2.835	Oct 2020	-		2.835	Continuing	Continuing	Continuing
End User Support - End User IT Hardware Support	C/CPAF	Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	37.313	4.640	Nov 2018	6.630	Nov 2019	4.944	Nov 2020	-		4.944	Continuing	Continuing	Continuing
End User Support - End User IT Software / Licenses	C/CPAF	Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	13.581	3.772	Nov 2018	5.710	Nov 2019	6.412	Nov 2020	-		6.412	Continuing	Continuing	Continuing
End User Support - End User Operational Support	C/CPAF	Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	50.929	5.766	Oct 2018	6.472	Oct 2019	5.953	Oct 2020	-		5.953	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPN) - SPPN Civilian Pay	Allot	MDA Civilian Pay : AL, CO, VA	7.255	1.326	Oct 2018	0.506	Oct 2019	1.041	Oct 2020	-		1.041	Continuing	Continuing	Continuing
Special Purpose Processing Nodes (SPPN) - SPPN Licenses	C/CPAF	Jacobs Engineering : AL, CO, VA	73.837	6.525	Nov 2018	9.000	Nov 2019	1.984	Nov 2020	-		1.984	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Special Purpose Processing Nodes (SPPN) - SPPN Operational Support	C/CPAF	Jacobs Engineering : AL, CO, VA	70.410	3.113	Jan 2019	2.126	Jan 2020	1.315	Jan 2021	-		1.315	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Civilian Pay	Allot	MDA Civilian Pay : AL, CO, VA	6.377	1.823	Oct 2018	1.783	Oct 2019	1.539	Oct 2020	-		1.539	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Consolidated Support	C/CPFF	Five Stones, Yorktown, Peopletec : AL, CO, VA	20.811	6.675	Aug 2019	7.707	Aug 2020	6.764	Aug 2021	-		6.764	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions Operational Support	C/CPAF	Jacobs Engineering : AL, CO, VA	38.783	1.937	Mar 2019	0.503	Mar 2020	2.478	Mar 2021	-		2.478	Continuing	Continuing	Continuing
Information Technology (IT) Planning and Solutions - IT Planning and Solutions SWDC PNT	C/CPFF	Northrup Grumman : AL, CO, VA	0.000	3.996	Mar 2019	2.900	Oct 2019	2.400	Mar 2021	-		2.400	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Civilian Travel / PCS	Allot	MDA Civilian Travel : AI, CO, VA	0.000	0.000		0.000		0.200	Oct 2020	-		0.200	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Civilian Pay	Allot	MDA Civilian Pay : AI, CO, VA	6.421	0.994	Oct 2018	2.023	Oct 2019	0.996	Oct 2020	-		0.996	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Hardware Licenses	C/CPIF	Jacobs Engineering : AL, CO, VA	1.800	0.736	Nov 2018	1.850	Nov 2019	1.392	Nov 2020	-		1.392	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Leased Communications/ Licenses	MIPR	DISA/DREN/IT2S : AL, AK, CA, CO, HI, NM, VA	21.481	6.305	Oct 2018	3.334	Oct 2019	7.008	Oct 2020	-		7.008	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Unified Communications - Unified Communications Operational Support	C/CPAF	Jacobs Engineering : AL, CO, VA	10.970	1.126	Dec 2018	2.037	Oct 2019	2.671	Dec 2020	-		2.671	Continuing	Continuing	Continuing
Unified Communications - Unified Communications VTC Operations Support	C/CPIF	Network Management Resources : AL, AK, CO, NM, VA	34.413	5.814	Apr 2019	5.464	Nov 2019	8.767	Apr 2021	-		8.767	Continuing	Continuing	Continuing
Unified Communications - Unified Communications Wireless Services	C/FFP	AT&T : AL, CO, VA	5.603	1.998	Nov 2018	1.983	Nov 2019	2.153	Oct 2020	-		2.153	Continuing	Continuing	Continuing
Unified Communications - VTC HW/Break-Fix	C/CPIF	Network Management Resources : AL, CO, VA	1.209	0.000		1.976	Nov 2019	0.000		-		0.000	0.000	3.185	0.000
Portal and Data Services - Portal and Data Services Civilian Pay	Allot	MDA Civilian Pay : AL, CO, VA	5.228	0.829	Oct 2018	1.686	Oct 2019	0.831	Oct 2020	-		0.831	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational	C/CPAF	Online Subscriptions Services : AL, CO, VA	2.257	0.417	Oct 2018	0.455	Oct 2019	0.350	Oct 2020	-		0.350	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operational Support	C/FFP	Network Management Resources : AL, CO, VA	20.343	4.658	Apr 2019	5.801	Apr 2020	6.200	Apr 2021	-		6.200	Continuing	Continuing	Continuing
Portal and Data Services - Portal and Data Services Operations and Support	C/CPAF	Jacobs Engineering : AL, CO, VA	10.216	1.661	Jan 2019	1.800	Jan 2020	7.050	Jan 2021	-		7.050	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Civilian Pay	Allot	MDA Civilian Pay : AL, CO, VA	3.513	0.331	Oct 2018	0.506	Oct 2019	0.331	Oct 2020	-		0.331	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Licenses	C/CPAF	Jacobs Engineering : AL, CO, VA	5.449	0.972	Nov 2018	0.991	Nov 2019	0.000		-		0.000	0.000	7.412	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Business Automation Services - Business Automation Operational Support	C/CPAF	Jacobs Engineering : AL, CO, VA	21.657	7.930	Jan 2019	9.018	Jan 2020	7.807	Jan 2021	-		7.807	Continuing	Continuing	Continuing
Business Automation Services - Business Automation Services Support	MIPR	CACI : AL, CO, VA	0.102	0.022	Mar 2019	0.000		0.000		-		0.000	0.000	0.124	0.000
		Subtotal	488.004	76.997		84.525		84.753		-		84.753	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

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	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	488.004	76.997		84.525		84.753		-		84.753	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
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Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Revise and Test Contingency Plans for Information Technology Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD30 / *BMD Information Management Systems*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Manage DoD Mandated Business Applications and Sustain MDA Financial and Contractual Support Systems - Follow-On	1	2019	4	2025
Operate and Maintain General Information Technology Services 18 hours per day, 6 days per week - Follow-On	1	2019	4	2025
Revise and Test Contingency Plans for Information Technology Systems - Follow-On	1	2019	4	2025
Operate and Maintain Classified and Unclassified MDA Knowledge Online Services - Follow-On	1	2019	4	2025
Procure, Implement, and Asset Control for Information Technology Operational Systems -Follow-On	1	2019	4	2025
Provide 18 hours per day, 6 days per week Network and Helpdesk Services for General Information Technology Services for MDA Workforce - Follow-On	1	2019	4	2025
Fund Recurring Leased Circuits, Maintenance Agreements and Licenses for MDA Enterprise - Follow-On	1	2019	4	2025
Operate, Monitor and Sustain Recurring Classified and Unclassified Telecommunication Requirements for Unified Communications - Follow-On	1	2019	4	2025
Sustain the BMDS Integrated Master Schedule and the Ballistic Missile Defense Asset Management Tool - Follow-On	1	2019	4	2025
Perform Analysis, Track, and Report Metrics on Equipment Lifecycle - Follow-On	1	2019	4	2025
Sustain the Information Technology Infrastructure Across the MDA Enterprise - Follow-On	1	2019	4	2025
Operate, Monitor and Sustain Recurring Operations for Video Teleconferencing for Unified Communications Follow-On	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency											Date: February 2020	
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*				Project (Number/Name) MC30 / *Cyber Operations*			
COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC30: *Cyber Operations*	62.165	97.405	117.100	64.659	-	64.659	67.264	68.130	69.815	71.257	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional add for Cyber Enhancements. FY 2021 and the outyears represent the steady state Cyber profile.
Accomplishments map to the Office of Management and Budget (OMB) and Office of the Secretary of Defense (OSD) approved Cybersecurity Taxonomy including 1) Preventing Malicious Activity, 2) Detect, Analyze and Mitigate Intrusions, 3) Planning, Policy Development and Workforce Management, 4) Continuous Monitoring and 5) Outside Federal Outreach, Defense Industrial Base.

A. Mission Description and Budget Item Justification

A number of key IT strategies were identified in the DoD Information Technology Enterprise Strategy and Roadmap issued by the Deputy Secretary of Defense in 2011. The IT Roadmap specifically addresses the need to improve Cybersecurity. It states that DoD networks are under constant attack from cybersecurity threats launched from various sources. MDA must meet the National Command Authority Directives for rapid deployment of the BMDS while complying with the key principles of the Cybersecurity standards to ensure MDA remains a secure member of the DoD Information Network (DODIN).

DoD Instruction 8500.01 Cybersecurity issued in March 2014, requires continuous monitoring, data analysis, reporting and incident mitigation of DoD classified and unclassified, mission, test and administrative networks. To comply with the Instruction, MDA must implement a multi-tiered cybersecurity risk management capability to protect critical BMD data and systems from rapidly evolving internal and external threats.

The issuance of DoD Instruction 8510.01, Risk Management Framework (RMF) Information Technology in March 2014 requires additional resources to implement, manage, monitor and report as a result of a thirty-five percent increase in controls (237 controls with 817 enhancements). DoD 8510.01 also states that resources for implementing the RMF must be identified and allocated as part of the Defense planning, programming, budgeting, and execution process. The Controls must be tested on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported.

This project provides funds to sustain the Risk Management Framework (RMF) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Officer (PM/ISSO) Plan of Action and Milestones (POA&M) for the MDA mission, test and administrative systems. Maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&M on all MDA information systems. Supports the monitoring and tracking of Cybersecurity mitigations detailed in IT security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA PM/ISSO and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with Federal Information Security Management Act (FISMA).

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

This project funds the MDA Global Network Operations Security Center(GNOSC)formerly MDA Security Operations Center (SOC), responsible for monitoring, managing, patching, and maintaining MDA network and core IT services; issuing and tracking Technical Compliance Orders; and coordinating overarching Enterprise NetOps. The GNOSC provides the network security operations centers and supporting processes to protect and defend BMDS and the MDA Enterprise information and information systems.

The MDA Computer Emergency Response Team (CERT) monitors the classified and unclassified information technology MDA administrative IT networks and reports vulnerabilities. The MDA CERT coordinates with U.S. Cyber Command to identify and implement network vulnerability updates and patches to comply with U.S. Cyber Command vulnerabilities identified for DoD networks.

The project funds Cybersecurity governance management and administrative management support, annual Agency-wide computer-based IA training and metrics reporting, implementation of Public Key Infrastructure and Enabling and Communication and Security (COMSEC) related activities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Preventing Malicious Cybersecurity Activity	18.738	20.080	16.544
Articles:	-	-	-

Description: Provide: Federal Information Security Management Activity Act (FISMA)-related activities; Intrusion Prevention Systems; Trusted Internet Connections; Identity Management and Authentication; Supply Chain Management; Network & Data Protection and Insider Threat Mitigation Activities.
This effort includes integration and test capabilities for element interface verification and provide operations and sustainment of the deployed PNT Last Mile integration capabilities at BMDS locations.

Recurring Activities to Preventing Malicious Cyber Attacks:
-Maintain a current Information Assurance risk and residual risk assessment of the BMDS.
-Coordinate all IT projects and remote sites to ensure Cybersecurity compliance.
-Implement methodologies and goals to identify insecure and unauthorized vectors of access to networks or applications, analyze the threat, attempt to exploit the vectors and confirm existence and analyze the risk for exploiting an application, network or service.
-Track ports, protocols, and services. -Coordinate with private partnerships to ensure the Defense Industrial Base protects MDA data.

FY 2020 Plans:
-SEE ABOVE.

FY 2021 Plans:
-SEE ABOVE.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Decrease from FY 2020 to FY 2021 reflects labor realignment to the Planning, Policy Development, Workforce Training and Force Management, and Continuous Monitoring accomplishments within this budget project for greater visibility and to align with new contract structure.			
Title: Planning, Policy Development, Workforce Training and Force Management	3.017	3.243	4.164
Articles:	-	-	-
Description: Provide National Initiative for Cybersecurity Education (NICE); Workforce Development; Security Training for Employees with Significant Security Responsibilities; and Cybersecurity Strategic Planning, Policy, Oversight and Management. Specific and/or unique accomplishments to each FY are as follows: Recurring Activities for the Planning, Policy Development, Workforce Training and Force Management Accomplishment: -Document and maintain Standard Operating Instructions/Procedures for consistent interface with the MDA BMDS Network Operations Support Center (BNOSC) and the BMDS elements. -Publish MDA policies to incorporate new requirements stated in DoDI 8510.01 Risk Management Framework (RMF) to comply with 237 new controls and 817 control enhancements into controls validation testing of BMDS elements and networks. -Manage the Information Assurance Workforce Improvement Program to certify Cybersecurity professionals and report compliance in accordance with Federal Information Security Management Act (FISMA) and Information Assurance Workforce Improvement Program (DoD Manual 8570.1), achieving the DoD certification goal; reports IA Risk Assessments, Primary RMF artifacts. -Interface with United States Central Command (USCENTCOM) to provide BMDS Mission RMF package. -Conduct an annual IA Security review of the BMDS in accordance with DoDI 8510.01 and provide an analysis of changes in IA posture. -Collect, analyze, and report vulnerability and cyber warfare attack metrics to the MDA CIO, MDA leadership, and U.S. Cyber Command. -Provide Information Assurance engineering and planning guidance and vulnerability assessment for all MDA Information Technology acquisition programs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** - Increase from FY 2020 to FY 2021 reflects labor realignment from the Preventing Malicious Cybersecurity Activity within this budget project for greater visibility and to align with new contract structure.			
Title: Continuous Monitoring	5.134	7.495	8.230
Articles:	-	-	-
Description: Provide IT Security Tools and Other Continuous Monitoring. Recurring Activities for the Continuous Monitoring Accomplishment: -Manage data-at-rest encryption to ensure compliance with Global Information Grid mandated policies. -Procure/renew cybersecurity software maintenance agreements for IT Security Tools. -Procure/renew cybersecurity hardware maintenance for hardware. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Detect, Analyze and Mitigate Intrusions	70.350	86.115	35.550
Articles:	-	-	-
Description: Provide cybersecurity activities including: Federal Incident Response Centers; National Institute of Standards for Technology (NIST) SP 800.53 Implementation; Cyber Threat Analysis; Cyber Continuity of Operations (COOP); Incident Response and Remediation; Forensics and Damage Assessment; and Computer Emergency Response Teams. Specific and/or unique accomplishments to each FY are as follows: Recurring Activities for the Detect, Analyze and Mitigate Intrusions Accomplishment: -Test Risk Management Framework (RMF) controls on all IT supporting research, development, test and evaluation and DoD-controlled IT operated by a contractor or other entity on behalf of DoD and reported.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Conduct RMF analysis and reporting for the BMDS such as evaluation of residual risk by incorporating current and proposed BMDS monitoring and mitigations. -Maintain MDA Computer Emergency Response Team (MDA CERT) as a fully accredited Tier II Computer Network Defense Service provider (CNDSP) in accordance with CJCSI 6510.01F and DoD O-8530.1. -Perform CNDSP services (protect, detect, respond and sustain) for all MDA Admin/General Services, MDA Mission and test networks and enclaves 24 hours per day, seven days a week, 365 days a year. -Conduct application testing that looks for vulnerabilities and issues using a number of tactics, technical and procedures. -Conduct vulnerability scanning of MDA network to assess risks to MDA data from inside and outside sources. -Conduct monthly information assurance vulnerability audits. -Issue and track implementation of Information Assurance Vulnerability Alerts (IAVA), Bulletins and Technical Advisories. -Implement Information Assurance Vulnerability Alerts (IAVA) and Communication Tasking Orders remediation and patches. -Perform network security monitoring of all MDA subscriber networks and enclaves. -Conduct system forensic analysis, review content of compromised system, document files and data, and identify tactics, techniques and procedures used by an attacker to gain access. -Develop and maintain the RMF package for the BMDS Mission System to support a full Authorization to Operation (ATO). -Compile and validate BMDS Mission Element-level certification and accreditation documents to include BMDS Element-level System Implementation Plans (SIPs), DoD Information Assurance Certification and Authorization Process (DIACAP) Implementation Plans (DIPs), Certification and Authorization (C&A) Scorecards, Plan of Action and Milestone (POA&M) artifacts and Control Validation Testing (CVT). -Ensure MDA mission, test, and administrative systems are operated securely in accordance with DoD Information Assurance Certification and Accreditation policies. -Prepare and maintain current certification and accreditation documentation for general service networks reported to DoD and Office of Management and Budget (OMB). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - With FY 2020 Congressional Plus Up, provide Cyber Engineering (planning, analysis, and assessment) required to provide cybersecurity assessments of BMDS critical infrastructure Control Systems (CS) operations. ***FY 2021 Plans:*** SEE ABOVE (Note: FY 2019 included a Congressional Plus Up of $40M.) ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Decrease from FY 2020 to FY 2021 reflects FY 2020 Congressional Plus Up for Cyber Security Enhancements and a one-time investment for the build-out of a BMDS Tier II Cyber Security Service Provider and replacement of non-compliant IT infrastructure.			
Title: Outside Federal Outreach - Defense Industrial Base	0.166	0.167	0.171
Articles:	-	-	-
Description: Review current Cybersecurity Policies and coordinating with MDA Ballistic Missile Defense System (BMDS) Programs to ensure all applicable Cybersecurity clauses are included into MDA contracts with MDA Industry partners in the Defense Industrial Base (DIB) to ensure protection of BMDS Controlled Unclassified Information (CUI). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	97.405	117.100	64.659

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions (IRES) provides IT design, engineering, implementation and sustainment services.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Preventing Malicious Cybersecurity Activity - COMSEC	MIPR	National Security Agency : AL, CO, VA	0.000	0.000		0.200	Mar 2020	0.221	Apr 2021	-		0.221	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - Civilian Pay	Allot	Civilian Pay : AL, CO, VA, NM	1.740	1.740	Mar 2019	1.408	Oct 2019	1.649	Oct 2020	-		1.649	Continuing	Continuing	Continuing
Preventing Malicious Cybersecurity Activity - Consolidated Support CSM	C/CPFF	Booze, Allen & Hamilton : AL, CO, VA	0.570	0.904	Mar 2019	0.701	Mar 2020	0.000		-		0.000	0.000	2.175	0.000
Preventing Malicious Cybersecurity Activity - Cyber CSS	C/CPAF	Jacobs Engineering : AL, COL, VA	7.411	16.094	Jan 2019	17.771	Jan 2020	14.674	Nov 2020	-		14.674	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training and Force Management - A&AS Cyber BMDS CSM/CND	C/CPFF	Booze, Allen & Hamilton : AL, CO, VA	2.672	1.779	Mar 2019	1.815	Aug 2020	3.048	Nov 2020	-		3.048	Continuing	Continuing	Continuing
Planning, Policy Development, Workforce Training and Force Management - Civilian Pay	Allot	Civilian Pay : AL, CO, NM, VA	1.212	1.238	Oct 2018	1.428	Oct 2019	1.116	Oct 2020	-		1.116	0.000	4.994	0.000
Continuous Monitoring - Continuous Monitoring - IT Security Tools	C/CPAF	Jacobs Engineering : AL, CO, VA	7.032	5.134	Jan 2019	7.495	Jan 2020	8.230	Jan 2021	-		8.230	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Detect, Analyze and Mitigate Intrusions - A&AS, BMDS CSM/CND	C/CPFF	Booze, Allen & Hamilton : AL, CO, VA	1.140	1.452	Mar 2019	1.390	Aug 2020	2.489	Aug 2021	-		2.489	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - A&AS, Cyber Risk Mgmt	C/CPFF	Decisive Analytics Corporation : AL, CO, VA	2.856	3.916	Mar 2019	3.904	Mar 2020	3.985	Mar 2021	-		3.985	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Civilian Pay	Allot	Civilian Pay : AL, CO, NM,, VA	3.255	2.320	Oct 2018	2.823	Oct 2019	2.267	Oct 2020	-		2.267	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Civilian Travel / PCS	Allot	Civilian Travel : AL, CO, NM,, VA	0.000	0.000		0.000		0.200	Oct 2020	-		0.200	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Cyber CSS	C/CPAF	Jacobs Engineering : AL, CO, VA	34.277	55.437	Jan 2019	71.998	May 2020	26.609	Jan 2021	-		26.609	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Cyber Customer Support	C/CPAF	Network Management Resources : AL, CO, VA	0.000	6.775	Sep 2019	2.000	Mar 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Detect, Analyze and Mitigate Intrusions - Network/System assessment and authorization contract support services	C/FFP	Booze, Allen & Hamilton, : VA	0.000	0.450	Feb 2019	4.000	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Outside Federal Outreach - Defense Industrial Base - Civilian Pay	Allot	MDA Civilian Pay : AL, CO, NM, VA	0.000	0.166	Oct 2018	0.167	Oct 2019	0.171	Oct 2020	-		0.171	Continuing	Continuing	Continuing
		Subtotal	62.165	97.405		117.100		64.659		-		64.659	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	62.165	97.405		117.100		64.659		-		64.659	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
PNT Test Capabilities		✦	✦	✦																								
PNT Operations and Maint	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC30 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
PNT Test Capabilities	2	2019	4	2019
PNT Operations and Maint	1	2019	4	2023
Report Vulnerability and Cyber Warfare Attack Metrics to the MDA Chief Information Officer, MDA Leadership, and Cyber Command - Follow-On	1	2019	4	2025
Monitor Networks and Systems to Defend Mission, Test, and Administrative Systems on a 24 hours per day, 7 days per week, 365 days per year basis for Information Assurance - Follow-On	1	2019	4	2025
Provide Information Assurance Engineering and Planning Guidance and Vulnerability Assessment for Information Technology Acquisition Programs - Follow-On	1	2019	4	2025
Procure, Implement, and Asset Control of Hardware maintenance and Software Licenses for Monitoring Systems of Information Assurance - Follow-On	1	2019	4	2025
Conduct Information Assurance Certification Evaluation of Mission, Test, and Administrative Systems - Follow-On	1	2019	4	2025
Complete Annual Information Assurance user Training for MDA Workforce - Follow-On	1	2019	4	2025
Implement Information Assurance Vulnerability Alert Control Improvements for General Information Technology Services - Follow-On	1	2019	4	2025

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COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD31: *Modeling & Simulation*	267.102	79.982	88.487	107.710	-	107.710	88.557	77.761	70.661	69.913	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides software development and testing for the End-to-end Digital Integrated System-level Simulation Early Digital Product, and planning and requirements determination for the Full Digital Product.

A. Mission Description and Budget Item Justification

MDA's Modeling and Simulation (M&S) program is essential to ensuring missile defense capabilities are affordable and effective. M&S develops system-level models, frameworks, truth, simulations, and operational environments as missile defense technologies continually advance and the threat changes, and evaluates performance of the Elements, Components, and overall BMD System for verification, validation and accreditation purposes. MDA's M&S program provides a cost effective means to assess and examine Missile Defense performance space beyond what can be physically tested under current test range conditions and within the Agency's fiscal constraints. M&S future concept simulation activities provide the capability to design and develop technologies to hedge against future missile threats. MDA's M&S systems and products provide analysis, decision-making, and planning capabilities for Real-World Operations to inform the National Command Authority, Joint Staff, Military Services, NATO, Combatant Commanders (CCMDs), Operational Test Authority (OTAs), Director of Operational Test & Evaluation (DOT&E), and Allies.

The strategy of MDA's M&S Program is 1) to execute a single, integrated, and synchronized program to manage M&S development and sustainment, 2) to improve System Flight and Ground Test execution, 3) to leverage MDA test activities to collect data to anchor M&S, and 4) to perform Warfighter training and tactics validation. The strategy also incorporates key elements to address DOT&E's BMDS Assessment Report: Ensure that future M&S architectures are composable and flexible, and simplify the integration process to conserve resources and improve capabilities; Ensure that future M&S architectures incorporate and require the use of consistent truth representations (phenomenology, lethality, environmental factors, threat simulations, etc.); Improve cross-organizational system engineering processes to optimize requirements generation and ensure the inclusion of all stakeholders; Develop refined M&S accreditation criteria between MDA and the OTA.

MDA's M&S Program consists of system and product planning, development, integration, and operation; threat model development, verification, and analysis; and integration and deployment of MDA's distributed real-time Hardware-in-the-Loop (HWIL) and digital M&S simulation capabilities. Models and simulations are tailored to the specific needs of the Agency's test events and to match MDS components in their various stages of development, ranging from low-to-medium fidelity analyses supporting concept definitions studies, to high-fidelity models used to support engineering level activities. MDA validates and accredits System-level models and simulations by anchoring them to ground and flight test events, per the Integrated Master Test Plan (IMTP), to enable accurate and comprehensive assessments.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: M&S Requirements, Design Support, Scenario Optimization	12.950	12.340	10.869
Articles:	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: This activity provides the integrated program lifecycle planning and requirements definition of all MDS M&S models and capabilities to enable assessment of capability deliveries. M&S capability development executes an integrated, synchronized program to manage M&S development in support of MDS development, testing, and assessment. The following actions are required on a continuing basis to accomplish the M&S lifecycle planning and requirements definition mission: - Maintain traceability between the M&S Systems Requirements Documents and M&S product development - Produce capability documents and specifications for M&S product development to enable System flight and HWIL tests, training events, exercises, wargames, concept evaluation and development engineering - Support MDA response to export requests for M&S software and technical data to nations or international organizations - Participate in Technical Interchange Meetings and provide support for bilateral agreements with allies and partners - Support system engineering capability trades for all BMDS capability deliveries (including BMDS capability deliveries for Phased Adaptive Approach and Homeland Defense) - Continue the transition to replace the Single Stimulation Framework (SSF) with the Objective Simulation Framework (OSF) to support M&S Intended Uses - Provide integrated program lifecycle planning and scheduling of all System-level M&S models and capabilities to enable assessment of capability deliveries for Homeland and Regional Defense - Execute M&S planning, development, framework and test integration and operation; threat model development, verification, and analysis; and integration and deployment of MDA's distributed real-time Hardware-in-the-Loop (HWIL) and digital M&S simulation capabilities - Develop/sustain models and simulations tailored to the specific needs of the Agency's test events; match MDS components in their various stages of development or sustainment as required for the test venue Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: BMDS Simulations & Tools	11.690	12.585	13.437
Articles:	-	-	-

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: This activity funds the development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for Missile Defense performance assessments, Warfighter events, and BMD International Simulation events. The following actions are required on a continuing basis: Event Integration/Support Operations: - Deliver integrated architecture instantiations of the MDS to support Performance Assessments and integration of new capabilities into the Operational Capability Baseline - Integrate, test, and verify the M&S enterprise supporting System-level testing, assessment, exercises, and wargaming, including testing infrastructure - Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises - Continue the transition of real-time digital simulation capability to OSF to support Intended Uses - Maintain simulations for Element M&S development laboratories used in the BMDS Integration & Development Lab and Digital M&S Integration Center (DMIC) in Huntsville, AL and in the MDIOC Simulation Center - Conduct integration, testing and system-level verification per the digital System Requirements Document (SRD); operate the testbed to mature the OSF-based digital system simulation - Provide Event Integration Support for non-MDA Missile Defense component and weapon system models for use in MDA test and validation events - Provide HWIL/M&S benchmarking/integration, documentation and coordination; sustain, integrate and execute ground tests, and Exercises/Wargames - Provide communications emulation (MTJ, STJ, and Link-16) and network analysis support via the Tactical Communications Environment Segment (TCES) for use in IMTP events, HWIL System Post Flight Reconstructions (SPFRs) and HWIL System Pre Mission Tests (SPMTs) - Perform operational planning for planned MDS assessment events - Conduct M&S system integration and verification to support M&S system architecture development; conduct developmental integration testing M&S Operations: - Provide digital representations of BMDS elements/components using MDA's BMD International Simulation (I-SIM) in support of Combatant Command and International Wargames, conceptual planning, BMD visualizations, BMD training/orientation, M&S demonstrations, and the Warfighter's Modification & Fielding Requirements List (MFRL) for exercises and training - Implement I-SIM re-architecture requirements and emerging requirements such as IAMD/Fog of War to adapt to growing distributed event requirements - Sustain the Missile Defense Space Warning Tool (MDST) to keep pace with fielded BMDS Overhead Persistent Infrared (OPIR) Architectures in support of Warfighter training and exercise events, and System development engineering			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide software operations/maintenance support to the Extended Air Defense Simulation (EADSIM) code base for use in Warfighter exercises, training venues, and CCMD planning tools - Upgrade legacy models and develop new designs or software as required to support System simulation Re-Architecture - Provide threat representations (kinematic trajectories, radar cross sections, and infrared signatures data) for use in real-world events, simulations, exercises, wargames, and test and evaluation activities across the DoD -Develop products that meet digital and test requirements and allow M&S participation in these venues Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: M&S Objective Simulation Framework (OSF)	14.240	14.661	12.352
Articles:	-	-	-
Description: The following actions are required on a continuing basis to accomplish the OSF mission: - Develop and implement OSF upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs - Perform testing and integration of Core Truth Model capabilities into the OSF framework - Sustain and enhance framework products to maintain capabilities to support stakeholders and to keep pace with the IMTP - Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP; provide event architecture integration and checkout of Wargames for these same IMTP scheduled events - Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP; support delivery of integrated architectures for test across all test venues using the System test framework to integrate distributed architectures - Develop, maintain, test, field, and operate model representations for use in IMTP events and other MDA M&S stakeholder application areas; deploy hardware and software updates to distributed sites; perform regular maintenance and critical repairs of hardware and software - Develop a System-level integrated, high-fidelity end-to-end digital simulation, including hardware and software, data storage and transmission, and verification tools			

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Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Maintain the M&S Integration and Development Laboratories for Element M&S; maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development - Deploy Simulation Interface Units (SIUs) for BMDS testing - materials, licenses, SIU fleet purchasing; deploy SIUs and components to maintain and sustain SIU fleet including cybersecurity; enables Developmental and Operational testing with full MDS as required in the IMTP - Continue maintenance of SSF in the required venues until the transition to OSF in the venues completes - Develop M&S products to keep pace with evolving requirements in all digital and test venues - Prototype, develop and deliver new OSF capabilities to support agency efforts in the Concept Evaluation and Developmental Engineering Intended Uses Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of transition from the M&S Single Stimulation Framework (SSF) to the Objective Simulation Framework (OSF).			
Title: M&S Core Truth Modeling	11.417	12.166	11.655
Articles:	-	-	-
Description: The Core Truth Model (CTM) program provides consistent and common Phenomenology, Lethality, Environment, Communications, and Threat models for M&S venues utilized in all digital and Ground Test events and wargaming exercises. The CTM efforts are critical in the assessment of all Missile Defense capability deliveries. The following actions are required on a continuing basis to accomplish the CTM mission: - Implement next generation truth representations for signatures and lethality to address advanced MDS capability needs for tracking, discrimination and engagement - Maintain legacy truth representations (e.g., Parametric Endoatmospheric-Exoatmospheric Lethality Simulation (PEELS), Kinetic Intercept Debris Distribution (KIDD) and Optical Signatures Code/Optical Signature Inline Generator (OSC/OPTISIG)) until fully transitioned - Support integration of all applicable CTM functions into the OSF framework - Provide support for scheduled events including training, exercises, Wargames, and the Distributed, Focused and Integrated HWIL Events as presented in the IMTP			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Deliver CTM Toolkit for integrated truth representations across the M&S enterprise - Maintain an Environments Program that will provide consistent environment models for system and element level simulations - Continue development of Truth Interaction which includes infrared (IR) propagation and radio frequency (RF) propagation; this will provide consistent models and truth to system and element level simulations - Generate CTM Sensitivity analysis to identify the sensitivity within system simulation of Core Truth Models and boundary - Develop and maintain CTM design to support system and element level simulations across the entire M&S portfolio Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: M&S Improvements	29.685	36.735	59.397
Articles:	-	-	-
Description: This effort funds MDS Enterprise-wide M&S improvements that will enhance digital and ground test capabilities. Planned improvements include an experimental, developmental M&S prototype capability necessary to achieve a System-level integrated, high-fidelity end-to-end digital simulation. The prototype effort designs and develops a digital simulation capability that will provide assessment data, supplemental to Ground- and Flight tests, in areas that those venues cannot address. The End-to-end Digital Integrated System-level Simulation (EDISS) will eventually replace the current stand-alone approach to digital predictive pre-mission analysis. MDA is also implementing Ground Test Re-architecture to address accreditation and assessment limitations, increased Hardware-in-the-Loop (HWIL) complexity and reduced available integration times. The Ground Test Integrated System-level Simulation (GTISS) will make truth data consistent, implement standard framework interfaces, and provide common data formats to correct ground test simulation inadequacies in threat uncertainty as well as debris modeling. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete development for the Early Digital Product initial capability (EDISS-EDP) -- Complete integration testing for EDISS-EDP in support of data production runs starting in FY 2021 -- Continue to implement M&S software development and execute M&S integration testing across MDA Elements in support of EDISS-EDP - Acquire M&S IT hardware infrastructure to support data production runs			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Complete systems engineering and top-level design for next increment of all-digital capability EDISS-FDP (Full Digital Product) -- Conduct a System Requirements Review and System Functional Review for EDISS-FDP 1 - Ground Test Integrated System-level Simulation (GTISS) -- Execute software development, testing and prototyping in support of Ground Test re-architecture -- Complete consistent modeling of environments and debris -- Execute systems engineering design and early software development in support of advanced threats and advanced Missile Defense capabilities			
FY 2021 Plans: - Continue development of initial delivery of EDISS, called Early Digital Product (EDP) -- Create cloud-computing and Data Analytics environment -- Prepare M&S for execution in support of Long Range Discrimination Radar (LRDR) assessment -- Complete requirements development -- Continue software development and conduct spiral In-Progress Reviews -- Conduct M&S Integration, Test, and Verification, Increment Acceptance Reviews - Continue Software Development of EDISS Full Digital Product (FDP), Increments 1 and 2: -- Complete systems engineering for FDP Inc 1, initiate systems engineering for FDP Inc 2, including System Requirements Review and System Functional Review -- Continue software development for FDP Inc 1, including Spiral In-Progress Reviews -- Conduct integration and testing for FDP Inc 1 - Deploy Phase 1 of GTISS (Ground Test Integrated System-level Simulation) improvements to the MDA Ground Test Architecture: -- Complete requirements development -- Continue software development -- Provide Threat Data Production improvements -- Conduct M&S Integration, Test, and Verification - Continue Engineering and Development of GTISS Phase 2: -- Continue software development, including in-progress technical reviews -- Integrate and Test GTISS phase 2 M&S - Perform GTISS Phase 3 Functional Analysis and System Design -- Conduct requirements analysis and functional analysis, develop system design			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Conduct Systems Engineering Technical Reviews ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides concurrent Enterprise-wide ground test re-architecture improvements and digital capability development.			
Accomplishments/Planned Programs Subtotals	79.982	88.487	107.710

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing

Remarks

D. Acquisition Strategy

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks while the Elements, using the same open competition methods, develop and deliver models of their systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Element prime contractors, with additional technical standards and engineering oversight provided by FFRDCs and UARCs.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M&S Requirements, Design Support, Scenario Optimization - 3rd generation SIU development	C/CPFF	TBE : AL	0.000	4.500	Nov 2018	0.000		0.000		-		0.000	0.000	4.500	0.000
M&S Requirements, Design Support, Scenario Optimization - FFRDC & UARC	MIPR	Various : CO, AL	6.224	2.110	Nov 2018	1.458	Nov 2019	1.093	Nov 2020	-		1.093	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Prior Yr Requirements & Scenario Design no longer funded in FYDP	Various	Various : AL	8.532	0.000		0.000		0.000		-		0.000	0.000	8.532	0.000
M&S Requirements, Design Support, Scenario Optimization - Requirements & Design - CSS 2	C/CPFF	TEAMS : CO, AL	22.202	6.340	Nov 2018	6.838	Nov 2019	9.776	Nov 2020	-		9.776	Continuing	Continuing	Continuing
M&S Requirements, Design Support, Scenario Optimization - Science and Technology Council	Various	Various : VA, AL	0.000	0.000		0.500	Dec 2019	0.000		-		0.000	0.000	0.500	0.000
M&S Requirements, Design Support, Scenario Optimization - Threat Modeling	Various	Various : CO, AL	0.000	0.000		3.544	Dec 2019	0.000		-		0.000	0.000	3.544	0.000
BMDS Simulations & Tools - Digital Framework Development	C/CPAF	Northrop Grumman : CO	27.800	6.871	Nov 2018	0.000		0.000		-		0.000	0.000	34.671	0.000
BMDS Simulations & Tools - Digital Simulation Development / Support	MIPR	SMDC : AL	3.547	1.164	Nov 2018	1.108	Dec 2019	1.750	Nov 2020	-		1.750	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BMDS Simulations & Tools - M&S / Digital Framework Development	C/CPAF	SWDC : CO	0.000	0.000		9.610	Nov 2019	7.257	Nov 2020	-		7.257	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support	Various	MDA : CO, AL	2.560	0.000		0.867	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - CSS	C/CPFF	TEAMS : CO	2.839	3.655	Nov 2018	0.000		1.963	Nov 2020	-		1.963	Continuing	Continuing	Continuing
BMDS Simulations & Tools - M&S / Digital Framework Support - Industry	C/CPFF	TBE : AL	1.850	0.000		0.000		0.000		-		0.000	0.000	1.850	0.000
BMDS Simulations & Tools - M&S / Digital Framework Support - OGA	MIPR	AMRDEC : AL	16.459	0.000		0.000		0.000		-		0.000	0.000	16.459	0.000
BMDS Simulations & Tools - Science & Technology Council	Various	Various : VA, AL	0.000	0.000		1.000	Dec 2019	2.467	Nov 2020	-		2.467	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - Continuous Integration Requirements Development	Various	Various : CO, AL	0.000	0.000		3.294	Dec 2019	2.088	Nov 2020	-		2.088	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - CSS	C/CPFF	TEAMS / Jacobs : CO	3.000	2.626	Nov 2018	2.708	Nov 2019	6.670	Nov 2020	-		6.670	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL - Industry	C/CPAF	Northrop Grumman : CO	6.540	0.000		0.000		0.000		-		0.000	0.000	6.540	0.000
M&S Objective Simulation Framework (OSF) - M&S HWIL Framework Development and Support	C/CPFF	MASC : AL, CO	29.722	9.590	Nov 2018	1.663	Nov 2019	0.000		-		0.000	0.000	40.975	0.000
M&S Objective Simulation Framework (OSF) - M&S	Various	Various : CO, AL	0.000	0.000		2.426	Dec 2019	1.144	Dec 2020	-		1.144	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
HWIL Simulations / Models - Various															
M&S Objective Simulation Framework (OSF) - M&S HWIL Simulations / Models Development	MIPR	AMRDEC : AL	23.615	1.726	Nov 2018	3.570	Nov 2019	2.450	Nov 2020	-		2.450	Continuing	Continuing	Continuing
M&S Objective Simulation Framework (OSF) - M&S HWIL Support / GT re-architecture	Various	MDA : AL, CO	8.557	0.298	Nov 2018	0.000		0.000		-		0.000	0.000	8.855	0.000
M&S Objective Simulation Framework (OSF) - Science & Technology Council	Various	Various : VA, AL	0.000	0.000		1.000	Dec 2019	0.000		-		0.000	0.000	1.000	0.000
M&S Core Truth Modeling - M&S Core Truth Modeling - OGA	MIPR	AFRL : CO	2.700	1.400	Nov 2018	0.000		0.000		-		0.000	0.000	4.100	0.000
M&S Core Truth Modeling - Core Truth Modeling - Engineering	Various	Various : CO	0.000	0.000		4.282	Dec 2019	6.253	Nov 2020	-		6.253	Continuing	Continuing	Continuing
M&S Core Truth Modeling - Core Truth Models Validation	Various	MDA : CO, AL	7.144	0.800	Nov 2018	2.200	Nov 2019	0.700	Nov 2020	-		0.700	Continuing	Continuing	Continuing
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS	C/CPFF	Peopletec : AL, CO	2.507	1.990	Nov 2018	0.000		0.000		-		0.000	0.000	4.497	0.000
M&S Core Truth Modeling - M&S Core Truth Modeling - CSS 2	C/CPFF	TEAMS : AL, CO	0.000	1.683	Nov 2018	0.000		0.000		-		0.000	0.000	1.683	0.000
M&S Core Truth Modeling - M&S Core Truth Modeling - Lethality/ Phenomenology Modeling	MIPR	AMRDEC : AL	33.712	1.110	Nov 2018	0.000		0.000		-		0.000	0.000	34.822	0.000
M&S Core Truth Modeling - M&S Core Truth	C/CPAF	Northrop Grumman : CO	46.272	4.434	Nov 2018	0.000		0.000		-		0.000	0.000	50.706	0.000

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Modeling Simulation System															
M&S Core Truth Modeling - M&S Core Truth Modeling Simulation System 2	C/CPAF	SWDC : CO	0.000	0.000		5.684	Nov 2019	4.702	Nov 2020	-		4.702	Continuing	Continuing	Continuing
M&S Improvements - Enterprise-wide ground test re-architecture improvements	Various	Various : CO, AL	0.000	10.650	Dec 2018	10.219	Dec 2019	21.198	Dec 2020	-		21.198	Continuing	Continuing	Continuing
M&S Improvements - M&S Improvement - Enterprise-wide digital capability development	Various	Various : CO, AL	11.320	19.035	Nov 2018	26.516	Nov 2019	38.199	Nov 2020	-		38.199	Continuing	Continuing	Continuing
		Subtotal	267.102	79.982		88.487		107.710		-		107.710	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	267.102	79.982		88.487		107.710		-		107.710	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
International Simulation v8.6	▲																											
MDST v16.4	▲																											
Release Update to OSF - FY 2019		▲																										
International Simulation v8.7					▲																							
Release Update to OSF - 4Q FY 2020								△																				
Release Update to OSF - FY 2021									△																			
International Simulation v8.8 - 1Q FY 2021									△																			
MDST Update - FY 2021									△																			
Initial GTISS Delivery										△																		
Release Update to OSF - FY 2022													△															
International Simulation v8.9 - 1Q FY 2022													△															
MDST Update - FY 2022													△															
GTISS Update (2022)														△														
Early Digital Product														△														
International Simulation v8.10 - 1Q FY 2023																	△											
Release Update to OSF - FY 2023																	△											
MDST Update - FY 2023																	△											
GTISS Update (2023)																		△										
Release Update to OSF - FY 2024																					△							
International Simulation v8.11 - 1Q FY 2024																					△							
MDST Update - FY 2024																					△							
Release Update to OSF - FY 2025																									△			
International Simulation v8.12 - 1Q FY 2025																									△			
MDST Update - FY 2025																									△			

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
International Simulation v8.6	1	2019	1	2019
MDST v16.4	1	2019	1	2019
Release Update to OSF - FY 2019	2	2019	2	2019
International Simulation v8.7	1	2020	1	2020
Release Update to OSF - 4Q FY 2020	4	2020	4	2020
Release Update to OSF - FY 2021	1	2021	1	2021
International Simulation v8.8 - 1Q FY 2021	1	2021	1	2021
MDST Update - FY 2021	1	2021	1	2021
Initial GTISS Delivery	2	2021	2	2021
Release Update to OSF - FY 2022	1	2022	1	2022
International Simulation v8.9 - 1Q FY 2022	1	2022	1	2022
MDST Update - FY 2022	1	2022	1	2022
GTISS Update (2022)	2	2022	2	2022
Early Digital Product	2	2022	2	2022
International Simulation v8.10 - 1Q FY 2023	1	2023	1	2023
Release Update to OSF - FY 2023	1	2023	1	2023
MDST Update - FY 2023	1	2023	1	2023
GTISS Update (2023)	2	2023	2	2023
Release Update to OSF - FY 2024	1	2024	1	2024
International Simulation v8.11 - 1Q FY 2024	1	2024	1	2024
MDST Update - FY 2024	1	2024	1	2024
Release Update to OSF - FY 2025	1	2025	1	2025
International Simulation v8.12 - 1Q FY 2025	1	2025	1	2025

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD31 / *Modeling & Simulation*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MDST Update - FY 2025	1	2025	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC31: *Engineering Cyber Operations*	10.263	20.559	23.618	35.709	-	35.709	22.911	25.706	25.689	27.007	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides full funding for Cyber Assistance Teams (CATs) and additional funding for Cyber Engineering to provide System-level analysis, cyber assessments, Adversarial Assessments, and Cyber Vulnerability Penetration Assessments (CVPAs) to support cybersecurity of BMD components.

A. Mission Description and Budget Item Justification

This project provides monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POAMs. Activities include preparation of certification and accreditation documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/Certification Authority (CA) and DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act.

This project implements Risk Management Framework (RMF) system engineering principles as specified within DOD 8510.01 to acquire, design, test, implement and field technical solutions throughout the systems architecture to ensure sufficient protections exist from a threat and risk based approach. MDA's goal is to ensure Cybersecurity engineering principles flow into system requirements and design specifications early to provide the most cost benefit and ensure security controls are aligned with the National Institute of Standards and Technology (NIST) 800-53a security controls as applicable to systems categorized as National Security Systems.

This project includes resources to conduct an MDA Insider threat program to identify, deter, and mitigate potential insider threats. This activity is Presidentially and DoD-mandated.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Information Assurance / Cyber Network Defense	20.559	23.618	35.709
Articles:	-	-	-
Description: This activity includes network defense and Information System Security Manager (ISSM) activities for MDA Engineering. Specific tasks include: - Conduct Cybersecurity/information assurance engineering and architecture planning for Engineering information technology systems - Plan and test the information assurance controls for Engineering systems - Implement RMF system engineering principles to ensure sufficient protections exist from a threat and risk based approach - Conduct Controls Validation Testing of systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Conduct annual information assurance reviews to assess compliance in implementing and maintaining information assurance controls - Perform cybersecurity upgrades as needed to MDA Engineering systems to be in compliance with DoD mandates - Continue MDA Insider Threat Mitigation Team efforts - Implement and conduct continuous monitoring to determine continued security clearance eligibility Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue to perform on-site visits of MDA DIB partners to detect and increase understanding of DIB cyber threats - Develop tailored cyber threat mitigation strategies - Promote cyber threat reporting and information sharing within the DIB. - Per the FY 2020 NDAA: -- Conduct Cyber Engineering to provide System-level analysis, cyber assessments, Adversarial Assessments, and Cyber Vulnerability Penetration Assessments (CVPAs) to support cybersecurity of BMD components ***FY 2021 Plans:*** - Provide full funding for Cyber Assistance Teams - Perform on-site visits of MDA Defense Industrial Base (DIB) partners to detect and increase understanding of cyber threats - Conduct Cyber Engineering to provide System-level analysis, cyber assessments, Adversarial Assessments, and Cyber Vulnerability Penetration Assessments (CVPAs) to support cybersecurity of BMD components ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides full funding for Cyber Assistance Teams (CATs) and additional funding for Cyber Engineering.			
Accomplishments/Planned Programs Subtotals	20.559	23.618	35.709

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0305103C: *Cyber Security Initiative*	0.961	11.138	1.148	-	1.148	1.172	1.194	1.231	1.255	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

D. Acquisition Strategy

This project leverages expertise in the Engineering, intelligence/counterintelligence, and information assurance communities, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution. Products and Services will be acquired by competitive means to the extent that is beneficial and practical.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Assurance / Cyber Network Defense - Cyber Assistance Team Leads	MIPR	Various : VA, AL	0.000	2.769	Nov 2018	1.000	Nov 2019	2.490	Nov 2020	-		2.490	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Contractor Support	C/CPFF	TEAMS : VA, AL	0.806	7.362	Nov 2018	3.860	Nov 2019	9.240	Nov 2020	-		9.240	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Hardware	Various	Various : VA, AL	0.291	1.401	Nov 2018	1.184	Nov 2019	1.545	Nov 2020	-		1.545	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Intelligence Reporting	C/CPAF	Deloitte : AL, VA	1.018	2.160	Nov 2018	0.000		2.215	Nov 2020	-		2.215	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Assistance Teams - Software/Licenses	C/CPAF	Splunk : AL, VA	0.000	2.401	Nov 2018	0.000		2.040	Nov 2020	-		2.040	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Engineering	C/CPFF	Various : AL, VA	0.000	0.000		6.198	Feb 2020	6.028	Dec 2020	-		6.028	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Cyber Engineering - CSS	C/CPFF	TEAMS : VA, AL	0.000	0.000		2.896	Feb 2020	2.546	Nov 2020	-		2.546	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Information Assurance / Cyber Network Defense - Cyber Engineering - VISUM	MIPR	Various : AL	0.000	0.000		2.960	Feb 2020	2.961	Dec 2020	-		2.961	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - IT / CND Support	C/CPFF	TEAMS : CO, AL, VA	3.262	1.194	Nov 2018	2.220	Nov 2019	1.634	Nov 2020	-		1.634	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Insider Threat - Continuous SSO Support	C/CPFF	TEAMS : CO, AL, VA	0.000	0.000		0.000		1.124	Dec 2020	-		1.124	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Insider Threat Mitigation Cell - IT	C/CPAF	Northrop Grumman : CO	2.400	0.510	Dec 2018	0.520	Dec 2019	0.531	Dec 2020	-		0.531	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Insider Threat Mitigation Cell IT Network Defense	C/CPFF	TEAMS : CO, AL, VA	1.629	0.862	Dec 2018	0.880	Dec 2019	1.398	Dec 2020	-		1.398	Continuing	Continuing	Continuing
Information Assurance / Cyber Network Defense - Software Assurance	Various	MDA : Various	0.857	1.900	Nov 2018	1.900	Nov 2019	1.957	Nov 2020	-		1.957	Continuing	Continuing	Continuing
		Subtotal	10.263	20.559		23.618		35.709		-		35.709	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.263	20.559		23.618		35.709		-		35.709	Continuing	Continuing	N/A

Remarks
Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Engineering Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MC31 / *Engineering Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Engineering Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD32: *Quality, Safety, and Mission Assurance*	266.350	28.190	29.986	30.269	-	30.269	30.578	31.258	32.181	32.846	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Quality, Safety, and Mission Assurance ensures that the Missile Defense System (MDS) and all of its elements are designed, tested and operated in a reliable, safe, and effective manner.

Quality and Mission Assurance: Responsible for ensuring the reliable and effective design, test and operation of the MDS and all of its elements. Develops and ensures implementation of quality and mission assurance requirements. Mitigates quality and mission assurance risks to the lowest practical level. Provides in-plant MDA Assurance Representatives (MARs) at MDA government and contractor facilities to provide quality and mission assurance oversight of contractor manufacturing and integration. Performs Quality and Mission Assurance Assessments to ensure contractual requirements, internal requirements, and industry best practices are implemented at prime contractor and lower tier suppliers. Reviews and approves all new and modified parts, materials and critical processes for MDS elements.

Safety: Responsible for ensuring the safe design, test and operation of the MDS and all of its elements. Develops and ensures implementation of safety requirements. Mitigates safety risks to the lowest practical level. Ensures a safe workplace for all MDA employees and contractors by implementing a Safety and Occupational Health program. MDS Safety Officers (BSOs) provide on-site support at the Missile Defense Integration and Operations Center (MDIOC) 24 hours a day, 7 days a week, 365 days a year to ensure operational safety of the MDS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Quality, Safety & Mission Assurance	28.190	29.986	30.269
Articles:	-	-	-
Description: Quality, Safety, and Mission Assurance ensures that the Missile Defense System and all of its elements are designed, tested and operated in a reliable, safe, and effective manner. Specific and/or unique accomplishments to each FY are as follows:			
FY 2020 Plans: - SEE ABOVE.			
FY 2021 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	28.190	29.986	30.269

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Quality, Safety and Mission Assurance program is a collaboration between subject matter expertise in the Government, Federally Funded Research and Development Centers (FFRDC), University Affiliated Research Centers (UARC), Contract Support Services (CSS), and Industry.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Quality, Safety & Mission Assurance - Audits & Quality On-site Support	MIPR	NSWC Corona : AL, CA	25.152	2.074	Nov 2018	3.500	Nov 2019	3.925	Nov 2020	-		3.925	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - In-Plant Quality Support (MARS)	C/CPFF	Various Multi : AL, AK, AZ, CA, CO, FL, HI, NJ, MA, MO, MD, UT	14.439	2.099	Dec 2018	1.600	Nov 2019	0.000		-		0.000	0.000	18.138	0.000
Quality, Safety & Mission Assurance - Independent Readiness Review Team	C/CPFF	AI Solutions : AL	5.559	0.235	Dec 2018	0.200	Nov 2019	0.000		-		0.000	0.000	5.994	0.000
Quality, Safety & Mission Assurance - MDS Quality Support	C/CPFF	AI Solutions : AL	10.407	0.930	Dec 2018	0.800	Nov 2019	0.000		-		0.000	0.000	12.137	0.000
Quality, Safety & Mission Assurance - MDS Safety	C/CPFF	APT, INC : AL	11.586	0.930	Jan 2019	0.600	Nov 2019	0.000		-		0.000	0.000	13.116	0.000
Quality, Safety & Mission Assurance - MDS Safety Officers	MIPR	AMRDEC : AL	4.387	0.227	Nov 2018	0.092	Nov 2019	0.000		-		0.000	0.000	4.706	0.000
Quality, Safety & Mission Assurance - Management and Operations Support	MIPR	AMRDEC : AL	2.976	0.290	Nov 2018	0.222	Nov 2019	0.639	Nov 2020	-		0.639	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Mission	C/CPFF	APT, INC. : AL	8.163	0.420	Jan 2019	0.500	Nov 2019	0.000		-		0.000	0.000	9.083	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Assurance Subject Matter Experts															
Quality, Safety & Mission Assurance - Operations Support	MIPR	Various Multi : AL, CA	5.459	0.200	Nov 2018	0.200	Nov 2019	0.000		-		0.000	0.000	5.859	0.000
Quality, Safety & Mission Assurance - Parts, Materials and Processes (PMP) Program	MIPR	Various Multi : AL, CA, DC, IN	16.035	1.615	Nov 2018	2.300	Nov 2019	1.097	Nov 2020	-		1.097	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Parts, Materials and Processes - PMP - Program	C/CPFF	AI Solutions : AL	7.562	0.855	Dec 2018	1.666	Nov 2019	0.000		-		0.000	0.000	10.083	0.000
Quality, Safety & Mission Assurance - Pedigree & Design Certification - FFRDC	MIPR	Aerospace : AL, CA	26.769	2.289	Nov 2018	3.000	Nov 2019	2.376	Nov 2020	-		2.376	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality and Mission Assurance Support	C/CPFF	AI Solutions : AL, AK, AZ, CA, CO, FL, HI, NJ, MA, MO, MD, UT	9.504	0.867	Dec 2018	0.750	Nov 2019	7.297	Nov 2020	-		7.297	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Safety & Occupational Health	C/CPFF	APT, Inc : AL, VA	2.804	0.210	Jan 2019	0.220	Nov 2019	0.902	Jan 2021	-		0.902	Continuing	Continuing	Continuing
		Subtotal	150.802	13.241		15.650		16.236		-		16.236	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance HQ & Core Management (MDA CIV)	Allot	MDA QS : AL, VA, MD, CA, AZ, HI, AK, MA, NJ, FL, AR, UT	87.829	12.019	Oct 2018	11.836	Oct 2019	12.073	Oct 2020	-		12.073	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support	C/CPFF	AI and Yorktown : AL and VA	11.022	1.755	Dec 2018	1.500	Nov 2019	0.880	Dec 2020	-		0.880	Continuing	Continuing	Continuing
Quality, Safety & Mission Assurance - Quality, Safety & Mission Assurance Operations Support (Travel/PCS)	Allot	MDA QS : AL, CO, AK, DC, VA	16.697	1.175	Oct 2018	1.000	Nov 2019	1.080	Oct 2020	-		1.080	Continuing	Continuing	Continuing
		Subtotal	115.548	14.949		14.336		14.033		-		14.033	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	266.350	28.190		29.986		30.269		-		30.269	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD32 Quality, Safety, and Mission Assurance					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD32 / *Quality, Safety, and Mission Assurance*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD32 Quality, Safety, and Mission Assurance	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency												Date: February 2020
Appropriation/Budget Activity 0400 / 4					R-1 Program Element (Number/Name) PE 0603890C / *BMD Enabling Programs*				Project (Number/Name) MD40 / *Program-Wide Support*			
COST ($ in Millions)	**Prior Years**	**FY 2019**	**FY 2020**	**FY 2021 Base**	**FY 2021 OCO**	**FY 2021 Total**	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**Cost To Complete**	**Total Cost**
MD40: *Program-Wide Support*	163.712	20.550	23.562	23.808	-	23.808	21.937	21.897	28.702	31.784	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	20.550	23.562	23.808
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	20.550	23.562	23.808

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various Multi: : AL, CO, CA, VA	24.196	3.635	Mar 2019	0.000		2.157	Dec 2020	-		2.157	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	5.845	0.311	Jul 2019	0.356	Jul 2020	0.000		-		0.000	0.000	6.512	0.000
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	MDA : AK, AL, CA, CO, VA	32.108	0.000		16.012	Oct 2019	16.000	Oct 2020	-		16.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK, AL, CO, CA, HI, MD, VA, NJ, NY, OCONUS	0.000	0.000		5.442	Nov 2019	3.077	Nov 2020	-		3.077	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/Various	Various : Multi: AL, CO, CA, VA	95.961	16.604	Apr 2019	0.000		2.574	Dec 2020	-		2.574	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AL, CA, AL, AK	0.000	0.000		1.752	May 2020	0.000		-		0.000	0.000	1.752	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	5.602	0.000		0.000		0.000		-		0.000	0.000	5.602	0.000
		Subtotal	163.712	20.550		23.562		23.808		-		23.808	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	163.712	20.550		23.562		23.808		-		23.808	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603890C / *BMD Enabling Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603891C / *Special Programs - MDA*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	2,126.466	418.722	512.098	420.216	-	420.216	448.064	386.824	313.780	301.189	Continuing	Continuing
MD27: *Special Programs*	2,126.466	418.722	512.098	420.216	-	420.216	448.064	386.824	313.780	301.189	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	422.348	377.098	357.650	-	357.650
Current President's Budget	418.722	512.098	420.216	-	420.216
Total Adjustments	-3.626	135.000	62.566	-	62.566
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	135.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-10.082	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	6.456	0.000	62.566	-	62.566

Change Summary Explanation

Further details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	3,783.490	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
MD09: *Aegis BMD*	2,804.582	229.791	274.932	405.041	-	405.041	366.322	327.247	258.300	248.567	Continuing	Continuing
MG09: *Aegis BMD SM-3 Development Articles*	194.018	79.686	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	273.704
MM09: *Aegis BMD SM-3 Development*	114.507	187.879	253.244	201.970	-	201.970	102.453	28.969	14.285	7.954	0.000	911.261
MC09: *Cyber Operations*	7.944	13.005	19.617	29.392	-	29.392	38.348	48.632	46.252	28.946	Continuing	Continuing
MX09: *Aegis BMD Development Support*	347.831	179.320	163.628	148.030	-	148.030	140.923	126.302	134.702	139.178	Continuing	Continuing
MD40: *Program-Wide Support*	314.608	35.050	25.848	30.503	-	30.503	26.779	22.252	24.461	24.500	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2020 to FY 2021 provides the following:
- Increased cybersecurity requirements to initiate Radio Frequency (RF) Link Improvements Initiation between Aegis BMD Weapon Systems and missiles to enable missile hardware enhancements in alignment with the U.S. Navy
- Increased concepts, system-level requirements and preliminary design for methods to achieve deployment in support of Layered Homeland Defense
- Increased development efforts of Aegis Ballistic Missile Defense (BMD) 4.2 required to maintain joint U.S. Navy schedule alignment with an accelerated certification date to deliver capability to the warfighter in time to support the need
- Expanded BMD 5.x Weapon System capabilities to include integration with SM-3 Block IIA Software Updates 8.2 and 8.3 to address evolving threats
- Increased development for Aegis BMD 6.0 baseline necessary to address the complexities of integrating BMD Capability with the Advance Capability Build (ACB) 20 combat system to include new SPY-6 requirements
- Incorporation of Maritime Tactical Command and Control (MTC2) into Aegis BMD Mission Planner Prototype (Cerberus) to provide multi-mission planning and de-confliction

The FY 2021 funding request was reduced by $3.024 million during DWR to reduce Civilian Labor.

The FY 2021 funding request was reduced by $4.443 during DWR to reduce contractor support.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*

A. Mission Description and Budget Item Justification

The Aegis BMD mission is to deliver an enduring, operationally effective and supportable BMD capability to defend the nation, deployed forces, friends and allies, and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing United States Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges, and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight, and shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the Standard Missile-3 (SM-3) configuration enable Aegis BMD to provide effective, supportable defensive capability against longer range, more sophisticated threats and an enduring Aegis Ashore defensive capability.

This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The result will be a BMDS architecture more capable of discriminating and destroying reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine, and more efficiently using interceptor inventory. BMDS threat discrimination improvements are funded from the Enabling (0603890C), Midcourse (0603882C), BMD Sensors (0603884C), C2BMC (0603896C), and Aegis BMD (0603892C) PEs.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	741.076	727.479	718.949	-	718.949
Current President's Budget	724.731	737.269	814.936	-	814.936
Total Adjustments	-16.345	9.790	95.987	-	95.987
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-28.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	37.790			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-12.324	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-4.021	0.000	95.987	-	95.987

Change Summary Explanation

Net Increase in FY 2020 reflects the enacted congressional decrease of $28M for Unjustified Growth and provides congressional adds for SM-3 Block IIA test planning and acquisition of test articles for environmental testing and increased cybersecurity requirements.

Increase in FY 2021 provides the following:

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*

- Increased cybersecurity requirements to initiate Radio Frequency (RF) Link Improvements Initiation between Aegis BMD Weapon Systems and missiles to enable missile hardware enhancements in alignment with the U.S. Navy
- Re-baseline BMD 6.x program to condense BMD software development schedule to continue in alignment with U.S. Navy's Flight III DDG deployment
- Upgrades to Aegis Baseline (BL) 9 (BMD 5.x) to provide additional threats to the Aegis weapon system aligning with SM-3 Block IIA Build 8.2/8.3 software updates and threat set
- Aegis BL 5.4.1 (BMD 4.2) program schedule acceleration reducing total Future Year Defense Program (FYDP) cost while delivering capability to the warfighter in time to support the need in joint coordination with the U.S. Navy

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD09: *Aegis BMD*	2,804.582	229.791	274.932	405.041	-	405.041	366.322	327.247	258.300	248.567	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides the following:
- Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures
- Concepts, system-level requirements and preliminary design for methods to achieve persistent deployment in support of Layered Homeland Defense
- Increased development efforts of Aegis BMD 4.2 required to maintain joint U.S. Navy schedule alignment with an accelerated certification date to deliver capability to the warfighter in time to support the need
- Expanded BMD 5.x Weapon System capabilities to include integration with SM-3 Block IIA Software Updates 8.2 and 8.3 to address evolving threats
- Increased development for Aegis BMD 6.0 baseline necessary to address the complexities of integrating BMD Capability with the ACB 20 combat system to include new SPY-6 requirements

A. Mission Description and Budget Item Justification

Aegis BMD continues development of a Sea-Based BMD capability in support of the MDA's mission to protect the homeland, deployed forces, friends and allies from ballistic missile threats of all ranges and in all stages of flight.

Systems Engineering & Integration performs requirements development, engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration.

Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion enables cross-baseline specification management and capability assessments to ensure consistent application of technical standards, processes, and procedures across the Aegis BMD program. Aegis BMD specific efforts include: systems engineering and architecture (process and execution); modeling and simulation (M&S); Verification and Validation (V&V) test and evaluation support; ship integration; quality; safety and mission assurance M&S. V&V efforts in this accomplishment are performed at the Aegis BMD element level, which feed into the overall BMDS system level.

Aegis Baseline (BL) 5.4.0 (BMD 4.1.2) is a joint effort with the U.S. Navy developing a single Aegis Weapon System that merges BMD 4.1 and Aegis BL 5.3 computer programs within the current BMD 4.x weapon system architecture. Additional capabilities provide Anti-Air Warfare (AAW) improvements, SM-6 Dual I Extended Range AAW/Anti-Surface Warfare (ASUW), interoperability improvements, and updated BMD threat adaptation data.

Aegis BL 5.4.1 (BMD 4.2) is a joint effort with the U.S. Navy that refurbishes existing ship AN/SPY-1 radar arrays with the installation of antenna Low Noise Amplifiers (LNAs). This baseline will provide update to 21 Flight I/II Destroyers (DDG) with increased capability to maintain relevance through End of Service Life. Capabilities delivered include discrimination improvements, expanded threat set, increased stand-off range, expanded ship operating area, and war fighter requested improvements.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Aegis BL 9 (BMD 5.x) aligns with U.S. Navy Aegis Baseline 9 Capability Packages (2020, 2021, 2022, and 2024) to provide expanded detection, track, and defeat capabilities of additional intermediate range threats and threats with increasingly complex engagement scenes, increased raid sizes, and enables the Weapon System to operate in challenging operational environments. Through a series of unique Capability Insertion Packages, BMD 5.x provides software updates to the original BMD 5.1 to incorporate emergent BMDS capabilities, War fighter improvements, and improved Weapon System performance.

Aegis BL 10 (BMD 6.0) incorporates the solid state Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first Flight III DDG. BMD 6.0 will provide deployed assets enhanced Integrated Air and Missile Defense (IAMD) capability, while enabling BMDS element utilization of SPY-6 data for remote engagement. Enhancements include significant improvements in IAMD planning, search, track, discrimination and force level (multi-asset) raid defense. BMD 6.0 will enable U.S. Navy ships to maintain greater stand-off range while increasing performance against complex threats.

Aegis Underlay includes Aegis Weapon System and SM-3 Block IIA software modifications to existing systems to support a phased delivery of operational capability against expanded threat/mission space.

Modeling & Simulation (M&S) Objective Simulation Framework (OSF) effort develops, maintains and deploys the framework hardware and software for use at element laboratories and Combatant Command (CCMD) locations to support IMTP events, BMDS capability delivery assessments, War fighter training, exercises, and wargames.

M&S BMDS Simulations & Tools effort provides development and sustainment of digital products and the architecture framework, and delivery/maintenance of infrastructure for BMDS performance assessments.

BMD System Assessment and Verification, Validation & Assessment (VV&A) includes activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling and simulation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	**FY 2019**	**FY 2020**	**FY 2021**
Title: Systems Engineering & Integration	17.930	20.780	18.999
Articles:	-	-	-
Description: Perform requirements development, engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMDS Specification and BMDS Description Document. Recurring Accomplishments: - Conduct system level performance analyses to support ongoing BMDS Architecture and Systems Engineering efforts - Perform top-down system level engineering analysis, capability integration, and performance verification for Aegis BMD development and BMDS integration, including Aegis BMD compliance with the BMD System Specification and BMD System Description Document - Identify architecture alternatives that improve the BMD System's performance and are complementary to and interoperable with NATO systems and theaters around the world			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Define BMDS technical content expectations and develop system requirements, to include integration of new capabilities, such as the U.S. Navy's Air and Missile Defense Radar (AMDR) - Develop functional performance, interface, and design suitability requirements in collaboration with Aegis BMD engineers to ensure correct flow-down and allocation of BMD System-level requirements to Aegis BMD - Respond to Warfighter, Combatant Command and other requests for analyses and requests for information; provide analytical support for real-world events - Conduct non-advocate assessments of BMDS capabilities and limitations prior to capability delivery decisions to determine fielding readiness (including Theater/Regional BMD) - Conduct extensive analysis of data collected in BMD test events to evaluate BMD System operations and performance Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion	57.427	46.170	60.497
Articles:	-	-	-
Description: Aegis BMD Core System Engineering enables cross-baseline specification management and capability assessments to ensure consistent application of technical standards, processes, and procedures across the Aegis BMD program. Aegis BMD specific efforts include: systems engineering and architecture (process and execution), M&S, V&V, test and evaluation support, and ship integration. M&S V&V efforts in this accomplishment are performed at the Aegis BMD element level, which feed into the overall BMDS system level. Recurring Accomplishments: - Conduct U.S. Navy and Joint Link certifications required for BMD Baseline certifications for operational deployment - Support Ground Test Campaign for BMDS to achieve Operational Capability Baseline (OCB) declaration - Execute V&V activities and provide results to MDA System Verification Team and the OTA in support of BMD system level accreditation for BMDS events - Provide M&S Requirements Management and Development - Conduct further development of Aegis BMD System Architecture and overarching system concepts - Conduct BMDS system level requirements allocation and Aegis BMD system requirements development, trace, validation and verification, and configuration management for coordination with all participating external agencies and organizations			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Perform Command, Control, Computer, Communications and Intelligence (C4I) systems engineering to further develop Aegis BMD requirements, and to identify and resolve BMDS interoperability issues - Define and coordinate development and implementation of C4I capabilities in U.S. Navy C4I programs of record to meet Aegis BMD requirements - Conduct Threat Engineering analysis and Requirements Assessment - Conduct Systems Engineering for Aegis BMD system-level M&S development and interfaces to the BMDS architecture - Provide verified, validated, accredited models in support of U.S. Navy certification, MDA characterization of system-level performance, Operational Test Agency (OTA) assessment of operational capabilities, and representation of Aegis BMD capabilities in BMD test and exercise venues - Provide target engineering, test planning activities, and IMTP process/inputs for Aegis BMD - Conduct Performance Assessment and Verification (PAV) processes which assess the sufficiency of Objective Quality Evidence (OQE) to provide a traceable evidence to verify Element Specification (ES) requirements traced to BMDS requirements - Provide oversight of all Aegis BMD analysis in support of systems assessment and verification supporting test and analysis requirements and test planning inputs to align with MDA and U.S. Navy test programs - Provide consolidated analysis and reporting for firing events Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Provide model development and V&V in support of COMOPTEVFOR BL 9.C2 M&S accreditation - Provide support and oversight of development, integration and sustainment of M&S in support of BMD 6 - Provide Electronic Protection analysis and development of Electronic Attack mitigation concepts - Develop or modify Aegis BMD models and supporting M&S components to meet system-level and enterprise M&S infrastructure requirements for both the Ground Test re-architecture and all-Digital BMDS M&S architecture. - Develop and mature Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures ***FY 2021 Plans:*** - Provide Electronic Protection analysis - Develop and mature Regional Sensor Advanced Discrimination solutions and modeling and simulation updates for multiple Aegis BMD architectures - Provide Software Development of End-to-end Digital Integrated System-level Simulation (EDISS) Full Digital Product (FDP), Increments 1 and 2 - Complete systems engineering for FDP Inc 1, initiate systems engineering for FDP Inc 2, including System Requirements Review and System Functional Review - Provide software development for FDP Inc 1, including Spiral In-Progress Reviews			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Conduct integration and testing for FDP Inc 1 - Deploy Phase 1 of Ground Test Integrated System-level Simulation (GTISS) improvements to the MDA Ground Test Architecture to address BMDS Operational Test Agency (OTA) identified issues - Provide software development of GTISS Phase 2, including in-progress technical reviews - Integrate and test GTISS Phase 2 M&S - Conduct requirements and functional analysis for GTISS Phase 3 - Conduct Systems Engineering Technical Reviews and develop GTISS Phase 3 system design ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides Regional Sensor Advanced Discrimination solutions, Link 16 Improvements Engineering, requirements and architecture definition for Aegis BMD Element Specifications and modeling and simulation updates for multiple Aegis BMD architectures.			
Title: Aegis BMD 4.x Development	28.681	45.047	74.195
Articles:	-	-	-
Description: Aegis Baseline 5.4.0 (BMD 4.1.2) incorporates the BMD 5.0 Capability Upgrade (CU) of EPAA Phase II ENDO/ EXO requirements including EPAA Phase II Exo-atmospheric threats, integration of the SM-3 Block IB Threat Upgrade (TU), and reintroduction of other Aegis capabilities integrated with the SM-6 Dual I (Endo only). It provides Aegis Modernization capabilities comparable to the BMD 4.0 ships with legacy computer processing architecture. Aegis Baseline 5.4.1 (BMD 4.2) baseline development takes advantage of refurbished and upgraded AN/SPY-1 radar arrays with LNAs by increasing BMD capabilities with improved radar sensitivity, discrimination, threat upgrades, and more efficient radar resource utilization. Recurring Accomplishments: - Update Critical Item Development (CIDS), Interface Description Specifications (IDS) and all supporting engineering documents and plans - Conduct design studies and concepts supporting development and integration - Conduct Aegis BMD performance analysis supporting In-Process Reviews (IPR) - Participate in program leadership and technical forums including Program Management Team, System Engineering Team, and Cross Product Teams for Integration and Test, Modeling & Simulation, Test, Evaluation & Certification, and Fleet Integration and Design - Provide Weapon System updates to include MIL-SPEC UYK-43, Commercial Off-The-Shelf (COTS) BMD Signal Processor, and COTS adjunct processor updates - MDA/Navy co-funded effort to provide BMD capability on Flight I/II DDGs Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Support of computer program delivery and to provide Objective Quality Evidence (OQE) for Certification: - Conduct Aegis Baseline 5.4 (BMD 4.1) Ship Installation and Test on first ship to support U.S. Navy At-Sea Testing - Certify Aegis Baseline 5.4 (BMD 4.1) in FY 2020 - Provide Aegis Baseline 5.4 (BMD 4.1) support to BMDS ground test events, collect Objective Qualitative Evidence (OQE) to support MDA Operational Capacity Baseline (OCB) reviews For Aegis Baseline 5.4 (BMD 4.2): - Update Critical Item Development (CIDS), Interface Description Specifications (IDS) and all supporting engineering document and plans - Conduct Aegis BMD low-level performance analysis supporting In-Process Reviews (IPR) - Conduct computer program integration efforts, capability development and coding; unit test and element computer program integration and test; Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing. ***FY 2021 Plans:*** For Aegis Baseline 5.4.1 (BMD 4.2): - Perform computer program integration efforts, capability development and coding; unit test and element computer program integration and test; Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing - Conduct two IPRs in FY 2021 - Conduct increased threat sensitivity runs in MEDUSA to account for new additional threats - Incorporate new baseline requirements as a result of an FY 2020 System Requirements Review (SRR) - Develop ship change documents supporting the Radar Array Face replacement ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides alignment to the joint Navy/MDA Aegis BL 5.4.1 (BMD 4.2) re-phased baseline plan. Schedule accelerated certification six months earlier, which reduces overall Future Year Defense Program (FYDP) cost while delivering capability to the warfighter; to include Hypersonic tracking and reporting. Major portion of complex development occurs in FY 2021. Aegis BL 5.4.1 (BMD 4.2) continues computer program integration efforts, capability development and coding; unit test and element computer program integration and test; Engineering Test and Evaluation (ET&E), Multi-Element Integration and Test (MEIT) with regression testing. Provides further update to Aegis BL 5.4.1 (BMD 4.2) Critical Item Development (CIDS), Interface Description Specifications (IDS) and all supporting engineering document and plans. Provides performance analysis in support of requirements certification to support two Aegis BL 5.4.1 (BMD 4.2) IPR events to review progress and status of the baseline.			
Title: Aegis BMD 5.x Development	9.881	23.721	51.682
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: In alignment with U.S. Navy Aegis Baseline 9 Capability Packages (2020, 2021, 2022, and 2024), Aegis BMD 5.x will develop a series of unique Capability Insertion Packages (CIP) that expand detection, track, and defeat capabilities of additional intermediate range threat and threats with increasingly complex engagement scenes, increased raid sizes, and enables the Weapon System to operate in challenging operational environments. Aegis BMD capability packages are focused towards Aegis Baseline 9 Destroyers (DDGs) and Aegis Ashore Missile Defense Systems. Annual capability upgrades are necessary to pace the evolving threat, improve system reliability, and incorporate technological growth. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** Deliver Aegis BMD 5.1.2 (Aligned with Navy AEGIS Baseline 9 2020): CIP includes: - Sea Based Terminal Increment 2 Capability Upgrade: Provides capability improvements against emerging/evolving endo-atmospheric threats - Mid-Term Discrimination Improvements for Homeland Defense: Provides Long Range Search and Track (LRS&T) queuing with improved discrimination for use with other BMDS Sensors - Integration of Boost Phase Communication (9-State): Provides additional position, velocity, and acceleration track covariance over the Tactical Datalink (TDL) for boosting track in support of the GMD mission Schedule: Design, Code, Test, Integration - Q1 FY 2020 Ground Test (BMDS OCB Testing) - Q2 FY 2020 Combat Systems Test (integrated with Aegis BL 9 2020) - Q3 FY 2020 Combat System Certification Panel (integrated with Aegis BL 9 2020) - Q3 FY 2020 BMDS OCB Approval - Q4 FY 2020 Continue Aegis BMD 5.1.3 (Aligned with Navy AEGIS Baseline 9 2021): CIP includes: - Missile Power Application Non-Launch (MPAN) Increment 1: Provides SM-3 Block IIA missile reprogramming capability in operational environment (Aligned with SM-3 Software Build 8.0/8.1) - Active Sensor Bias: Provides updates to improve radar tracking performance and report tracking bias across BMDS sensors for improved track quality Schedule: Design, Code, Test, Integration - 2Q FY 2020 Ground Test (BMDS OCB Testing) - 3Q FY2020 Combat Systems Test (integrated with Aegis BL 9 2021) - 3Q FY 2020			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Combat System Certification Panel (integrated with Aegis BL 9 2021) - 1Q FY 2021 Commence Aegis BMD 5.1.4 (Aligned with Navy Aegis Baseline 9 2022): CIP Includes: - Expanded Aegis BMD Threat Space: Provides integration of additional threats to the Aegis weapon system (aligns with SM-3 Block IIA Build 8.0/8.1 software updates and threat set) - Hypersonic TDL Upgrades: Incorporates two (2) TDL Interface Change Proposals (ICP) in support of BMDS Hypersonic track and reporting requirements - Electronic Attack/Electronic Protection (EA/EP) Increment 1: Provides initial weapon system improvements for operations in complex EA environments - Force Engagement and Sensor Coordination - Raid (FENSR): Provides improved weapon system track and defeat of threats (in raid) by improving radar resource allocation, improved tracking performance, and platform-to-platform weapons coordination - MPAN Increment 2: Builds upon Increment 1 (BMD 5.1.3) by providing parallel processing, which decreases software update cycle times - Aegis Ashore TI-12 Hybrid (TI-12H) Integration: Provides weapon system updates and integration of TI-12H architecture in Aegis Ashore Missile Defense Systems Schedule: - System Design and Specifications - 3Q FY 2020 - Software Coding - 4Q FY 2020 ***FY 2021 Plans:*** Deliver Aegis BMD 5.1.3 (Aligned with Navy AEGIS Baseline 9 2021): CIP includes: - Missile Power Application Non-Launch (MPAN) Increment 1: Provides SM-3 Block IIA missile reprogramming capability in operational environment (Aligned with SM-3 Software Build 8.0/8.1) - Active Sensor Bias: Provides updates to improve radar tracking performance and report tracking bias across BMDS sensors for improved track quality Schedule: BMDS OCB Approval - 2Q FY 2021 Continue Aegis BMD 5.1.4 (Aligned with Navy Aegis Baseline 9 2022): CIP Includes: - Expanded Aegis BMD Threat Space: Provides integration of additional threats to the Aegis weapon system (aligns with SM-3 Block IIA Build 8.0/8.1 software updates and threat set)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Hypersonic TDL Upgrades: Incorporates two (2) TDL Interface Change Proposals (ICP) in support of BMDS Hypersonic track and reporting requirements - Electronic Attack/Electronic Protection (EA/EP) Increment 1: Provides initial weapon system improvements for operations in complex EA environments - Force Engagement and Sensor Coordination - Raid (FENSR): Provides improved weapon system track and defeat of threats (in raid) by improving radar resource allocation, improved tracking performance, and platform-to-platform weapons coordination - MPAN Increment 2: Builds upon Increment 1 (BMD 5.1.3) by providing parallel processing, which decreases software update cycle times - Aegis Ashore TI-12 Hybrid (TI-12H) Integration: Provides weapon system updates and integration of TI-12H architecture in Aegis Ashore Missile Defense Systems Schedule: - Design, Code, Test, Integration - 3Q FY 2021 - Ground Test - 4Q FY 2021 - Combat System Test (integrated with Aegis BL 9 2022) - 4Q FY 2021/1Q FY 2022 Commence Aegis BMD 5.2.0 (Aligned with Navy Aegis Baseline 9 2024): CIP Includes: - Expanded Active Sensor Bias (Increment 2): Provides updates to improve radar tracking performance and report tracking bias across BMDS sensors for improved track quality - Expanded Hypersonic Track and Report (Increment 2): Continues development and delivery of Hypersonic tracking and reporting - Increased Boost Phase Communications (9-State Plus): Provides additional position, velocity, and acceleration track covariance over the TDL for boosting track in support of the GMD mission - Expanded Aegis BMD Threat Space: Provides integration of additional threats to the Aegis weapon system (aligns with SM-3 Block IIA Build 8.2/8.3 software updates and threat set) - EA/EP (Increment 2): Continues weapon system improvements for operations in complex EA environments - Aegis BMD Warfighter Improvements: Incorporates/Integrates Warfighter feedback enhancements to existing functionality Schedule: Critical Design Review - 2Q FY 2021 Commence Design Code Test and Integration - 2Q FY 2021 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the initiation of Aegis BMD 5.2.0 efforts for Weapon System integration with SM-3 Block IIA Software Updates 8.2 and 8.3 to address evolving threats.			
Title: Aegis BMD 6.x Development	56.881	66.798	101.548

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-

Description: The U.S. Navy is developing the Advance Capability Build (ACB) 20 Combat System (CS) and the Air and Missile Defense Radar (AMDR), now designated SPY-6, for introduction on the first DDG Flight III. Aegis BMD 6.0 will integrate Aegis BMD 5.1 capability with the ACB 20 Combat System, to include new SPY-6 requirements. Aegis BMD 6.0 exploits SPY-6 radar improvement to enhance Engagement and Search and Track capabilities to include discrimination, raid defense and expanded threat space. This will enable BMDS element utilization of SPY-6 data for remote engagements and will supplement deployed assets with simultaneous multi-mission capabilities (e.g. IAMD). SPY-6 will support a force-level (multi-asset) approach to raid defense and will enable U.S. Navy ships to have a greater stand-off range from threat environments.
Recurring Accomplishments:
- Develop Critical Item Development (CIDS), Interface Description Specifications (IDS) and all supporting engineering documents and plans
- Conduct design studies and concepts supporting development and integration
- Conduct Aegis BMD performance analysis supporting In-Process Reviews(IPR)
- Participate in program leadership and technical forums including Program Management Team, System Engineering Team, and Cross Product Teams for Integration and Test, Modeling & Simulation, Test, Evaluation & Certification, and Fleet Integration and Design
- Develop computer program for Aegis BMD 6.0 supporting Software Increment Reviews (SWIR)
- MDA/Navy co-funded effort to provide BMD capability on Flight III DDGs
Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
Aegis BMD 6.0 computer program development activities to support the Flight III DDG schedule:
- Conduct Aegis BMD 6.0 concurrent engineering across BMD Surveillance and Track, Exo-organic, Endo-organic, and Mission Planner areas
- Conduct SPY-6 integration efforts, capability development, and performance analysis
- Conduct Aegis BMD 6.0 design and code across the BMD Mission area
- Conduct Aegis BMD 6.0 unit test and element computer integration and test

FY 2021 Plans:
- Conduct Aegis BMD 6.0 concurrent engineering across Mission Planner (Polygon Defended Area/Launch Area/Weapons Doctrine & Real-Time Plan Response), IAMD/BMD Search & Track, Engagement Scheduling, Engagement Capacity, Raid and Dual Tier/Remote Engagement areas
- Continue SPY-6 integration efforts, capability development, and performance analysis

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Continue Aegis BMD 6.0 design, code, test and performance analysis across the BMD Mission area ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the most significant portion of the BMD 6.0 development efforts to include increased engineering across Mission Planner, IAMD/BMD Search & Track, Engagement Scheduling, Engagement Capacity, Raid, Engagement Scheduling and Dual Tier/Remote Engagement areas. Provides SPY-6 integration efforts, capability development, and performance analysis, as well as design, code, test and performance analysis across the BMD Mission area. Activities increase as Aegis BMD 6.0 prepares for a first quarter FY 2022 Engineering Assessment to deliver software ready for testing.			
Title: Aegis Layered Homeland Defense Development	0.000	12.000	39.229
Articles:	-	-	-
Description: Aegis Weapon System (AWS) and SM-3 Block IIA software modifications to existing systems to support a phased delivery of operational capability against expanded threat/mission space. Aegis Underlay efforts will initially operationalize residual defense capability aligned with FTM-44 and, in the second phase, will add capability for Aegis BMD to provide an initial under layer capability to GMD in support of Homeland Defense. ***FY 2020 Plans:*** - Conduct requirement definition for Aegis Homeland Defense Underlay - Conduct BMDS system level requirements allocation and Aegis BMD system requirements development, trace, validation and verification, and configuration management for coordination with all participating external agencies and organizations ***FY 2021 Plans:*** - Begin design phase to decompose Aegis BMD Element Specifications into the Weapon System and Standard Missile specifications - Deliver an AWS Mission Planning TAD update to existing Aegis BL 9 (BMD 5.x) Certified Computer Program to operationalize residual defense capability of the AWS and SM-3 - Execute an analysis of alternatives to evaluate concepts for alternate SM-3 deployment methods to achieve persistent deployment in support of Layered Homeland Defense - Define concept and establish system-level requirements, utilizing Aegis Weapon System fire control as point of departure, to complement existing BMDS elements - Commence preliminary design of concept - Identify and resolve integration challenges ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Increase from FY 2020 to FY 2021 provides an AWS Mission Planning TAD update to operationalize residual defense capability of the AWS and SM-3 deployed Aegis BL 9 (BMD 5.x) ships. Increase also provides concepts, system-level requirements and preliminary design for methods to achieve persistent deployment in support of Layered Homeland Defense.			
Title: Modeling & Simulation Objective Simulation Framework	34.387	36.337	32.829
Articles:	-	-	-

Description: This effort develops, maintains and deploys the framework hardware and software for use at element laboratories and Combatant Command (CCMD) locations to support IMTP events, BMDS capability delivery assessments, Warfighter training, exercises, and wargames.
Recurring Accomplishments:
- Develop and implement Objective Simulation Framework (OSF) upgrades to incorporate advanced tracking, discrimination, engagement and associated upper tier debris mitigation capabilities, as well as other requirements and capabilities to meet MDA's evolving M&S Enterprise needs
- Sustain and enhance framework products to maintain capabilities to support stakeholders
- Develop plans, procedures and documentation for scheduled events including Wargames and Combatant Command Exercises and the Distributed, Focused and Integrated hardware in the loop (HWIL) Events as presented in the IMTP. Provide event architecture integration and checkout of Wargames for these same IMTP scheduled events
- Provide the ground test architecture integration expertise to meet the testing requirements of the IMTP. Support delivery of integrated architectures for test across all test venues using the BMDS test framework to integrate distributed architectures in support of BMDS
- Develop, maintain, test, field, and operate model representations for use in events and other MDA M&S stakeholder application areas. Deploy hardware and software updates to distributed sites. Perform regular maintenance and critical repairs of hardware and software.
- Control and maintain the M&S Integration and Development Laboratories for Element M&S. Maintain venue for stakeholders to conduct early integration efforts and identification of issues prior to event architecture integration to support system development.
- Continue maintenance of the Single Stimulation Framework in the required venues until the transition of the Objective Simulation Framework into the venues completes.
Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE.

FY 2021 Plans:
- SEE ABOVE.

FY 2020 to FY 2021 Increase/Decrease Statement:

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Decrease from FY 2020 to FY 2021 reflects completion of transition from the M&S Single Stimulation Framework (SSF) to the Objective Simulation Framework (OSF).			
Title: M&S BMDS Simulations &Tools	5.098	4.647	4.543
Articles:	-	-	-
Description: This effort includes: development and sustainment of digital products and the architecture framework, and delivery/ maintenance of infrastructure for BMDS performance assessments. Recurring Accomplishments: - Integrate, test, and verify the M&S enterprise supporting BMDS testing, assessment, exercises, and wargaming, including testing infrastructure. Guide and facilitate integration testing of MDA's M&S frameworks and core truth models, and all M&S components into virtual representations of the BMDS that are credible, affordable, and provide decision makers with the data needed - Integrate, test, functionally qualify, and deliver M&S tools and complex test architectures to provide system test capabilities to support MDA IMTP based test events, wargames, and exercises - Continue the transition of real-time digital simulation capability to the OSF to support Intended Uses - Provide HWIL/M&S Benchmarking/Integration documentation and coordination - Conduct M&S system integration and verification to support M&S system architecture development. Provide developmental integration testing to support M&S system architecture integration Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: BMDS Verification, Validation & Assessment (VV&A)	19.506	19.432	21.519
Articles:	-	-	-
Description: This activity includes BMD System Assessment and VV&A activities to support BMDS Operational Capacity Baseline (OCB) delivery decisions and Technical Capability Declarations (TCDs), and anchor System modeling and simulation. Recurring Accomplishments: - Verify BMDS performance, and produce BMDS verification status reports - Conduct extensive analysis of data collected in BMDS ground and flight test events, instrumental to understanding BMD System operations and performance and anchoring models and simulations			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Identify mitigation approaches for BMDS performance issues uncovered during system level analysis and assessment - Maintain M&S VV&A database, and verification data for BMD System Specification Change Notices - Develop, maintain, and update the M&S VV&A tool kit - Provide recommendations for improving assessment confidence, including M&S and testing issue resolutions - Conduct V&V in support of MDA BMD System level accreditation process in support of BMDS Ground Test and performance assessment events - Conduct specified BMD System post-flight reconstructions, element post-flight reconstructions, and pre-mission testing events so as to optimize the body of evidence and analysis supporting system-level BMDS accreditation. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - Conduct V&V of Aegis BMD digital models in support of accreditation process for BMDS Ground Test and performance assessment events ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides for VV&A of digital models.			
Accomplishments/Planned Programs Subtotals	229.791	274.932	405.041

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C MD09: *Aegis BMD O&M*	77.765	75.237	85.830	-	85.830	77.612	81.977	84.899	85.610	Continuing	Continuing
• 0208866C MD09: *Aegis BMD Procurement*	706.366	697.768	620.096	-	620.096	498.016	541.099	890.056	815.708	Continuing	Continuing
• 0208866C MD73: *Aegis Ashore Procurement*	15.000	25.659	12.000	-	12.000	1.520	3.896	2.403	0.981	Continuing	Continuing
• 0208866C MD90: *Aegis Hardware and Software Procurement*	91.181	124.986	104.372	-	104.372	109.374	103.328	126.109	124.604	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

The M&S acquisition strategy utilizes full and open competition to develop, acquire and deliver the integrated architectures/frameworks, as well as develop and deliver models of Aegis systems. The Digital and HWIL product centers integrate the suite of M&S into a composite simulation capability, all based on an open architecture. M&S achieves this end-state via close collaboration between its integrating contractor teams (Digital and HWIL) and those of the Aegis BMD prime contractors, with additional technical standards and engineering oversight provided by Federally Funded Research and Development Centers (FFRDCs) and University Affiliated Research Centers (UARCs).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering & Integration - Systems Engineering	Various	MDA Various : VA, AL	65.979	1.191	Nov 2018	1.813	Nov 2019	1.330	Nov 2020	-		1.330	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - CSS	C/CPFF	TEAMS : VA	17.408	4.144	Nov 2018	5.312	Nov 2019	4.262	Nov 2020	-		4.262	Continuing	Continuing	Continuing
Systems Engineering & Integration - Systems Engineering - Industry	C/CPAF	Boeing : VA	62.990	12.595	Nov 2018	13.655	Nov 2019	13.407	Nov 2020	-		13.407	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD APL	SS/CPAF	JHU/APL : Columbia, MD	26.983	10.866	Nov 2018	8.785	Nov 2019	12.260	Nov 2020	-		12.260	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD LM	C/CPFF	Lockheed Martin : Moorestown, NJ	23.346	12.199	Nov 2018	2.277	Nov 2019	5.030	Nov 2020	-		5.030	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MIT	MIPR	Hanscom AFB - MIT/ LL : Lexington, MA	15.281	5.305	Nov 2018	3.775	Nov 2019	5.677	Nov 2020	-		5.677	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD MITRE	MIPR	CECOM - MITRE : Dahlgren, VA	2.512	1.053	Nov 2018	1.608	Nov 2019	1.966	Nov 2020	-		1.966	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - MD09 - TD NSWCDD	MIPR	NSWC DD : Dahlgren, VA	27.399	8.137	Nov 2018	10.620	Nov 2019	12.148	Nov 2020	-		12.148	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - NIWC Pacific	MIPR	NIWC PAC : San Diego, CA	5.516	4.669	Nov 2018	4.482	Nov 2019	7.059	Nov 2020	-		7.059	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Technology Design and Insertion - Discrimination	MIPR	Various - MDA : AL,VA	15.895	0.000		1.745	Nov 2019	2.193	Nov 2020	-		2.193	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Technology Design and Insertion - M&S improvements	MIPR	Various - MDA : AL, VA	0.000	0.000		8.812	Nov 2019	13.858	Nov 2020	-		13.858	Continuing	Continuing	Continuing
Aegis Ballistic Missile Defense (BMD) Technology Design and Insertion - Various - MDA	MIPR	Various - MDA : AL,VA,CA	13.313	15.198	Nov 2018	4.066	Nov 2019	0.306	Nov 2020	-		0.306	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev -MD09- Aegis Techrep	MIPR	AEGIS Techrep : Moorestown, NJ	3.205	0.377	Nov 2018	2.844	Nov 2019	4.684	Nov 2020	-		4.684	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - D	MIPR	MDA : VA	31.834	0.000		5.216	Nov 2019	8.591	Nov 2020	-		8.591	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Dahlgren	MIPR	NSWC/DD : DAHLGREN, VA	149.519	6.156	Nov 2018	3.912	Nov 2019	6.443	Nov 2020	-		6.443	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. - MD09 - Lockheed Martin	SS/CPIF	LOCKHEED MARTIN : MOORESTOWN, NJ	814.412	20.640	Nov 2018	30.059	Nov 2019	49.509	Nov 2020	-		49.509	Continuing	Continuing	Continuing
Aegis BMD 4.x Development - BMD 4.0 Dev. -MD09- BMD 4.0 Dev-	Various	Various : Various	43.102	1.508	Nov 2018	3.016	Nov 2019	4.968	Nov 2020	-		4.968	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD 5.x Development - MD09 - 5.x	SS/CPAF	LOCKHEED MARTIN : MOORESTOWN, NJ	714.844	6.373	Nov 2018	13.254	Nov 2019	35.117	Nov 2020	-		35.117	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 5.x APL	SS/CPFF	JHU/APL/MD : COLUMBIA, MD	54.203	0.460	Nov 2018	1.787	Nov 2019	2.828	Nov 2020	-		2.828	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 5.x DD	MIPR	NSWC/DD : DAHLGREN, VA	75.811	1.400	Nov 2018	5.896	Nov 2019	9.331	Nov 2020	-		9.331	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - 5.x PHD	MIPR	NSWC/PHD : PT HUENEME, CA	11.463	0.000		0.591	Nov 2019	0.935	Nov 2020	-		0.935	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - AW	MIPR	Aegis Tech Rep : Moorestown, NJ	4.509	0.000		0.750	Nov 2019	1.187	Nov 2020	-		1.187	Continuing	Continuing	Continuing
Aegis BMD 5.x Development - MD09 - Various	MIPR	Various : MA, MD, VA, NJ	207.411	1.648	Nov 2018	1.443	Nov 2019	2.284	Nov 2020	-		2.284	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - JHU/APL	SS/CPFF	JHU/APL : MD	9.925	3.902	Nov 2018	3.932	Nov 2019	5.978	Nov 2020	-		5.978	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Lockheed Martin	C/CPFF	Lockheed Martin : NJ	31.203	45.175	Nov 2018	55.062	Nov 2019	83.707	Nov 2020	-		83.707	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - MD09 - DD	MIPR	NSWC/DD : Dahlgren, VA	7.757	3.902	Nov 2018	3.902	Nov 2019	5.932	Nov 2020	-		5.932	Continuing	Continuing	Continuing
Aegis BMD 6.x Development - Various	MIPR	Various : MA, MD, VA, NJ, CA	23.202	3.902	Nov 2018	3.902	Nov 2019	5.931	Nov 2020	-		5.931	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Engineering - APL	SS/CPFF	JHU/APL : MD	0.000	0.000		0.000		4.000	Nov 2020	-		4.000	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Engineering - DD	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.000		4.000	Nov 2020	-		4.000	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Engineering - LM	SS/CPFF	Lockheed Martin : Moorestown NJ	0.000	0.000		0.000		8.000	Nov 2020	-		8.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Layered Homeland Defense Development - Aegis Engineering - MIT/LL	MIPR	MIT/LL : Lexington MA	0.000	0.000		0.000		3.000	Nov 2020	-		3.000	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Engineering - RMS	SS/CPIF	Raytheon : AZ	0.000	0.000		0.000		6.000	Nov 2020	-		6.000	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Weapon System - MD09 - APL	SS/CPFF	JHU/APL : MD	0.000	0.000		0.756	Nov 2019	0.897	Nov 2020	-		0.897	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Weapon System - MD09 - Aegis Techrep	MIPR	Aegis Techrep : Moorestown NJ	0.000	0.000		0.324	Nov 2019	0.384	Nov 2020	-		0.384	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Weapon System - MD09 - DD	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.540	Nov 2019	0.640	Nov 2020	-		0.640	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Aegis Weapon System - MD09 - LM	SS/CPFF	Lockheed Martin : Moorestown NJ	0.000	0.000		9.180	Nov 2019	10.608	Nov 2020	-		10.608	Continuing	Continuing	Continuing
Aegis Layered Homeland Defense Development - Standard Missile - 3 (SM-3) Block IIA Development - MD09 - Raytheon	SS/CPIF	Raytheon : AZ	0.000	0.000		1.200	Nov 2019	1.700	Nov 2020	-		1.700	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering	Various	MDA : AL, VA	13.351	3.576	Nov 2018	3.256	Nov 2019	5.453	Nov 2020	-		5.453	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation	C/CPFF	TEAMS : AL, CO	18.644	5.896	Nov 2018	7.344	Nov 2019	6.375	Nov 2020	-		6.375	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603892C / *AEGIS BMD*	Project (Number/Name) MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Framework - M&S OSF Engineering - CSS Support															
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Engineering Support	C/CPAF	Northrop Grumman : CO	32.479	9.181	Nov 2018	0.000		0.000		-		0.000	0.000	41.660	0.000
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Integration	MIPR	AMRDEC : AL	24.123	2.810	Nov 2018	3.090	Nov 2019	4.067	Nov 2020	-		4.067	Continuing	Continuing	Continuing
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Prime	C/CPFF	Teledyne Brown Engineering / TBD : AL, CO	138.312	12.924	Nov 2018	22.647	Nov 2019	0.000		-		0.000	0.000	173.883	0.000
Modeling & Simulation Objective Simulation Framework - M&S OSF Engineering - Prime 2	C/CPFF	Lockheed Martin : AL	0.000	0.000		0.000		16.934	Nov 2020	-		16.934	Continuing	Continuing	Continuing
M&S BMDS Simulations &Tools - Sims & Tools	C/CPFF	Teledyne Brown Engineering : AL, CO	2.373	1.185	Nov 2018	0.000		0.000		-		0.000	0.000	3.558	0.000
M&S BMDS Simulations &Tools - Sims & Tools - Industry	C/CPAF	Northrop Grumman : CO	37.054	3.254	Nov 2018	0.000		0.000		-		0.000	0.000	40.308	0.000
M&S BMDS Simulations &Tools - Sims & Tools - Industry (2)	C/CPAF	SWDC : CO	0.000	0.000		3.887	Nov 2019	4.069	Nov 2020	-		4.069	Continuing	Continuing	Continuing
M&S BMDS Simulations &Tools - Sims & Tools - Various	Various	Various : AL, CO	0.000	0.659	Dec 2018	0.760	Nov 2019	0.474	Nov 2020	-		0.474	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment	Various	MDA Various : AL, VA	6.329	1.066	Nov 2018	0.000		0.000		-		0.000	0.000	7.395	0.000
BMDS Verification, Validation & Assessment	C/CPFF	TEAMS : AL	14.742	1.316	Nov 2018	0.806	Nov 2019	1.531	Nov 2020	-		1.531	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
(VV&A) - Verification & Assessment - CSS Support															
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - Industry	C/CPAF	Boeing : AL	21.081	6.300	Nov 2018	7.559	Nov 2019	9.365	Nov 2020	-		9.365	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - Labs	MIPR	MITRE : VA	7.821	1.796	Nov 2018	2.236	Nov 2019	1.368	Nov 2020	-		1.368	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - OGA	MIPR	AMRDEC : AL	27.822	6.336	Nov 2018	6.974	Nov 2019	7.038	Nov 2020	-		7.038	Continuing	Continuing	Continuing
BMDS Verification, Validation & Assessment (VV&A) - Verification & Assessment - UARC2	MIPR	JHU/APL : AL, VA	1.429	2.692	Nov 2018	1.857	Nov 2019	2.217	Nov 2020	-		2.217	Continuing	Continuing	Continuing
		Subtotal	2,804.582	229.791		274.932		405.041		-		405.041	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,804.582	229.791		274.932		405.041		-		405.041	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, MIPRs, and civilian salaries on the R-3.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
BMD 6.0 IPR #3		✦																										
BL 5.4.0 (BMD 4.1.2) EA					✦																							
BMD 6.0 IPR #4					✦																							
BL 5.4.1 (BMD 4.2) SRR						✧																						
BMD 5.1.3 Design, Code, Test, Integration						△																						
BL 5.4.1 (BMD 4.2) IPR #1							△																					
BL 5.4.0 (BMD 4.1) Certification							☆																					
BMD 5.1.2 Certification							☆																					
BMD 5.1.3 BMDS OCB Testing							△																					
BMD 6.0 IPR #5								△																				
Aegis Underlay SRR								△																				
BL 5.4.1 (BMD 4.2) IPR #2									△																			
BMD 5.1.3 Certification									☆																			
BMD 5.1.3 BMDS OCB Approval										△																		
BMD 5.2.0 CDR										△																		
BMD 5.2.0 Design, Code, Test, Integration										△																		
BL 5.4.1 (BMD 4.2) IPR #3											△																	
BMD 6.0 IPR #6											△																	
BMD 5.1.4 Design, Code, Test, Integration											△																	
Aegis Underlay PDR												△																
BMD 5.1.4 BMDS OCB Testing												△																
BMD 6.0 EA													△															
BL 5.4.1 (BMD 4.2) IPR #4													△															
BMD 5.1.4 Certification														☆														

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
BL 5.4.1 (BMD 4.2) EA				△			
Aegis Underlay CDR				☆			
BL 5.4.1 (BMD 4.2) Certification					☆		
BMD 5.x Incremental Capability Upgrade 2024 Certification						☆	
Aegis Underlay Certification						☆	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BMD 6.0 IPR #3	2	2019	2	2019
BL 5.4.0 (BMD 4.1.2) EA	1	2020	1	2020
BMD 6.0 IPR #4	1	2020	1	2020
BL 5.4.1 (BMD 4.2) SRR	2	2020	2	2020
BMD 5.1.3 Design, Code, Test, Integration	2	2020	2	2020
BL 5.4.1 (BMD 4.2) IPR #1	3	2020	3	2020
BL 5.4.0 (BMD 4.1) Certification	3	2020	3	2020
BMD 5.1.2 Certification	3	2020	3	2020
BMD 5.1.3 BMDS OCB Testing	3	2020	3	2020
BMD 6.0 IPR #5	4	2020	4	2020
Aegis Underlay SRR	4	2020	4	2020
BL 5.4.1 (BMD 4.2) IPR #2	1	2021	1	2021
BMD 5.1.3 Certification	1	2021	1	2021
BMD 5.1.3 BMDS OCB Approval	2	2021	2	2021
BMD 5.2.0 CDR	2	2021	2	2021
BMD 5.2.0 Design, Code, Test, Integration	2	2021	2	2021
BL 5.4.1 (BMD 4.2) IPR #3	3	2021	3	2021
BMD 6.0 IPR #6	3	2021	3	2021
BMD 5.1.4 Design, Code, Test, Integration	3	2021	3	2021
Aegis Underlay PDR	4	2021	4	2021
BMD 5.1.4 BMDS OCB Testing	4	2021	4	2021
BMD 6.0 EA	1	2022	1	2022
BL 5.4.1 (BMD 4.2) IPR #4	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD09 / *Aegis BMD*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
BMD 5.1.4 Certification	2	2022	2	2022
BL 5.4.1 (BMD 4.2) EA	4	2022	4	2022
Aegis Underlay CDR	4	2022	4	2022
BL 5.4.1 (BMD 4.2) Certification	4	2023	4	2023
BMD 5.x Incremental Capability Upgrade 2024 Certification	3	2024	3	2024
Aegis Underlay Certification	4	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MG09: *Aegis BMD SM-3 Development Articles*	194.018	79.686	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	273.704
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

No funding is requested in FY 2021 and the outyears.

A. Mission Description and Budget Item Justification

This project supported Aegis BMD purchase of Development Articles to use as test articles, and initial deployment in support of EPAA Phase III. Project included manufacturing of SM-3 Block IIA All Up Round (AUR) for the purposes of flight testing and delivery to the fleet as operational assets, and to ensure the maturation of SM-3 Block IIA manufacturing process.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: FY16 SM-3 Block IIA RDT&E All Up Rounds	79.686	0.000	0.000
Articles:	-	-	-
Description: Manufacture seventeen (17) SM-3 Block IIA All Up Rounds (AURs) (delivered FY 2018 through FY 2020) for the purposes of flight testing as reflected in the IMTP and, if not consumed in testing, delivery to the fleet as operational assets prior to an initial production decision in support of EPAA Phase III. SM-3 Block IIA AURs validated the Engineering Manufacturing Readiness Level 3 criteria for an Initial Production Decision received 1Q FY 2020. Recurring Accomplishment: Deliver SM-3 Block IIA AURs Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** Complete manufacturing and deliver of FY16 SM-3 Block IIA RDT&E All Up Rounds deliveries ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	79.686	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - NSWC/DD	MIPR	NSWC/DD : Dahlgren, VA	0.145	0.000		0.000		0.000		-		0.000	0.000	0.145	0.000
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds - SM-3 MANUFACTURING - MG09	SS/CPAF	Raytheon : Tucson, AZ	193.873	79.607	Nov 2018	0.000		0.000		-		0.000	0.000	273.480	0.000
FY16 SM-3 Block IIA RDT&E All Up Rounds - FY16 SM-3 Block IIA RDT&E All Up Rounds- Various	MIPR	Various : Various, CA, VA, MD	0.000	0.079	Apr 2019	0.000		0.000		-		0.000	0.000	0.079	0.000
		Subtotal	194.018	79.686		0.000		0.000		-		0.000	0.000	273.704	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	194.018	79.686		0.000		0.000		-		0.000	0.000	273.704	N/A

Remarks

Award Dates reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
FY16 SM-3 Block IIA AUR-first round delivery	✦						
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration		✧					

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MG09 / *Aegis BMD SM-3 Development Articles*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FY16 SM-3 Block IIA AUR-first round delivery	4	2019	4	2019
FY16 SM-3 Block IIA AUR EPAA Phase III Declaration	3	2020	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MM09: *Aegis BMD SM-3 Development*	114.507	187.879	253.244	201.970	-	201.970	102.453	28.969	14.285	7.954	0.000	911.261
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the completion of development activities including the Guidance Electronics Unit (GEU) Engineering Change Proposal (ECP) and Software UP grades (SWUP) builds 8.1/8.2 and incorporation into the production line. Additionally reflects the efforts to complete Missile Power Application Non-Launch (MPAN) approval and integration into the fleet.

A. Mission Description and Budget Item Justification

Provides development of SM-3 Missiles, Upgrade Modifications, and Integration into the Aegis Weapon System.

The SM-3 Block IB improves Aegis BMD's ability to expand the BMD battlespace, engage longer range, more sophisticated ballistic missiles that may deploy countermeasures and launch in larger raid sizes. The SM-3 Block IB Kinetic Warhead's (KW) two color infra-red (IR) seeker and advanced signal processor provides a real-time discrimination and characterization capability while improving sensitivity for longer range targets and performance against more sophisticated threats. Additionally, the new Throttleable Divert and Attitude Control System (TDACS) KW divert engine has been upgraded over the SM-3 Block IA to provide a more flexible divert in order to maneuver the KW to intercept.

The SM-3 Block IIA consists of an upgrade to a 21-inch diameter SM-3 missile and expands beyond the SM-3 Block IB battlespace to counter Intermediate Range Ballistic Missile (IRBM). SM-3 Block IIA provides an increased kinematic envelope through improved infa-red (IR) discrimination and divert capability that provide performance against the EPAA phase III expanded threat set. When combined with Aegis BMD 5.1 weapon system modifications, the SM-3 Block IIA will provide Engage on Remote (EoR) capability, which allows the use of remote off board sensor information to launch and guide the SM-3 Block IIA to final intercept. Aegis BMD 5.1 EoR capability with SM-3 Block IIA also frees up radar resources and increases the number and type of threats to be engaged simultaneously over previous baselines.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Standard Missile-3 (SM-3) Block IB Development	45.050	34.611	47.133
Articles:	-	-	-
Description: This effort modernizes the SM-3 Block IB missile, which improves on the SM-3 Block IA performance and enables engagement of more sophisticated ballistic missiles and larger raid sizes SM-3 Block IB Threat Upgrade (TU) Technology Refresh (previously IB Modernization) will provide the following: - Refreshed SM-3 KW Common Avionics Package will provide improved producibility and utilization of common components between the SM-3 Block IIA. SM-3 Block IB common components will be extendable to support different form/fit in circuit card			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
assemblies across SM-3 Block IB and SM-3 Block IIA and will mitigate SM-3 Block IB hardware availability issues. Includes Back-fit of IIA GEU ECP into IB - Refreshed SM-3 Block IB Guidance Section (GS) with the integration of Digital Data Link (DDL) replacement of Plate 3A will resolve Plate 3A hardware availability issues Recurring Accomplishments: - Assess performance with weapons systems upgrades/modifications and against emerging threats Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue development of common KW Circuit Card Assembly - Development of SM-3 Block IB Circuit Card Assemblies (CCAs) to be common with SM-3 Block IIA(IB Common Components will be extendable to support different form/fit in CCAs across SM-3 Block IB, and SM-3 Block IIA) ***FY 2021 Plans:*** - SM-3 KW Common Avionics - Development of SM-3 Block IB Circuit Card Assemblies (CCAs) to be common with SM-3 Block IIA(IB Common Components will be extendable to support different form/fit in CCAs across SM-3 Block IB, and SM-3 Block IIA) - Back-fit of SM-3 Block IIA GEU ECP into SM-3 Block IB; integration and test to ensure Legacy SM-3 Block IB performance is met; and Digital Integrated Circuit technology - Continue integration of DDL replacement of Plate 3A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides increased funding for back-fit of GEU ECP and integration into the SM-3 Block IB.			
Title: Standard Missile-3 (SM-3) Block IIA Development	142.829	218.633	154.837
Articles:	-	-	-
Description: The SM-3 Block IIA is required to meet EPAA Phase III. It will increase the area that can be defended by Aegis BMD, increase the probability of kill against a larger threat set, and leverage enhanced capability provided by BMDS sensor upgrades Recurring Accomplishments: - Conduct SM-3 Block IIA software update to support engagements against additional complex threats identified during Aegis BMD 5.1 design process conducted after missile Critical Design Review (CDR) - Conduct End to End Distributed Development System (ETEDDS) integration testing; and flight test support - Continue implementation of SM-3 Block IIA cost reduction initiatives to support meeting cost goals to reduce the current estimated Average Unit Production Price (AUPP)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Continue transition of KW hardware commonality effort (from design to material purchases) to system integration testing in order to demonstrate Technology Readiness Level (TRL) 7 - Continue Engineering Manufacture Readiness Level (EMRL) 3 compliance to support life cycle progression Specific and unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete NRE services for manufacturing maturity (EMRL 4) inclusive of rate capability and production test equipment - Guidance Electronics Unit (GEU) Engineering Change Proposal (ECP) planned activities: - Conduct manufacturing readiness review for custom electronic part and verify unit is production ready - Complete upgraded GEU re-qualification activities and ensure readiness for production - Complete Computer in the Loop (CIL) and Hardware in the Loop (HIL) upgrades; upgrade Technical Design Agent's GEU equipment for flight test simulations - Complete the Engineering Change Proposal, including the technical data package and supporting documentation, for cut-in to missile production - Execute activities to transition GEU upgrades into current production line - Commence Test planning and acquisition of test articles for environmental testing - Begin evaluation of the effects of space environments on the SM-3 Block IIA missile during flight ***FY 2021 Plans:*** - Complete Software Update builds 8.1 - adds enhanced performance requirements for 6 new threats; and 8.2 - adds Missile Power Application Non-Launch (MPAN) capability, bringing Missile Reprogramming (MRP) to the missile and fleet allowing the Vertical Launch System to conduct Missile Built in Tests (MBIT) onboard the ship while underway and incorporates 3 additional threats. Additionally, allows the capability to update software of the SM-3 IIA Round while aboard the ship, thereby enhancing the ability to conduct updates, which historically only occurred during Recertification. - Complete MPAN Safety approval via Weapons Systems Explosive Safety Review Board (WSESRB) process and fleet introduction - GEU ECP planned activities: - Complete manufacturing readiness review at GEU ECP supplier and manufacturer to verify maturity and production readiness - Complete transition to production of GEU ECP into AURs - Continue Test planning and acquisition of test articles for environmental testing - Continue evaluation of the effects of space environments on the SM-3 Block IIA missile during flight ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Decrease from FY 2020 to FY 2021 reflects the completion of development activities including the GEU ECP and SWUP builds 8.1/8.2 and incorporation into the production line. Additionally reflects the completion of MPAN approval and integration into the fleet in 1Q FY 2021.			
Accomplishments/Planned Programs Subtotals	187.879	253.244	201.970

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C MD09: *Aegis BMD O&M*	77.765	75.237	85.830	-	85.830	77.612	81.977	84.899	85.610	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 Carderock	MIPR	NSWC Carderock : Bethesda, MD	0.000	0.436	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09	SS/CPAF	Raytheon : Tuscon, AZ	13.832	41.599	Dec 2018	28.959	Dec 2019	39.436	Dec 2020	-		39.436	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - 20117142332259	MIPR	NSWC/PHD : Port Hueneme, CA	0.085	0.060	Nov 2018	0.660	Nov 2019	0.899	Nov 2020	-		0.899	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 - Various	MIPR	NSWC Corona : Corona, CA	0.029	0.395	Nov 2018	0.790	Nov 2019	1.076	Nov 2020	-		1.076	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development - MM09 MIT	MIPR	Hanscom AFB - MIT/ LL : Lexington, MA	0.000	1.105	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09 DD	MIPR	NSWC Dahlgren : Dahlgren, VA	0.341	0.860	Nov 2018	1.612	Nov 2019	2.195	Nov 2020	-		2.195	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09 JHU/APL	SS/CPAF	JHUAPL : Laurel, MD	0.595	0.595	Nov 2018	0.420	Nov 2019	0.572	Nov 2020	-		0.572	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Standard Missile-3 (SM-3) Block IB Development - Standard Missile-3 (SM-3) Block IB Development- MM09-NAVSEA	MIPR	NAVSEA BAE Systems : Baltimore, MD	0.000	0.000		2.170	Nov 2019	2.955	Nov 2020	-		2.955	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - CA,VA, MD	MIPR	Various : CA, VA, MD	3.338	9.568	Nov 2018	6.281	Nov 2019	3.742	Nov 2020	-		3.742	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION	SS/CPIF	Raytheon : Tucson, AZ	76.521	110.080	Apr 2019	175.377	Nov 2019	132.033	Mar 2021	-		132.033	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - APL	MIPR	JHU/APL : Laurel, MD	5.378	15.157	Dec 2018	15.890	Dec 2019	9.467	Dec 2020	-		9.467	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA INTEGRATION - DD	MIPR	NSWC DD : Dahlgren, VA	6.466	3.717	Nov 2018	9.485	Nov 2019	5.651	Nov 2020	-		5.651	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NSWC Corona	MIPR	NSWC Corona : Corona, CA	2.794	1.816	Nov 2018	4.698	Nov 2019	2.799	Nov 2020	-		2.799	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3)	MIPR	NWSC/Crane : IN	0.907	0.589	Nov 2018	1.922	Nov 2019	1.145	Nov 2020	-		1.145	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Block IIA Development - NSWC/Crane															
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA	MIPR	Brookhaven Lab - DOE : Uptown NY	0.000	0.000		3.830	Oct 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - MM09 - SM-3 BLK IIA Draper	SS/CPIF	Draper Labatory : Cambridge MA	0.000	0.000		1.150	Oct 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Standard Missile-3 (SM-3) Block IIA Development - Standard Missile-3 (SM-3) Block IIA Development - NJ	C/CPFF	Lockheed Martin : Moorestown NJ	4.221	1.902	Nov 2018	0.000		0.000		-		0.000	0.000	6.123	0.000
		Subtotal	114.507	187.879		253.244		201.970		-		201.970	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	114.507	187.879		253.244		201.970		-		201.970	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GEU ECP Host GEU delta-CDR			✦																									
GEU ECP Qualification								✧																				
Baseline 8.1 Operational Capacity Baseline (OCB)									△																			
Baseline 8.1 MPAN WSERB									△																			
Baseline 8.3 SRR									△																			
IBTU Tech Refresh Missile PDR									△																			
IBTU Guidance Section (GS) SRR										△																		
Baseline 8.2 Formal Qualification Testing (FQT)											△																	
Baseline 8.2 OCB													△															
IBTU GS PDR														△														
Baseline 8.3 Technical Interchange Meetings (TIM)																△												
IBTU Guidance Unit (GU) Qual																△												
Baseline 8.3 OCB																	△											
IBTU GS CDR																		△										
Baseline 8.3 FQT																			△									

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MM09 / *Aegis BMD SM-3 Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GEU ECP Host GEU delta-CDR	3	2019	3	2019
GEU ECP Qualification	4	2020	4	2020
Baseline 8.1 Operational Capacity Baseline (OCB)	1	2021	1	2021
Baseline 8.1 MPAN WSERB	1	2021	1	2021
Baseline 8.3 SRR	1	2021	1	2021
IBTU Tech Refresh Missile PDR	1	2021	1	2021
IBTU Guidance Section (GS) SRR	2	2021	2	2021
Baseline 8.2 Formal Qualification Testing (FQT)	3	2021	3	2021
Baseline 8.2 OCB	1	2022	1	2022
IBTU GS PDR	2	2022	2	2022
Baseline 8.3 Technical Interchange Meetings (TIM)	4	2022	4	2022
IBTU Guidance Unit (GU) Qual	4	2022	4	2022
Baseline 8.3 OCB	1	2023	1	2023
IBTU GS CDR	2	2023	2	2023
Baseline 8.3 FQT	3	2023	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC09: *Cyber Operations*	7.944	13.005	19.617	29.392	-	29.392	38.348	48.632	46.252	28.946	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 initiates software development efforts, solution prototyping, and integration testing.

A. Mission Description and Budget Item Justification

Sustain the DoD Risk Management Framework (RMF) Certification and Accreditation process and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM).

This project supports the monitoring and tracking of Cybersecurity mitigation detailed in Information Technology Security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Authorizing Official (AO). Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the AB mission and non-mission systems, which includes test and remote site administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

The SM-3 Block IB and IIA missiles and corresponding Aegis BMD weapon systems communication requires hardware and software development and integration testing to enable new cyber security capabilities. Activities include Encoder/Decoder, Plate 3 Circuit Card Assemblies (CCAs) and Mission Computer CCA updates. After missile and baseline specific efforts are complete, significant integration testing is required.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	13.005	10.827	11.337
Articles:	-	-	-
Description: Network/System Certification and Accreditation (C&A) includes recurring efforts such as cybersecurity engineering and architecture requirements planning for Aegis BMD systems, plan and test the Risk Management Framework (RMF) controls for the BMDS in regards to Aegis BMD systems to comply with the new directive, RMF for DoD Information Technology (DoDi 8510.01) to replace the DoD Information Assurance Certification and Accreditation process (DIACAP) and conduct Controls Validation Testing (CVT. Recurring Accomplishments: - Continue coordination and development of new and existing accreditation packages that comply with new directive, RMF for DoD Information Technology (DoDi 8510.01) process - Conduct regular Controls Validation Testing (CVT) and cooperative risk assessments to mitigate cybersecurity deficiencies - Develop and deploy Hardware and Software HW/SW implementation strategies for Continuous Monitoring activities at remote sites and Aegis BMD assets			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Monthly reviews of systems through the eMass System - Daily management of eMass System Plan of Action and Milestones (POAMs) Specific and/or unique accomplishments to each FY are as follows: - Daily management of eMass System Plan of Action and Milestones (POAMs) ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** -N/A			
Title: RF Link Improvements	0.000	8.790	18.055
Articles:	-	-	-
Description: The U.S. Navy is pursuing improvements identified by Engineering Topic 17 (ET-17) within Aegis Baseline 10 development and specific missile type. Radio Frequency (RF) Link Security Improvements will advance communications between Aegis BMD Weapon System and SM-3 Block IB and IIA missile variants. Product development and implementation will enable missile hardware enhancements in order to achieve the full requisite Missile RF Link Security Improvements. ***FY 2020 Plans:*** - Provide MDA CNet upgrades for increased cybersecurity requirements - Begin replacement of Aegis Data Link (ADL) to enhance cybersecurity protections - Conduct hardware and software design solution efforts and down-select ***FY 2021 Plans:*** - Begin software development and hardware prototype efforts to include initial integration testing - Conduct analysis and design trades to define encryption scheme for the weapon system, including backwards compatibility with missiles without RF Link Security upgrades - Update Aegis BMD Weapon System requirements and interface specifications to incorporate changes between the weapon system and missile message link ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 initiates software development efforts, solution prototyping, and integration testing.			
Accomplishments/Planned Programs Subtotals	13.005	19.617	29.392

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing
• 0901598C: *Management HQ - MDA*	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Aegis BMD element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the SM-3 and the Aegis BMD Weapon System, respectively.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Booz Allen and Hamilton	C/CPIF	MDA : McLean, VA	4.935	2.193	Nov 2018	4.000	Nov 2019	3.410	Nov 2020	-		3.410	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - CND/IA Advisory and Assistance Services	C/CPIF	Torch Technologies : Huntsville, AL	2.166	0.581	Nov 2018	0.000		0.000		-		0.000	0.000	2.747	0.000
Network / System Certification and Accreditation (C&A) - Jacobs Technology	C/CPFF	Tullahoma : TN	0.000	0.682	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation - RMS	SS/CPAF	Raytheon : Tucson, AZ	0.000	0.000		0.000		1.486	Nov 2020	-		1.486	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation	SS/CPAF	Lockheed Martin : Moorestown NJ	0.843	7.305	Nov 2018	6.827	Nov 2019	6.441	Nov 2020	-		6.441	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network System Certification and Accreditation - DISA	TBD	DISA : Falls Church, VA	0.000	0.100	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A)	MIPR	NSWC/PHD : Port Hueneme CA	0.000	0.501	Nov 2018	0.000		0.000		-		0.000	0.000	0.501	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
- Network System Certification and Accreditation - PHD															
Network / System Certification and Accreditation (C&A) - Network/System Certification and Accreditation - DD	MIPR	NSWC - DD : Dahlgren VA	0.000	1.300	Nov 2018	0.000		0.000		-		0.000	0.000	1.300	0.000
Network / System Certification and Accreditation (C&A) - Program Operations - MC09 - CivSal	Allot	MDA : VA	0.000	0.343	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
RF Link Improvements - RF Link Improvements - SM-3	C/CPFF	Raytheon : Tucson, AZ	0.000	0.000		8.390	Mar 2020	17.313	Nov 2020	-		17.313	Continuing	Continuing	Continuing
RF Link Improvements - RF Link Improvements - WS	SS/CPIF	Lockheed Martin : Moorestown, NJ	0.000	0.000		0.400	Mar 2020	0.742	Nov 2020	-		0.742	Continuing	Continuing	Continuing
		Subtotal	7.944	13.005		19.617		29.392		-		29.392	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	7.944	13.005		19.617		29.392		-		29.392	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC09 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
MC09 RF Link Improvements									✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MC09 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC09 Cyber Operations	1	2019	4	2025
MC09 RF Link Improvements	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MX09: *Aegis BMD Development Support*	347.831	179.320	163.628	148.030	-	148.030	140.923	126.302	134.702	139.178	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This includes the Government, contractor, and Federally Funded Research and Development Center (FFRDC) workforce that manage the overall Aegis Ballistic Mission Defense (BMD) program and enables the program to develop, build, and test standard missiles and associated Aegis Weapons Systems. Aegis Ballistic Missile Defense (BMD), in accordance with negotiated agreements between the U.S. Navy and the Missile Defense Agency (MDA) has identified and segregated funding for Developmental Support of Aegis BMD specific elements resident aboard Aegis capable U.S. Navy ships. Computer Program Support consists of, but is not limited to, reviews of Technical Observation Reports (TORs) that are generated by ship crews during exercises or deployments, determination of root causes and preparation of Computer Program Change Request (CPCR) to correct TORs, updates to the in-service computer program to apply, test and certify multiple CPCRs, and tests installation of Aegis Weapon System (AN/SPY-radar/Fire Control System (FCS)) alignment updates as required. Aegis BMD provides support to Annual Integration Events (AIEs) to ensure any updated Aegis Combat System (ACS) computer programs do not degrade BMD equipped ships and provides distance and technical support for BMD equipped ships. Provides Fleet operations and mission support to enable the conduct of sustained BMD operation.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Operations	104.586	99.678	82.685
Articles:	-	-	-

Description: This activity includes the Government, contractor, and Federally Funded Research and Development Center (FFRDC) workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office in Engineering, Testing, Logistics, Acquisition, Safety, Quality Assurance, Finance, Budget Formulation and Execution, Cost Estimation, and Earned Value Management in support of development activities.
Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE.

FY 2021 Plans:
- SEE ABOVE.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
The decrease from FY 2020 to FY 2021 reflects a reduction in program operations.			
Title: Aegis Ballistic Weapon System Support	28.025	22.747	24.594
Articles:	-	-	-
Description: Provides system engineering for fielded Aegis BMD Weapon Systems from warfighter feedback, investigation of BMDS Discrepancy Reports, and BMDS ground test observation analysis. It includes computer program defect corrections and supports assessment of flight test readiness. Recurring Accomplishments: - Update threat adaptation data to keep pace with emergent threats - Provide operation and sustainment of land based test sites used for the development of Aegis BMD baselines. Operation and sustainment includes Engineering, Logistics, Quality Assurance, Configuration Management and other support activities to both baseline development and the sites. - Provide support for contingency operations of national interest - Support upgrades to fielded Aegis BMD computer programs baselines approved as an Operational Capacity Baseline - Provide engineering support to Operationally Capable Baseline ships that participate in BMD test events - Provide test site usage for maintenance and support of baselines under development - Sustain the classified computing infrastructure needed for development efforts Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides additional test site maintenance hours supporting multiple baselines under development.			
Title: Fleet Integration	17.340	16.871	24.702
Articles:	-	-	-
Description: Provide Fleet operations and mission support to enable the conduct of sustained BMD operations; advocate war fighter requirements and fleet feedback in baseline development and capability upgrades to Aegis BMD weapon system; provide analysis and Mission Planning support for Geographic Combatant Commanders for operational application of Maritime BMD capabilities; and provide BMD Capabilities Analysis and Exercise Support for Aegis BMD baselines under development or currently deployed in the Operational Fleet.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Recurring Accomplishments: - Define, develop and review Joint and Fleet Doctrine for incorporation of Aegis BMD capability transition to warfighter and baseline acceptance into MDA Operational Capacity Baseline (OCB) - Research and define certification and warfighter acceptance requirements for Aegis BMD baselines to ensure successful capability delivery - Develop Aegis BMD training simulations and scenarios to support shipboard training including BMD Qualification (BMDQ) and higher level exercises - Execute warfighter feedback process to enhance Aegis BMD functional capability development and influence future Aegis BMD requirements and support MDA Test Community and Combatant Commanders in BMD Exercises and Wargames - Provide analysis for Anti-Ship Ballistic Missile Defense - Provide analysis on parametric organic sensor sensitivity - Provide analysis on up-range ship/sensor support for Launch on Remote (LoR), Engage on Remote (EoR), and Cued engagements - Provide analysis on impacts of countermeasures - Provide analysis on developing threats Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Optimization of multi-baseline/ship defense designs - Limited anti-air warfare depth of fire calculations - Deliver Aegis BMD Mission Planner Prototype ***FY 2021 Plans:*** - Provide optimization of multi-baseline/ship defense designs in order to accomplish force defense design planning. - Provide limited Anti-Air Warfare (AAW) depth of fire calculations. Navy BMD assets need to account for air threats that impact their ship operating area integrated BMD/AAW mission. - Deploy Maritime Tactical Command and Control (MTC2) cloud device for local storage and mission planning computing in order to support collaboration across ship networks (afloat-to-ashore) and future mission planning software and data library updates - Incorporate MTC2 into Aegis BMD Mission Planner Prototype (Cerberus) to provide multi-mission planning and de-confliction (BMD, air, surface, etc) - Develop Capability Insertion and Requirements to resolve warfighter feedback design issues. Build warfighter requirement into current baseline on a more frequent schedule. - Mission Planner Integrated Product Team (IPT) Lead. Synchronizes mission planning efforts across the program. ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Increase from FY 2020 to FY 2021 provides Maritime Tactical Command and Control (MTC2) capability for collaborative planning across ship, strike group, and higher ashore headquarters. MTC2 deployment allows iterative and faster fielding of BMD Planner (Cerberus) to warfighters.			
Title: Infrastructure Upgrades	26.669	24.332	16.049
Articles:	-	-	-
Description: Provides management of C4I aspects of the BMDS Test Site (BTS) San Diego upgrade plan to maintain Fleet representative C4I configurations to support testing, troubleshooting, and Fleet operations. Includes IT services in support of the Aegis RDT&E mission to include: IT help-desk services; portal and data services; records management; business automation services; and desktop and Special Purpose Processing Nodes (SPPNs) maintenance and licenses. In addition, replaces critical IT infrastructure at end-of-life and to implement DoD mandated projects in support of the Joint Information environment (JIE) initiative. Recurring accomplishments: - Conduct Aegis IT services such as IT help-desk; portal and data services; records management; business automation services; and desktop and SPPN maintenance and licenses - Replacement of critical end-of-life equipment - Upgrades to IT infrastructure planning and implementation efforts to accomplish DoD mandated IT Projects (JIE and DoD CIO Information Resources Management (IRM) initiatives. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects realignment of Special Access Program facility upgrade efforts from Program Element 0603892C to Program Element 0603891C.			
Title: USINDOPACOM Joint Emerging Operational Needs Statement (JEONS)	2.700	0.000	0.000
Articles:	-	-	-
Description: Integrated upper tier Ballistic Missile Defense System that expands engagement options and increases coverage area. Provides updated Threat Adaptation Data necessary for successful mission planning and threat detection on Aegis BMD ships. JEON funding also supports initial development efforts for regional peer-to-peer engagement coordination with Terminal High-Altitude Area Defense (THAAD). ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	179.320	163.628	148.030

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C MD09: *MD09 Aegis BMD O&M*	77.766	75.237	85.830	-	85.830	77.612	81.977	84.899	85.610	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Aegis Ballistic Missile Defense (BMD) element acquisition approach supports evolutionary development, continuously building upon demonstrated capabilities to advance overall BMDS capability. After considering all the technical and management aspects of the program and to meet the requirements presented by an evolving ballistic missile threat, the Aegis BMD program awarded sole source contracts to Raytheon and Lockheed Martin to continue development of the Standard Missile-3 (SM-3) and the Aegis BMD Weapon System, respectively.

Competition will be maximized for purchase of any products or services as appropriate.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Program Operations - MX09 - Civ Sal	Allot	MDA : VA	33.575	28.512	Nov 2018	36.417	Nov 2019	34.933	Nov 2020	-		34.933	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - DD PM	MIPR	NSWC/DD : Dahlgren, VA	4.932	1.941	Nov 2018	3.186	Nov 2019	2.057	Nov 2020	-		2.057	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - IT	Various	MDA : VA, AL	1.402	1.787	Nov 2018	1.752	Nov 2019	1.517	Nov 2020	-		1.517	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - MDA Travel	Allot	MDA : VA	2.165	2.352	Nov 2018	3.483	Nov 2019	2.500	Nov 2020	-		2.500	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington, DC	13.691	13.603	Nov 2018	14.785	Nov 2019	13.348	Nov 2020	-		13.348	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - NAVSEA RB Sal	MIPR	NAVSEA : Washington, DC	2.429	2.429	Nov 2018	2.499	Nov 2019	2.391	Nov 2020	-		2.391	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - NAVSEA Training, Various	MIPR	NAVSEA : Washington, DC	1.526	0.060	Nov 2018	0.297	Nov 2019	0.060	Nov 2020	-		0.060	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - NAVSEA Travel	MIPR	NAVSEA : Washington, DC	1.056	1.130	Nov 2018	0.659	Nov 2019	0.000		-		0.000	0.000	2.845	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Program Operations - MX09 - Security	MIPR	Various : VA	1.651	0.127	Nov 2018	2.722	Nov 2019	0.285	Nov 2020	-		0.285	Continuing	Continuing	Continuing
Program Operations - Program Operations - MX09 - TEAMS	C/CPFF	Various : VA, AL	40.197	52.645	Nov 2018	33.878	Nov 2019	25.594	Nov 2020	-		25.594	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW APL	SS/CPFF	JHU/APL : Columbia, MD	5.127	1.182	Nov 2018	0.853	Nov 2019	0.929	Nov 2020	-		0.929	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW DD	MIPR	NSWC DD : Dahlgren, VA	18.128	3.946	Nov 2018	3.618	Nov 2019	3.768	Nov 2020	-		3.768	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW LM	C/CPFF	Lockheed Martin : Moorestown, NJ	41.405	6.373	Nov 2018	2.098	Nov 2019	2.284	Nov 2020	-		2.284	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW NAVSEA	MIPR	NAVSEA : Washington, DC	41.461	15.332	Nov 2018	15.372	Nov 2019	16.736	Nov 2020	-		16.736	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW TECH REP	MIPR	Aegis Tech Rep : Moorestown, NJ	0.940	0.432	Nov 2018	0.432	Nov 2019	0.470	Nov 2020	-		0.470	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - AW Wallops	MIPR	SCSC : Wallops Island, VA	3.243	0.304	Nov 2018	0.374	Nov 2019	0.407	Nov 2020	-		0.407	Continuing	Continuing	Continuing
Aegis Ballistic Weapon System Support - MX09 - TD Various	MIPR	Various : San Diego, CA	32.663	0.000		0.000		0.000		-		0.000	0.000	32.663	0.000
Aegis Ballistic Weapon System Support - MX09 - AW PHD	MIPR	NSWC PHD : Port Hueneme, CA	0.500	0.456	Nov 2018	0.000		0.000		-		0.000	0.000	0.956	0.000
Fleet Integration - MX09 - Fleet APL	SS/CPFF	JHU/APL/MD : Columbia, MD	17.496	10.955	Nov 2018	11.130	Nov 2019	12.009	Nov 2020	-		12.009	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet DD	MIPR	NSWC DD : Dahlgren, VA	7.765	2.725	Nov 2018	5.081	Nov 2019	3.630	Nov 2020	-		3.630	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fleet Integration - MX09 - Fleet NIWC	MIPR	NIWC : San Diego, CA	0.000	2.002	Nov 2018	0.000		7.713	Nov 2020	-		7.713	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet SMDC	MIPR	SMDC/ARSTRST : Huntsville, AL	1.305	0.604	Nov 2018	0.660	Nov 2019	0.250	Nov 2020	-		0.250	Continuing	Continuing	Continuing
Fleet Integration - MX09 - Fleet CSCS	MIPR	CSCS : Dahlgren, VA	3.160	1.054	Nov 2018	0.000		1.100	Nov 2020	-		1.100	Continuing	Continuing	Continuing
Infrastructure Upgrades - Infrastructure Upgrades - MX-09 S Jacobs	C/CPAF	Jacobs Engineering : AL, CA, CO, NM, VA, HI	0.000	0.096	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Infrastructure Upgrades - Infrastructure Upgrades MX-09 S Network	C/CPFF	Network Management Resources : Chantilly, VA	0.000	0.171	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - ICT Funding	C/CPAF	Jacobs Engineering : AL,CA,CO,NM,VA,HI	34.885	12.717	Nov 2018	11.569	Nov 2019	11.662	Nov 2020	-		11.662	Continuing	Continuing	Continuing
Infrastructure Upgrades - MX09 - S	MIPR	SPAWAR : CA	0.191	0.255	Nov 2018	0.000		0.000		-		0.000	0.000	0.446	0.000
Infrastructure Upgrades - MX09 - S APL	SS/CPAF	JHU/APL : Laurel, MD	1.497	0.300	Nov 2018	5.160	Nov 2019	0.000		-		0.000	0.000	6.957	0.000
Infrastructure Upgrades - MX09 - S Corona	MIPR	NSWC Corona : Corona, CA	2.788	1.697	Nov 2018	0.847	Nov 2019	0.000		-		0.000	0.000	5.332	0.000
Infrastructure Upgrades - MX09 - S LM	C/CPAF	Lockheed Martin : Moorestown, NJ	14.908	5.827	Nov 2018	0.894	Nov 2019	0.000		-		0.000	0.000	21.629	0.000
Infrastructure Upgrades - MX09 - S MIT	C/CPAF	MIT : Lexington, MA	0.658	0.300	Nov 2018	0.348	Nov 2019	0.000		-		0.000	0.000	1.306	0.000
Infrastructure Upgrades - MX09 - S RMS	C/CPAF	Raytheon : Tucson, AZ	5.820	0.000		1.100	Nov 2019	0.000		-		0.000	0.000	6.920	0.000
Infrastructure Upgrades - MX09- D/TD	MIPR	SPAWAR : CA	5.095	5.076	Nov 2018	3.294	Nov 2019	4.387	Nov 2020	-		4.387	0.000	17.852	0.000
Infrastructure Upgrades - MX09- S DD	MIPR	NSWC DD : Dahlgren, VA	3.313	0.230	Nov 2018	0.300	Nov 2019	0.000		-		0.000	0.000	3.843	0.000
Infrastructure Upgrades - MX09-Various	MIPR	Various : Various	0.759	0.000		0.820	Nov 2019	0.000		-		0.000	0.000	1.579	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) - USINDOPACOM Joint Emerging Operational Needs Statement (JEON) - MX09 AW JHU/APL	SS/CPFF	JHU/APL : Columbia, MD	0.480	0.000		0.000		0.000		-		0.000	0.000	0.480	0.000
USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) - USINDOPACOM Joint Emerging Operational Needs Statement (JEON) - MX09 AW Lockheed Martin	C/CPFF	Lockheed Martin : Moorestown, NJ	0.935	2.700	Nov 2018	0.000		0.000		-		0.000	0.000	3.635	0.000
USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) - USINDOPACOM Joint Emerging Operational Needs Statement (JEON) - MX09 AW NSWC	MIPR	NSWC DD : Dahlgren, VA	0.685	0.000		0.000		0.000		-		0.000	0.000	0.685	0.000
		Subtotal	347.831	179.320		163.628		148.030		-		148.030	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	347.831	179.320		163.628		148.030		-		148.030	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MX09 Aegis BMD Development Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MX09 / *Aegis BMD Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MX09 Aegis BMD Development Support	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	314.608	35.050	25.848	30.503	-	30.503	26.779	22.252	24.461	24.500	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	35.050	25.848	30.503
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	35.050	25.848	30.503

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	C/CPAF	Various : Multi: AL, CA, CO, VA	2.702	0.537	Jul 2019	0.423	Jul 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries	Various	MDA : Multi: AK, AL, CO, CA, VA	236.981	34.513	Oct 2018	23.547	Oct 2019	24.791	Oct 2020	-		24.791	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK/ AL/CA/CO/HI/MD/ VA/NJ/NY/OCONUS	30.979	0.000		0.152	Jan 2020	0.235	Oct 2020	-		0.235	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	39.256	0.000		1.726	Jul 2020	5.477	Jul 2021	-		5.477	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	4.690	0.000		0.000		0.000		-		0.000	0.000	4.690	0.000
		Subtotal	314.608	35.050		25.848		30.503		-		30.503	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	314.608	35.050		25.848		30.503		-		30.503	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603892C / *AEGIS BMD*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	3,106.024	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
MD01: *Command & Control, Battle Management, Communications (C2BMC)*	2,053.448	295.608	313.562	367.380	-	367.380	351.374	309.375	330.737	289.908	Continuing	Continuing
MC01: *Cyber Operations*	12.738	17.468	33.012	12.658	-	12.658	21.742	16.403	14.657	14.987	Continuing	Continuing
MT01: *C2BMC Test*	300.717	53.690	64.624	61.264	-	61.264	65.861	59.880	60.784	63.901	Continuing	Continuing
MX01: *Command & Control, Battle Management, Communications (C2BMC) Development Support*	614.876	112.909	114.876	128.482	-	128.482	130.808	138.840	145.446	145.502	Continuing	Continuing
MD40: *Program-Wide Support*	124.245	21.290	23.682	23.569	-	23.569	23.545	21.973	29.752	29.673	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2020 to FY 2021 provides Combatant Command (CCMD) requested C2BMC Upgrades for increased Protected Anti-Scintillation Anti-Jam Wideband Net-Centric System (PAAWNS) support, and CCMD requested C2BMC Upgrades for AN-TPY-2 High Altitude Electromagnetic Pulse (HEMP) Hardened Transportable Terminals (HTT) Integration and for initiating Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture.

The FY 2021 funding request was reduced by $7.5 million during DWR to reduce Discrimination efforts.

The FY 2021 funding request was reduced by $1.245 million during DWR to reduce Civilian Labor.

The FY 2021 funding request was reduced by $1.555 million during DWR to reduce contractor support.

A. Mission Description and Budget Item Justification

The Command and Control, Battle Management, and Communications (C2BMC) program is the integrating element of the Ballistic Missile Defense System (BMDS). It is a vital operational system that enables the U.S. President, Secretary of Defense and Combatant Commanders at strategic, regional and operational levels to systematically plan missile defense operations, to collectively see the battle develop, and to dynamically manage designated networked sensors and weapons systems to achieve global and regional mission objectives. Systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground-based Midcourse Defense (GMD), Army Integrated Air and Missile Defense Battle Command System (IBCS), and sensors such

as the Army Navy/Transportable Radar Surveillance and Control-2 (AN/TPY-2) Radar, Sea-Based X-Band Radar (SBX), Long Range Discrimination Radar (LRDR), Homeland Defense, Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infrared (OPIR) Architecture (BOA). The C2BMC program also works to increase coalition partners' capabilities and investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system. C2BMC begins support to integrate existing sensor elements within Missile Defense Agency and the Services into the Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	507.817	564.206	534.988	-	534.988
Current President's Budget	500.965	549.756	593.353	-	593.353
Total Adjustments	-6.852	-14.450	58.365	-	58.365
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-33.300			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	18.850			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-6.852	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	58.365	-	58.365

Change Summary Explanation

Decrease in FY 2020 reflects the Congressional decrease for Increment 7 efforts and Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) and an increase for Cybersecurity efforts.

Increase in FY 2021 provides development of additional Post Intercept Assessment (PIA) capability delivering kill assessment data for GMD, integration of a NORTHCOM user node for increased availability and resiliency in support of Homeland Defense operations and the integration of an additional management node providing uninterrupted global mission support while delivering increased resiliency to BMD network system and security. It also supports AN/TPY-2 hardening of Satellite Communications (SATCOM) terminals, and increased Protected Anti-Scintillation Anti-Jam Wideband Net-Centric System (PAAWNS) support to ensure continued communications in the event of high altitude nuclear explosion. The FY 2021 increase also supports the integration of existing MDA and Air Force sensor elements with C2BMC and the Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD01: *Command & Control, Battle Management, Communications (C2BMC)*	2,053.448	295.608	313.562	367.380	-	367.380	351.374	309.375	330.737	289.908	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides Combatant Command (CCMD) required C2BMC Upgrades for increased Protected Anti-Scintillation Anti-Jam Wideband Net-Centric System (PAAWNS) support, and C2BMC Upgrades for AN-TPY-2 High Altitude Electromagnetic Pulse (HEMP) Hardened Transportable Terminals (HTT) Integration as well as initiating Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture.

A. Mission Description and Budget Item Justification

Provides incremental development, deployment and operational support of C2BMC capabilities required for BMDS planning, situational awareness, sensor management, and engagement coordination. The FY 2019 National Defense Authorization Act (NDAA) section 869 recognized C2BMC for its implementation of this iterative practice and directed C2BMC's inclusion in a Community of Practice to advise on agile or iterative development.

C2BMC delivers capabilities incrementally with each software build (named as a Spiral), adding to or enhancing the capability of the previous build. C2BMC incremental delivery of Spiral 8.2 provides critical Homeland Defense for increased GMD battlespace, improved threat tracking using multiple sensors communicating via Link 16, enhanced sensor tasking to meet track quality and discrimination timeliness requirements, space situational awareness (SSA) tasking support, and improved cyber capabilities. Enhanced Homeland Defense also integrates the BMDS Overhead Persistent Infrared (OPIR) Architecture (BOA) with the BMDS to enhance system level missile-tracking capabilities through earlier cueing of radars and weapon systems.

European Phased Adaptive Approach (EPAA) Phase 3/Engage-on-Remote (EOR) (Spiral 8.2-3) provides critical sensor management capability, greater engagement flexibility, improved OPIR-based cueing, and enhanced Aegis BMD defended area by enabling Aegis to use Army Navy/Transportable Radar Surveillance and Control-2 (AN/TPY-2) data for EOR engagements, providing a five-fold increase in defended area coverage in the USCENTCOM/USEUCOM area of responsibility compared to individual weapon system organic capability. Spiral 8.2-3 also includes SSA and integrates Mobile Sensor Integration (MSI) Phase 1 and BOA data into the BMDS.

Long Range Discrimination Radar (LRDR) Control for Homeland Defense (Spiral 8.2-5) enables increased homeland and regional defense by providing LRDR sensor management, creation and dissemination of a BMD System track inclusive of LRDR sensor data, hypersonic threat tracking, significant capability expansion of track and reporting Advance Threats for warfighter SSA for the Air Force, implements Link-16 reporting, integration of system level discrimination data, transmission of LRDR-based information to GMD Fire Control (GFC) and other BMDS elements, and operationalization of Space-based Kill Assessment (SKA) hit assessment.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Future incremental C2BMC capability enhancements will include expanded Regional and Homeland Defense to continue risk reduction, planning, and development efforts including C2BMC tasking of OPIR Enterprise assets, enhanced system-level integrated discrimination functionality with Advanced Discrimination regional weapon system use of Link 16 based system track, transmission of advanced discrimination features, generation of space object data and monitoring of modified Aegis BMD, THAAD, PATRIOT, Regional Engagement coordination.

C2BMC continues to develop incremental improvements to the BMDS to keep pace with emerging threats worldwide by investing in the development, integration and testing of advanced algorithms to improve track and discrimination capabilities, Robust Post Intercept Assessment (PIA) and enhancing use of space based sensor data from sources such as the Space Based Infrared System (SBIRS), using the BMDS OPIR architecture. Related disciplines provide development and deployment support to C2BMC system capabilities. In support of Hypersonic Defense, C2BMC will provide contingency capability to demonstrate, develop and deploy a detection and warning for advanced threats. C2BMC continues Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration, installations and technical refresh globally of the threat-based communication network modernization against the advanced threat, while maintaining efficiencies in cost.

C2BMC International Partner system engineering ensures friends and allies are integrated to the fullest extent possible with U.S. BMDS capabilities. Collaborative system engineering, testing, and fielding facilitate interoperability with North Atlantic Treaty Organization (NATO) and partner nations such as Israel and Japan. C2BMC works with these nations to define and document international interfaces that are compatible with international standards and traceable to U.S. BMDS requirements. C2BMC participates in test events and live fire exercises hosted by international partners to ensure U.S. missile defense weapons, sensors, and Command and Control (C2) systems are interoperable with international systems. C2BMC maintains and upgrades the U.S./NATO secure data sharing gateways located at Ramstein Air Base, Germany, for missile defense operations and training. C2BMC also supports development of Japan's BMD requirements to ensure interoperability of Japanese and U.S. BMD systems (sensors, shooters, command and control) resulting in an integrated regional, operational, and strategic defense of Japan.

C2BMC Modeling and Simulation (M&S) maintains BMDS simulation/stimulation tools and federated models to support development and verification of deployed C2BMC and BOA Spirals. The BMDS C2BMC Model (BCM) is used for Flight Test pre-mission analysis and exercises to represent a second C2 Suite for Cross-Area of Responsibility (XAOR) functionality, Early Digital Product (EDP) for C2BMC performance assessment, and supports development and integration of GMD, AN/TPY-2, and Aegis software and models. The OPIR sensor M&S is used in the Ground Test Integrated System-level Simulation (GTISS) as the stimulus for BOA. The BCM program provides a cost effective means to assess and explore the performance space of the BMDS beyond what can be physically tested via Flight Tests and Target of Opportunity collections.

C2BMC develops, integrates, and tests advanced algorithms to improve discrimination capabilities and enhance the use of space-based sensor data. In support of MDA's discrimination improvements effort, C2BMC demonstrates, develops, and deploys multiple techniques to improve BMD System ability to identify lethal and non-lethal objects.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: C2BMC Development and Deployment	275.431	284.431	327.887
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Provides funding for incremental development and deployment of C2BMC capabilities that link sensors and shooters to enable integrated BMDS capabilities, integrate BOA with the BMDS architecture to enhance missile tracking capabilities and enable much earlier cueing of radars and shooters, and fulfill Cybersecurity requirements. The Enterprise Sensors Laboratory (ESL) and Experimentation Laboratory (X-Lab) produce key prototypes for further maturation in the C2BMC capability Spiral development process and enables integrated experimentation for C2BMC, ESL, OPIR products, and other BMDS elements through robust connectivity to simulation frameworks, weapon systems, sensors, and operational assets. Expand capability to track and report Advanced Threats for warfighter Situational Awareness (SA). Expanding Space Situational Awareness (SSA) tasking and reporting to include TPY2, LRDR and Aegis sensors. Recurring accomplishments include iterative development and procurement cycles for hardware, software, network capability system engineering tasks, and artifacts for technical engineering reviews; participation in test readiness reviews, pre-test engineering and analysis of ground and flight test results, wargames, and exercises in accordance with the BMDS Integrated Master Test Plan (IMTP); site planning, scheduling and hardware acquisition to support planned deployment of C2BMC Spirals and BMDS Overhead Persistent Infrared (OPIR) Architecture (BOA) capabilities; updates and maintenance for C2BMC Model (BCM) BMDS simulation/stimulation (federated model) and verification scenarios for all C2BMC Spirals deployed and under development; Discrimination, operationalization of SKA as part of Post Intercept Assessment (PIA), Robust PIA and C2BMC capabilities; design and installation of operational sharing gateways; and collaboration with international partners to ensure future interoperability; maintain Verification and Validation in support of BMDS capability ground testing and participation in BMDS ground tests. C2BMC will begin to integrate existing MDA and Service elements with C2BMC and the Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture Specific and/or unique accomplishments for each FY are as follows: ***FY 2020 Plans:*** EPAA Phase 3 / EOR (Spiral 8.2-3): - Maintain ability to develop/deploy capability in response to emergent operational requirements LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus: - Continue iterative software coding, unit testing, and interoperability testing of Spiral 8.2-5 capabilities, including LRDR and hypersonic threat detection and tracking, Space Situational Awareness (SSA), and Overhead Persistent Infrared (OPIR) cueing. - Initiate iterative software coding, unit testing, and interoperability testing for BMDS integration			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Support developmental testing and preparation of transfer of the LRDR to the Air Force - Continue deployment of hardware and software to provide LRDR BMDS network connectivity and sensor control nodes - Increase Verification and Validation in support of BMDS capability ground testing and participation in BMDS ground tests C2BMC Additional and Expanded Regional and Homeland Defense focus: - Design and prototyping of the next incremental capability addressing Additional Homeland Defense and Mid-Term Discrimination requirements. - Continue operationalization of Space-based Kill Assessment (SKA) Hit Assessment (HA) - Continue planning and prototyping tasks for Robust BMDS Post Intercept Assessment (PIA) - Initiate design and development of accredited models and simulations (M&S) for C2BMC and BOA spirals for participation in End-to-end Digital Integrated System Simulation (EDISS) - Continue design and development of Ground Test Integrated System-level Simulation (GTISS) ***FY 2021 Plans:*** EPAA Phase 3 / EOR (Spiral 8.2-3): - Continue maintenance of Spiral 8.2-3's ability to develop/deploy capability in response to emergent operational requirements LRDR for Homeland Defense (Spiral 8.2-5), homeland defense focus: - Continue incremental capability development for S8.2-5 in response to emergent operational requirements - Support developmental testing and preparation of transfer of the LRDR to the Air Force - Continue phased deployment of hardware and software to provide LRDR BMDS network connectivity and sensor control nodes - Complete development, integration and operationalization of BOA 7.0 capability to detect and track advanced threats globally - Continue operationalization of Space-based Kill Assessment(SKA) Hit Assessment (HA) C2BMC Additional and Expanded Regional and Homeland Defense focus: - Continue design and prototype of next incremental capability addressing Additional Homeland Defense and Mid-Term Discrimination requirements to receive and utilize initial Advanced Discrimination data from LRDR, inclusive of C2BMC Generation of BMD System Track (with System Level Discrimination Data Integration) for GMD Homeland Defense Engagements and Expanded Regional and Homeland Defense, exploit additional OPIR data via BOA, enhanced Aegis BMD engage on capability, and expanded hypersonic defense tracking and reporting - Continue planning, designing and tasks for Robust BMDS PIA - Continue design and development of, and deliver accredited models and simulations (M&S) for, C2BMC and BOA spirals for participation in End-to-end Digital Integrated System Simulation (EDISS)			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Support two training device development program for distributed and individual training - Continue to support the design and development of Ground Test Integrated System-level Simulation (GTISS) by developing and delivering accredited M&S for BOA spirals - Initiate development of next iteration of BOA which will include addition of new sensors and expanded Advanced Threat Performance - Initiate early technology development to integrate additional advanced sensors into BOA to expand coverage and increase custody of emerging threats - Initiate Management Node to provide uninterrupted mission support by providing geographical separated locations for BMD network and system security - Initiate user node to USNORTHCOM as a Warfighter Involvement Process (WIP) item providing hardware and integration to support Homeland Defense - Initiate integration of sensor elements to provide enhanced, dynamic space capabilities and extend existing Ballistic Missile Defense System Communications Network (BCN) and cybersecurity management to cover expanded architecture - Initiate technical upgrade and refresh for development lab infrastructure and the Joint Early Warning Lab (JEWL) ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects increase in development and integration for Space-based Kill Assessment (SKA) Hit Assessment (HA) Post intercept Assessment (PIA) and the integration of a Management Node to a new geographic location as well as a user node for the NORTHCOM warfighter to support Homeland Defense and begins integration of existing MDA and Air Force sensor elements with C2BMC and the Ballistic Missile Defense System Communications Network (BCN) to establish a globally integrated sensor architecture to provide enhanced, dynamic space capabilities, and extend existing BCN network and cybersecurity management to cover the expanded architecture.			
Title: C2BMC Communications	20.177	29.131	39.493
Articles:	-	-	-
Description: The BMD Communications Network (BCN) ties together an expanding set of sensors and weapons systems to enable the National Command Authority and the commanders at the strategic, theater and tactical levels to optimally engage missile threats. Recurring accomplishments include the following: - Provide GMD Communications Network (GCN) Long Haul Communications Transport (LHCT) services and a robust, end-to-end, high availability, operational communications network (COMNET) infrastructure with diverse paths that quickly and unambiguously share information across the global BMDS - Participate in and analyze results from events scheduled in the BMDS IMTP			

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Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide BMDS communications via leased Defense Information Service Agency (DISA) circuits, and resolve real-time operational issues through DISA's Network Operations and Security Center - Provide effective network management to coordinate and integrate information across diverse equipment platforms, interface with other DoD communications systems, evolve information standards and capabilities, and adhere to the DoD Risk Management Framework (RMF) - Upgrade BCN capability by supporting all DoD teleports to enhance satellite communications Specific and/or unique accomplishments for each FY are as follows: ***FY 2020 Plans:*** - Complete installation of hardware circuits for the Ground-Based Midcourse Defense Communication Network Modernization - Continue Protected Anti-Jam/Anti-Scintillation Wideband Net-Centric System (PAAWNS) modem integration and installations - Conduct technical refresh for End-of-Life SATCOM terminals on SBX by transitioning to Military Satellite Communications (MILSATCOM) terminals - Acquire network circuits to support the threat based communication network modernization ***FY 2021 Plans:*** - Complete installation of long distance circuit hardware for the Ground-Based Midcourse Defense Communication Network Modernization - Continue technical refresh for End-of-Life SATCOM terminals on SBX by transitioning to Military Satellite Communications (MILSATCOM) terminals - Continue acquiring additional network circuits to support the threat based communication network modernization - Continue PAAWNS modem integration and installations globally - Upgrade and technical refresh of the PAAWNS threat-based communication network against the advanced threat of nuclear capabilities, while maintaining efficiencies in cost - Upgrade and integrate AN-TPY/2 High Altitude Electromagnetic Pulse (HEMP) Hardened Transportable Terminals (HTT) for increased protection of satellite communication systems at relevant sites ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides Combatant Command (CCMD) required C2BMC Upgrades for increased PAAWNS support, and CCMD required C2BMC upgrades for AN/TPY-2 HEMP HTT.			
Accomplishments/Planned Programs Subtotals	295.608	313.562	367.380

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Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing

Remarks

D. Acquisition Strategy

A sole source C2BMC contract to Lockheed Martin was awarded 1st quarter FY 2012. The current ordering period is through 1st quarter FY 2025. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and

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sustainment, and cyber operations support of the C2BMC system. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Furthermore, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Architecture (BOA) and Simultaneous Correlation of Unambiguous Tracks (SCOUT).

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - Independent Performance Assessment and Analysis -Various	MIPR	Various : Huntsville, AL, Colorado Springs, CO; NCR	1.864	3.736	Oct 2018	2.938	Oct 2019	4.449	Oct 2020	-		4.449	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Aggregated Discrim	Various	Various : Various	19.791	18.517	Oct 2018	14.902	Oct 2019	27.321	Oct 2020	-		27.321	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BMDS C2BMC Model (BCM) - EDISS Integration	SS/CPIF	Lockheed Martin : Huntsville, AL, Colorado Springs, CO; NCR	0.000	0.000		3.107	Oct 2019	2.995	Oct 2020	-		2.995	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS	C/CPAF	SciTec : Newark, NJ	0.250	0.250	Oct 2018	0.711	Oct 2019	2.632	Oct 2020	-		2.632	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -GOV	MIPR	Sandia National Labs : Albuquerque, NM	0.000	1.317	Nov 2018	2.523	Nov 2019	0.704	Nov 2020	-		0.704	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA OPIR Stimulation M&S - EDISS/ GTISS -NGC	SS/CPAF	Northrop Grumman Space and Mission Systems : Azusa, CA	0.000	1.615	Nov 2018	3.722	Nov 2019	0.687	Nov 2020	-		0.687	Continuing	Continuing	Continuing
C2BMC Development and Deployment - BOA Simulation Development and Integration- EDISS	SS/CPAF	Northrop Grumman Space and Mission Systems : Boulder, CO	0.000	0.000		6.355	Oct 2019	0.687	Oct 2020	-		0.687	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Hardware/Software Development, Integration & Test (I&T)	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	777.460	99.914	Nov 2018	124.987	Dec 2019	126.367	Dec 2020	-		126.367	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - C2BMC Integration	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	163.886	4.823	Nov 2018	6.819	Nov 2019	2.577	Nov 2020	-		2.577	Continuing	Continuing	Continuing
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT	SS/CPFF	Northrop Grumman Space and Mission Systems : Huntsville, AL	41.259	8.969	Oct 2018	7.978	Oct 2019	0.000		-		0.000	0.000	58.206	0.000
C2BMC Development and Deployment - C2BMC Mid-Term Discrim-SCOUT OGA	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	3.117	1.213	Nov 2018	0.713	Nov 2019	0.224	Nov 2020	-		0.224	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Contract Support Services (CSS)	C/CPFF	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	276.703	29.344	Nov 2018	26.022	Nov 2019	28.599	Nov 2020	-		28.599	Continuing	Continuing	Continuing
C2BMC Development and Deployment - ESL/BOA Development	SS/CPAF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	37.729	10.926	Oct 2018	9.507	Oct 2019	28.411	Oct 2020	-		28.411	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Federally Funded Research & Development Centers / University Affiliated Research Center	MIPR	MITRE, IDA, ORNL, Aerospace, JHU/APL, GTRI : Arlington, VA/ Huntsville, AL/ Colorado Springs, CO	180.866	19.856	Oct 2018	19.741	Oct 2019	17.239	Oct 2020	-		17.239	Continuing	Continuing	Continuing
C2BMC Development and Deployment - IT User Services - IRES	C/CPAF	Jacobs Technical, Inc : AL, AK, CA, CO, HI, NM, VA	1.823	0.099	Mar 2019	6.166	Mar 2020	6.216	Mar 2021	-		6.216	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2BMC Development and Deployment - IT User Services - NGC	SS/CPFF	Northrop Grumman Space and Mission Systems : Colorado Springs, CO	9.266	0.000		0.000		0.000		-		0.000	0.000	9.266	0.000
C2BMC Development and Deployment - Independent Performance Assessment and Analysis	MIPR	Aviation and Missile Research Development and Engineering Center : Huntsville, AL	4.359	5.753	Nov 2018	2.411	Nov 2019	1.020	Nov 2020	-		1.020	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Joint Early Warning Lab (JEWL) and C2BMC Lab Build Out	C/CPAF	Jacobs Technical, Inc : Colorado Springs, CO	0.000	1.239	Mar 2019	1.548	Mar 2020	10.045	Mar 2021	-		10.045	Continuing	Continuing	Continuing
C2BMC Development and Deployment - MDA Civilian, Travel & PCS	Various	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	168.875	19.839	Oct 2018	21.953	Oct 2019	23.477	Oct 2020	-		23.477	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Mobile Sensor Integration Phase II	Various	Various : AL; CO; FL; OH; MA; VA	0.000	33.500	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Models & Simulation	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO; NCR	2.358	3.503	Oct 2018	8.926	Oct 2019	5.367	Oct 2020	-		5.367	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment	C/CPFF	SciTec : Newark, NJ	1.105	1.000	Nov 2018	1.578	Nov 2019	7.874	Nov 2020	-		7.874	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Post Intercept Assessment Hardware	C/CPAF	Northrop Grumman Space and Missile Systems : Colorado Springs, CO	0.713	0.000		0.000		0.000		-		0.000	0.000	0.713	0.000
C2BMC Development and Deployment - Post	SS/CPIF	Lockheed Martin Team : Huntsville,	0.000	0.359	Nov 2018	1.200	Nov 2019	20.920	Nov 2020	-		20.920	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intercept Assessment Integration		AL/Colorado Springs, CO													
C2BMC Development and Deployment - Post Intercept Assessment Prototyping	C/CPFF	Corvid : Huntsville, AL	2.089	3.939	Nov 2018	2.035	Nov 2019	7.874	Nov 2020	-		7.874	Continuing	Continuing	Continuing
C2BMC Development and Deployment - Prior year C2BMC Development and Deployment no longer funded in the FYDP	Various	Various : Various	1.000	0.000		0.000		0.000		-		0.000	0.000	1.000	0.000
C2BMC Development and Deployment - Specialized Warfighter Development Program Management	SS/CPAF	Northrop Grumman Space and Mission Systems : Huntsville, AL	2.031	1.359	Mar 2019	3.500	Mar 2020	0.000		-		0.000	0.000	6.890	0.000
C2BMC Development and Deployment - Spiral Development	MIPR	Sandia, MDA Various : AL; CA; CO; NCR, NM	7.466	0.793	Oct 2018	4.106	Oct 2019	2.202	Oct 2020	-		2.202	0.000	14.567	0.000
C2BMC Development and Deployment - X Lab	SS/CPIF	Lockheed Martin : Huntsville, AL	4.376	3.568	Oct 2018	0.983	Oct 2019	0.000		-		0.000	0.000	8.927	0.000
C2BMC Communications - Communication Equipment and Fielding	MIPR	DISA, PMDCATS, SPAWAR : Springfield, VA	146.936	14.008	Jan 2019	14.721	Jan 2020	28.417	Jan 2021	-		28.417	Continuing	Continuing	Continuing
C2BMC Communications - Communication Leases	MIPR	DISA : Arlington, VA	52.609	6.169	Oct 2018	11.550	Oct 2019	11.076	Oct 2020	-		11.076	Continuing	Continuing	Continuing
C2BMC Communications - Networks Development and Deployment	SS/CPFF	Lockheed Martin Team : Colorado Springs, CO	28.498	0.000		2.860	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
C2BMC Communications - Prior year C2BMC Communications no longer funded in the FYDP	Various	Various : Various	117.019	0.000		0.000		0.000		-		0.000	7.115	124.134	0.000
		Subtotal	2,053.448	295.608		313.562		367.380		-		367.380	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,053.448	295.608		313.562		367.380		-		367.380	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD01 Command & Control, Battle Management, Communications (C2BMC)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	△																											
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration			△																									
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM											△																	
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM													△															
Expanded Regional and Homeland Defense Capability Declaration																					△							

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD01 / *Command & Control, Battle Management, Communications (C2BMC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD01 Command & Control, Battle Management, Communications (C2BMC)	1	2019	4	2025
Spiral 8.2-3 EUCOM/CENTCOM Capability Declaration	1	2019	1	2019
Spiral 8.2-3 NORTHCOM/INDOPACOM Capability Declaration	3	2019	3	2019
Spiral 8.2-5 Homeland Defense Capability Declaration NORTHCOM/INDOPACOM	3	2021	3	2021
Spiral 8.2-5 Homeland Defense Capability Declaration EUCOM/CENTCOM	1	2022	1	2022
Expanded Regional and Homeland Defense Capability Declaration	1	2024	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC01: *Cyber Operations*	12.738	17.468	33.012	12.658	-	12.658	21.742	16.403	14.657	14.987	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the Congressional add in FY 2020 for cybersecurity.

A. Mission Description and Budget Item Justification

Command and Control, Battle Management, and Communications (C2BMC) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plan of Action and Milestones (POA&Ms) for MDA C2BMC mission systems. Activities in this Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	17.468	33.012	12.658
Articles:	-	-	-
Description: This activity maintains the Assessment and Authorization (A&A) and Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and Plan of Action and Milestones (POA&Ms) on all Missile Defense Agency (MDA) information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) / Security Controls Assessor and the AO. Leverages Cross Domain Solution (CDS) as single authority implementing standard security policies for C2BMC across the BMDS. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. - Conduct cybersecurity design, engineering, and architecture planning for C2BMC information technology systems - Plan and test the cybersecurity controls for C2BMC systems - Conduct Security Controls Assessment testing continuous monitoring of C2BMC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities Specific and/or unique accomplishments for each FY are as follows: ***FY 2020 Plans:*** - Implement DoD required Endpoint Security Solution to replace current Host Based Security Solution			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Continue upgrade and implementation of DoD required Secure Host Baselines for required operating systems - Plan and test virtualization and artificial intelligence capability solutions in relation to cyber resiliency - Provide Cyber Engineering (planning, analysis, and assessment) required to provide cybersecurity assessments of BMDS critical infrastructure Control Systems (CS) operations, selected sensors, weapons, and C2BMC systems - Enhancements to replace manual auditing, security monitoring and data at rest encryption. ***FY 2021 Plans:*** - Complete upgrade and implementation of DoD required Secure Host Baselines for required operating systems - Maintain Cyber posture with operating system and partial hardware refresh ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the $18.85M Congressional add in FY 2020 for cybersecurity enhancements.			
Accomplishments/Planned Programs Subtotals	17.468	33.012	12.658

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

A sole source C2BMC contract to Lockheed Martin was awarded 1st quarter FY 2012. The current ordering period is through 1st quarter FY 2025. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Furthermore, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Architecture (BOA).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Civ Cyber Labor	Various	MDA Other : Various	0.928	0.515	Oct 2018	0.387	Oct 2019	0.531	Oct 2020	-		0.531	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO, NCR	1.025	1.296	Oct 2018	5.137	Oct 2019	1.329	Oct 2020	-		1.329	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Core C2BMC	SS/CPAF	Lockheed Martin : Colorado Springs, CO / Huntsville, AL	2.438	10.609	Jan 2019	22.343	Jan 2020	7.276	Oct 2020	-		7.276	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - IA/ CND Network/System C&A	MIPR	Army, Air Force : Various	6.331	0.000		0.000		0.000		-		0.000	0.000	6.331	0.000
Network / System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	Jacobs Technology : Colorado Springs, CO	1.252	4.925	Mar 2019	3.008	Mar 2020	3.382	Oct 2020	-		3.382	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Lab Infrastructure	SS/CPAF	Northrop Grumman : Colorado Springs, CO	0.764	0.123	Mar 2019	2.137	Mar 2020	0.140	Oct 2020	-		0.140	Continuing	Continuing	Continuing
		Subtotal	12.738	17.468		33.012		12.658		-		12.658	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	12.738	17.468		33.012		12.658		-		12.658	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency			**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*	

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC01 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MC01 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC01 Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT01: *C2BMC Test*	300.717	53.690	64.624	61.264	-	61.264	65.861	59.880	60.784	63.901	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Command and Control, Battle Management and Communications (C2BMC) Test supports system flight and ground testing, wargames, and exercises as detailed in the Missile Defense Agency (MDA) Integrated Master Test Plan (IMTP) to ensure C2BMC capabilities delivered are consistent with the Prioritized Capabilities List and are interoperable with other Ballistic Missile Defense System (BMDS) components.

MDA gains efficiencies and minimizes laboratory resource requirements (footprint, personnel, and hardware) by utilizing the C2BMC test bed and the Overhead Persistent Infrared Architecture (OPIR) Capabilities Lab test infrastructure as the laboratory environment supporting System Test, Development, and Sustainment. For System Ground and Flight Test, the labs are used for pre-test analysis, test execution and post-test analysis. For Development, the labs are utilized for software verification and validation testing and system integration testing. For Sustainment, the labs are used to assist with root cause determination for issues discovered on the fielded system and validation of any required software patches.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Integrated Master Test Plan	53.690	64.624	61.264
Articles:	-	-	-
Description: This activity funds C2BMC participation in BMDS flight and ground testing, wargames and exercises, and resources in accordance with the BMDS IMTP. Recurring accomplishments include: Test Execution - Assess BMDS interoperability, integration, and functionality in lab and distributed environments, leveraging a complex set of scenarios to test the limits of the C2BMC system. Participate in and analyze results of ground tests and flight tests in accordance with the BMDS IMTP. Support all phases of the MDA Ground Test Concept of Operations (CONOPS) and the MDA Flight Test CONOPS. Provide Flight Test Predictive Analysis support. Generate, test, and distribute federated model compatible scenarios for Ground Test and Flight Test Experimentation test support. Use BMDS C2BMC Model (BCM) to support exercise integration testing activities including test case and scenario checkout.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Utilize the Enterprise Sensors Laboratory (ESL) to plan, coordinate, and provide test operations to demonstrate prototype algorithms through flight tests and United States-launched targets of opportunity. The development plans for algorithm improvements focus on track and measurement level sensor data fusion and feature extraction to improve 3-D track formation utilizing a variety of space, airborne, and terrestrial-based sensors. Results from the tests and experiments are provided back to the algorithms development activity to enable algorithm refinement. - Continue LRDR node integration, testing, and training with new C2BMC Spiral 8.2-5 Homeland Defense baseline changes at the MDIOC. Retain Existing Sensor Data Interfaces and provide LRDR Data for Risk Reduction for GMD; Initial Hypersonic Tracking and Reporting; and Cyber Security Enhancements Risk Management Functions. - Utilize the C2BMC Experimentation Laboratory (X-Lab) to plan, coordinate, and provide test operations to demonstrate maturing C2BMC technologies and software builds within an integrated C2BMC environment through flight tests, ground tests and real-world targets of opportunity before incorporation into formal C2BMC spiral builds. The development plans for C2BMC improvements focus on the BMDS Post Intercept Assessment (PIA) capabilities, architecture improvements, and C2BMC algorithm improvements to mitigate development risk. Results from the tests and experiments are provided back to the C2BMC and X-Lab development activity. - Participate in wargames and exercises using current and future C2BMC architectures to support all requesting combatant commands, NATO partners, and Host Nations allowing warfighters to validate Ballistic Missile Defense (BMD) Techniques, Tactics, and Procedures (TTP) specific to all designated Areas of Operations (AOs) to include current and future C2BMC architectures. - Provide development and upgrades in the C2BMC Testbed (CTB) to support flight and ground tests. Continue Cyber Testing in the CTB to support continuous C2BMC spiral development. Continue C2BMC and NATO planning demonstrations and support to NATO live fire events. Provide Situational Awareness (SA) Node sustainment for the BMDS incremental development to support ongoing planning and cooperation in the development and enhancement of interoperability between U.S. BMD systems and the NATO BMD systems. Provide infrastructure, network, and troubleshooting support to C2BMC Command Center (CCC), to include the BMDS Network Operations and Security Center (BNOSC), System Test and Operations Center (STOC), C2BMC System Support Center (CSSC), BMDS Communications Network (BCN), the Distributed Training system (DTS) and Combined Overhead Persistent Infrared (OPIR) Laboratories (OCL). Specific and/or unique accomplishments for each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: - Participate in flight and ground test events to support the BMDS Spiral 8.2-5 and Homeland Defense including LRDR by testing the following capabilities: C2BMC generation of initial BMD System Track (discrimination results by enhanced C2BMC selection); Long Range Discrimination Radar (LRDR) Integration into BMDS; Initial GMD use of LRDR data; Initial Active Sensor Bias Monitoring & Reporting; Retain Existing Sensor Data Interfaces and provide LRDR Data for Risk Reduction for GMD; Initial Hypersonic Tracking and Reporting; and Cyber Security Enhancements Risk Management Functions - In flight test events: Assess ability to satisfy Aegis remote engagement logic using space sensors and other C2BMC assets. Collect data for Post Intercept Assessment (PIA)/ Space-based Kill Assessment (SKA) algorithm development. Demonstrate Army Navy/Transportable Radar Surveillance and Control-2 (AN/TPY-2) Forward Base Mode (FBM) ability to execute a cued acquisition tasked by C2BMC based on BMDS Overhead Persistent Infrared Architecture (BOA) tracks, and demonstrate C2BMC ability to construct system tracks - In ground test events: Assess C2BMC incremental capability to perform PIA; assess Advanced Threat Processing (ATP) alternatives for C2BMC system track typing, correlation, and launch event association processes in the presence of advances threats. Demonstrate interoperability with Aegis and collect data to assess Aegis Engage-on-Remote (EoR) capability. Provide Aegis BL 9.C2 EoR and improved sensor processing with BOA 6.1. Assess interoperability of C2BMC S8.2-5, hypersonic threats, AN/TPY-2 FBM CX 4.0, LRDR 1.0, GS 8, XBR 4.1, and Terminal High Altitude Area Defense (THAAD) 4.0; assess C2BMC planning, monitoring, and tasking capabilities effect on Homeland Defense performance; assess SKA and PIA algorithms - Continue LRDR node integration, testing, and training with new C2BMC Spiral 8.2-5 Homeland Defense baseline changes at the Missile Defense Integration and Operation Center (MDIOC) - Consolidate and synergize Space-Based Infrared Sensors/BMDS OPIR Architecture (SBIRS/BOA) test lab efforts to plan, coordinate, and provide test operations for BMDS system flight tests and ground tests ***FY 2021 Plans:*** - Participate in flight and ground test events to support fielding of Spiral 8.2-5 and BOA 7.0 for Homeland Defense including LRDR by testing the following capabilities: C2BMC generation of initial BMD System Track (discrimination results by enhanced C2BMC selection); LRDR Integration into BMDS; Initial GMD use of LRDR data; Initial Active Sensor Bias Monitoring and Reporting; - In flight test events: Continue to collect data for PIA/SKA algorithm development. Continue to demonstrate AN/TPY-2 FBM ability to execute a cued acquisition tasked by C2BMC based on BOA tracks, and demonstrate C2BMC ability to construct system tracks. Demonstrate interoperability of C2BMC S8.2-5 with LRDR and conduct GMD simulated engagement using System Track data from C2BMC that includes LRDR discrimination data. - In ground test events: Continue to assess C2BMC incremental capability to perform PIA, to include support of SKA Hit Assessment fielding in Increment 6B.2; assess ATP alternatives for C2BMC system track typing, correlation, and launch event			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
association processes in the presence of advanced threats. Continue to demonstrate interoperability with Aegis and collect data to assess Aegis Engage-on-Remote (EoR) capability - Continue to assess interoperability of C2BMC S8.2-5, BOA BBR 7.0 hypersonic threats, AN/TPY-2 FBM CX 4.0, LRDR 1.0.0, GS 8 IR6, XBR 4.1, EKV 23.2/10.2, BV 11.0/8.0, SBR 19-1, THAAD 3.2, and THAAD 4.0; assess C2BMC planning, monitoring, and tasking capabilities effect on Homeland Defense performance. - Complete consolidation of SBIRS/BOA test lab efforts to plan, coordinate, and provide test operations for BMDS system flight tests and ground tests. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	53.690	64.624	61.264

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing

Remarks

D. Acquisition Strategy

A sole source C2BMC contract to Lockheed Martin was awarded 1st quarter FY 2012. The current ordering period is through 1st quarter FY 2025. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC), and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Furthermore, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Architecture (BOA).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Master Test Plan - BMDS Level Testing GOV	MIPR	Army/Air Force : Various	7.200	3.707	Oct 2018	6.485	Oct 2019	0.782	Oct 2020	-		0.782	Continuing	Continuing	Continuing
Integrated Master Test Plan - Consolidated Contractor Support	Various	MDA : Huntsville, AL; Colorado Springs, CO; NCR	0.000	0.000		0.336	Oct 2019	0.243	Oct 2020	-		0.243	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure Support	MIPR	Various : VA; OH; AL; NM; CA	13.312	1.667	Oct 2018	2.210	Oct 2019	1.752	Oct 2020	-		1.752	Continuing	Continuing	Continuing
Integrated Master Test Plan - Enterprise Sensors Lab Infrastructure/BOA Infrastructure-BMDS Level Testing	SS/CPAF	Northrop Grumman Corporation : Colorado Springs, CO	42.784	7.585	Oct 2018	1.487	Mar 2020	2.480	Mar 2021	-		2.480	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Master Test Plan - FFRDC	MIPR	Institute for Defense Analyses (IDA) : Alexandria, VA	0.000	0.000		0.700	Oct 2019	1.557	Oct 2020	-		1.557	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS Level Testing	SS/IDIQ	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	122.624	19.203	Jul 2019	21.692	Jul 2020	23.294	Jul 2021	-		23.294	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing - Element/System Test Lab Facilities	C/CPAF	Northrop Grumman Corporation : Colorado Springs, CO	6.186	2.843	Mar 2019	12.945	Mar 2020	12.847	Mar 2021	-		12.847	Continuing	Continuing	Continuing
Integrated Master Test Plan - Integrated Master Test Plan BMDS level Testing (Element/System Test Lab Facilities)	C/CPAF	Jacobs Technology, Inc : Huntsville, AL; Colorado Springs, CO	17.910	18.685	Mar 2019	18.769	Mar 2020	18.309	Mar 2021	-		18.309	0.000	73.673	0.000
Integrated Master Test Plan - Prior year IMTP no longer funded in the FYDP	Various	Various : Various	90.701	0.000		0.000		0.000		-		0.000	0.000	90.701	0.000
		Subtotal	300.717	53.690		64.624		61.264		-		61.264	Continuing	Continuing	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	300.717	53.690		64.624		61.264		-		61.264	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	MT01 / *C2BMC Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	▲																											
FTI-03 (OTA, OT Intercept Flight Test)	▲																											
Enterprise Sensor Lab Infrastructure Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
FTG-11 (OT) (GM, OT Intercept Flight Test)		▲																										
GT-18 Sprint 3 (N/P) (BMDS Ground Test)		✦																										
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)			▲																									
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)			▲																									
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)			▲																									
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)			▲																									
GTI-19 Sprint 1 (N/P) (BMDS Ground Test)			✦																									
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)				✦																								
GTD-07b (N/P) (BMDS Ground Test)			✦																									
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)							△																					
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)				▲																								
FTT-23 (TH, DT Intercept Flight Test)				▲																								
Warfighter TP 07b (BMDS Ground Test)				✦																								
GTI-07c (N/I) (BMDS Ground Test)					✦																							
FTX-39 (LTPO, DT Target Only Flight Test)					▲																							
(EX) JUNIPER COBRA 20					✧	✧																						
(EX) GLOBAL LIGHTNING 20					✧	✧																						
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)						△																						
FTP-21 (P8.1.1)(LTPO, DT Intercept Flight Test)									△																			
FTP-27 E1 (LTPO, DT/OT Flight Test)						△																						
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)						✧																						

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GTI-20 Sprint 1(E/C) (BMDS Ground Test)					✧																							
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)						△																						
FTP-27 E2 (LTPO, DT/OT Flight Test)					△																							
(EX) EAGLE RESOLVE 20					△																							
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19					△																							
(EX) KEY RESOLVE 20					△																							
(EX) EUROPEAN TEST BED 20					△																							
(EX) RESILIENT SHIELD 20					△																							
(EX) STEADFAST ALLIANCE 20					✧	✧																						
(EX) PACIFIC SENTRY 20					✧	✧	✧																					
(EX) Joint Live, Virtual, and Constructive 2019/20-2					✧	✧	✧	✧																				
GTD-07b (AA) (BMDS Ground Test)						✧																						
(EX) GLOBAL RESPONSE EXERCISE 09						△																						
(WG) Demonstration, Table-top Exercises & Experiments 20						✧	✧	✧																				
(WG) BMDS Wargames 21						✧	✧	✧	✧	✧																		
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)							△																					
(EX) AIR AND MISSILE DEFENSE EXERCISE 21							△																					
(EX) ULCHI FREEDOM GUARDIAN 20							△																					
(EX) GLOBAL RESPONSE EXERCISE 10							△																					
GM BVT-03 (GM, DT Interceptor Only Flight Test)								△																				
(WG) Multi-National Missile Defense Conference (MNC) 20							✧	✧																				
(EX) VIGILANT SHIELD 21							✧	✧																				
(EX) KEEN SWORD 21							✧	✧																				
(EX) GLOBAL THUNDER 21							✧	✧																				

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	MT01 / *C2BMC Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20									△																			
(EX) Joint Project Optic Windmill 2021									✧	✧																		
(WG) NIMBLE TITAN 22									✧	✧	✧	✧	✧	✧	✧	✧												
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)										✧																		
FTT-21 (TH, DT Intercept Flight Test)										△																		
(EX) AUSTERE CHALLENGE 21									✧	✧	✧	✧																
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20										△																		
(EX) EUROPEAN TEST BED 21										△																		
(EX) RESILIENT SHIELD 21										△																		
(EX) GLOBAL LIGHTNING 21										✧	✧																	
(EX) PACIFIC SENTRY 21										✧	✧	✧																
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21										✧	✧	✧																
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)											✧																	
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)											△																	
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)											△																	
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)											△																	
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)											△																	
(WG) Huntsville Wargames 21											✧	✧																
(WG) Demonstration, Table-top Exercises & Experiments 21											✧	✧	✧															
GTI-ISR (21) (BMDS Ground Test)												✧																
(WG) Space & Missile Defense Symposium 21												△																
(EX) VIGILANT SHIELD 22												✧	✧															
(EX) KEEN EDGE 22												✧	✧	✧														
(EX) Joint Live, Virtual, and Constructive 2021/22-1												✧	✧	✧	✧	✧	✧											

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	MT01 / *C2BMC Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
FTP-25 (LTPO, OT Intercept Flight Test)				△			
(EX) EPOCH PLANEX 23				△			
GTD-09 (E/C) (BMDS Ground Test)			✧				
(EX) JUNIPER COBRA 22				✧ ✧			
(EX) GLOBAL LIGHTNING 22				✧ ✧			
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)				△			
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)				△			
GM CTV-03+ (GM, DT Interceptor Only Flight Test)				△			
(EX) EAGLE RESOLVE 22				△			
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21				△			
(EX) KEY RESOLVE 22				△			
(EX) EUROPEAN TEST BED 22				△			
(EX) RESILIENT SHIELD 22				△			
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)				△			
(EX) STEADFAST ALLIANCE 22				✧ ✧			
(EX) PACIFIC SENTRY 22				✧ ✧ ✧			
(EX) Joint Live, Virtual, and Constructive 2021/22-2				✧ ✧ ✧ ✧			
(EX) AIR AND MISSILE DEFENSE EXERCISE 22				✧ ✧			
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)					✧ ✧		
(WG) Demonstration, Table-top Exercises & Experiments 22				✧ ✧ ✧			
(WG) BMDS Wargames 23				✧ ✧ ✧ ✧ ✧			
(EX) ULCHI FREEDOM GUARDIAN 22				△			
(EX) AIR AND MISSILE DEFENSE EXERCISE 23				△			
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)				△			

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	MT01 / *C2BMC Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
(WG) Multi-National Missile Defense Conference (MNC) 22				✧	✧		
(EX) VIGILANT SHIELD 23				✧	✧		
(EX) KEEN SWORD 23				✧	✧		
(EX) GLOBAL THUNDER 22				✧	✧		
FTG-17 (GM, DT Intercept Flight Test)					△		
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22					△		
(EX) GLOBAL RESPONSE EXERCISE 11					△		
(EX) GLOBAL RESPONSE EXERCISE 12					△		
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)						✧	
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)					△		
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)					△		
(EX) GLOBAL LIGHTNING 23					✧ ✧		
(EX) AUSTERE CHALLENGE 23					✧ ✧ ✧ ✧		
(WG) NIMBLE TITAN 24					✧ ✧ ✧ ✧	✧ ✧ ✧ ✧	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22					△		
(EX) Joint Project Optic Windmill 2023					✧		
(EX) EUROPEAN TEST BED 23					△		
(EX) KEY RESOLVE 23					△		
(EX) RESILIENT SHIELD 23					△		
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)					✧ ✧		
(EX) STEADFAST ARMOUR 23					✧ ✧		
(EX) PACIFIC SENTRY 23					✧ ✧ ✧		
(EX) PACIFIC SENTRY 24					✧ ✧ ✧		
(WG) Huntsville Wargames 23					△		

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	MT01 / *C2BMC Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)					△		
GTD-10 (E/C) (BMDS Ground Test)						✧	
GTI-ISR (23) (BMDS Ground Test)					✧		
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)						△	
FTT-24 (TH, DT Intercept Flight Test)					△		
(EX) Joint Live, Virtual, and Constructive 2023/24-1					✧ ✧	✧	
(WG) Demonstration, Table-top Exercises & Experiments 23					✧ ✧	✧	
(WG) Space & Missile Defense Symposium 23					△		
(EX) ULCHI FREEDOM GUARDIAN 23					△		
(EX) AIR AND MISSILE DEFENSE EXERCISE 24					△		
FTX-28 E1-E3 (TH, DT Target Only Flight Test)					△		
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)					✧ ✧		
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)					△		
(WG) Multi-National Missile Defense Conference (MNC) 23					✧	✧	
(EX) GLOBAL THUNDER 23					✧	✧	
(EX) VIGILANT SHIELD 24					✧	✧	
(EX) KEEN EDGE 24					✧	✧ ✧	
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23						△	
FTG-18 (GM, DT/OT Intercept Flight Test)						△	
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)							✧
(EX) JUNIPER COBRA 24						✧ ✧	
(EX) GLOBAL LIGHTNING 24						✧ ✧	
(EX) EAGLE RESOLVE 24						△	
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23						△	

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
(EX) EUROPEAN TEST BED 24						△	
(EX) KEY RESOLVE 24						△	
(EX) RESILIENT SHIELD 24						△	
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)						△	
(EX) STEADFAST ALLIANCE 24						✧ ✧	
(EX) Joint Live, Virtual, and Constructive 2023/24-2						✧ ✧ ✧	✧
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests						△	
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)							✧
(WG) Demonstration, Table-top Exercises & Experiments 24						✧ ✧	✧
(WG) BMDS Wargames 25						✧ ✧	✧ ✧ ✧
(EX) ULCHI FREEDOM GUARDIAN 24						△	
GTD-11 (N/I) (BMDS Ground Test)					✧		
(EX) GLOBAL THUNDER 24						✧	✧
(WG) Multi-National Missile Defense Conference (MNC) 24						✧	✧
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)						✧	

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
Enterprise Sensor Lab Infrastructure Support	1	2019	4	2025
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GT-18 Sprint 3 (N/P) (BMDS Ground Test)	2	2019	2	2019
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2019	3	2019
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2019	3	2019
GTI-19 Sprint 1 (N/P) (BMDS Ground Test)	3	2019	3	2019
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)	4	2019	4	2019
GTD-07b (N/P) (BMDS Ground Test)	3	2019	3	2019
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	3	2020	3	2020
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)	4	2019	4	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
Warfighter TP 07b (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
(EX) JUNIPER COBRA 20	1	2020	2	2020
(EX) GLOBAL LIGHTNING 20	1	2020	2	2020
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MT01 / *C2BMC Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTP-21 (P8.1.1)(LTPO, DT Intercept Flight Test)	1	2021	1	2021
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)	2	2020	2	2020
GTI-20 Sprint 1(E/C) (BMDS Ground Test)	2	2020	2	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19	2	2020	2	2020
(EX) KEY RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN TEST BED 20	2	2020	2	2020
(EX) RESILIENT SHIELD 20	2	2020	2	2020
(EX) STEADFAST ALLIANCE 20	2	2020	3	2020
(EX) PACIFIC SENTRY 20	2	2020	4	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-2	2	2020	1	2021
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
(EX) GLOBAL RESPONSE EXERCISE 09	3	2020	3	2020
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021
(WG) BMDS Wargames 21	3	2020	3	2021
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
(EX) ULCHI FREEDOM GUARDIAN 20	4	2020	4	2020
(EX) GLOBAL RESPONSE EXERCISE 10	4	2020	4	2020
GM BVT-03 (GM, DT Interceptor Only Flight Test)	1	2021	1	2021
(WG) Multi-National Missile Defense Conference (MNC) 20	4	2020	1	2021
(EX) VIGILANT SHIELD 21	4	2020	1	2021

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) KEEN SWORD 21	4	2020	1	2021
(EX) GLOBAL THUNDER 21	4	2020	1	2021
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20	1	2021	1	2021
(EX) Joint Project Optic Windmill 2021	1	2021	2	2021
(WG) NIMBLE TITAN 22	1	2021	4	2022
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
(EX) AUSTERE CHALLENGE 21	1	2021	4	2021
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20	2	2021	2	2021
(EX) EUROPEAN TEST BED 21	2	2021	2	2021
(EX) RESILIENT SHIELD 21	2	2021	2	2021
(EX) GLOBAL LIGHTNING 21	2	2021	3	2021
(EX) PACIFIC SENTRY 21	2	2021	4	2021
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21	2	2021	4	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2021	3	2021
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2021	3	2021
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2021	3	2021
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2021	3	2021
(WG) Huntsville Wargames 21	3	2021	4	2021
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022
GTI-ISR (21) (BMDS Ground Test)	4	2021	4	2021
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
(EX) VIGILANT SHIELD 22	4	2021	1	2022
(EX) KEEN EDGE 22	4	2021	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) Joint Live, Virtual, and Constructive 2021/22-1	4	2021	1	2023
FTP-25 (LTPO, OT Intercept Flight Test)	3	2022	3	2022
(EX) EPOCH PLANEX 23	1	2022	1	2022
GTD-09 (E/C) (BMDS Ground Test)	4	2021	4	2021
(EX) JUNIPER COBRA 22	1	2022	2	2022
(EX) GLOBAL LIGHTNING 22	1	2022	2	2022
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21	2	2022	2	2022
(EX) KEY RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN TEST BED 22	2	2022	2	2022
(EX) RESILIENT SHIELD 22	2	2022	2	2022
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
(EX) STEADFAST ALLIANCE 22	2	2022	3	2022
(EX) PACIFIC SENTRY 22	2	2022	4	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-2	2	2022	1	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	3	2022	4	2022
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2023	3	2023
(WG) Demonstration, Table-top Exercises & Experiments 22	3	2022	1	2023
(WG) BMDS Wargames 23	3	2022	3	2023
(EX) ULCHI FREEDOM GUARDIAN 22	4	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(WG) Multi-National Missile Defense Conference (MNC) 22	4	2022	1	2023
(EX) VIGILANT SHIELD 23	4	2022	1	2023
(EX) KEEN SWORD 23	4	2022	1	2023
(EX) GLOBAL THUNDER 22	4	2022	1	2023
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 11	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 12	1	2023	1	2023
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)	1	2023	1	2023
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	1	2023	1	2023
(EX) GLOBAL LIGHTNING 23	1	2023	2	2023
(EX) AUSTERE CHALLENGE 23	1	2023	4	2023
(WG) NIMBLE TITAN 24	1	2023	4	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22	2	2023	2	2023
(EX) Joint Project Optic Windmill 2023	2	2023	2	2023
(EX) EUROPEAN TEST BED 23	2	2023	2	2023
(EX) KEY RESOLVE 23	2	2023	2	2023
(EX) RESILIENT SHIELD 23	2	2023	2	2023
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	2	2023	3	2023
(EX) STEADFAST ARMOUR 23	2	2023	3	2023
(EX) PACIFIC SENTRY 23	2	2023	4	2023
(EX) PACIFIC SENTRY 24	2	2023	4	2023
(WG) Huntsville Wargames 23	3	2023	3	2023
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	3	2023	3	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTD-10 (E/C) (BMDS Ground Test)	3	2024	3	2024
GTI-ISR (23) (BMDS Ground Test)	4	2023	4	2023
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)	1	2024	1	2024
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
(EX) Joint Live, Virtual, and Constructive 2023/24-1	3	2023	1	2024
(WG) Demonstration, Table-top Exercises & Experiments 23	3	2023	1	2024
(WG) Space & Missile Defense Symposium 23	4	2023	4	2023
(EX) ULCHI FREEDOM GUARDIAN 23	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
FTX-28 E1-E3 (TH, DT Target Only Flight Test)	4	2023	4	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
(WG) Multi-National Missile Defense Conference (MNC) 23	4	2023	1	2024
(EX) GLOBAL THUNDER 23	4	2023	1	2024
(EX) VIGILANT SHIELD 24	4	2023	1	2024
(EX) KEEN EDGE 24	4	2023	2	2024
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23	1	2024	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	1	2025	1	2025
(EX) JUNIPER COBRA 24	1	2024	2	2024
(EX) GLOBAL LIGHTNING 24	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23	2	2024	2	2024
(EX) EUROPEAN TEST BED 24	2	2024	2	2024
(EX) KEY RESOLVE 24	2	2024	2	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
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	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) RESILIENT SHIELD 24	2	2024	2	2024
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)	2	2024	2	2024
(EX) STEADFAST ALLIANCE 24	2	2024	3	2024
(EX) Joint Live, Virtual, and Constructive 2023/24-2	2	2024	1	2025
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests	3	2024	3	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	3	2025	3	2025
(WG) Demonstration, Table-top Exercises & Experiments 24	3	2024	1	2025
(WG) BMDS Wargames 25	3	2024	3	2025
(EX) ULCHI FREEDOM GUARDIAN 24	4	2024	4	2024
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023
(EX) GLOBAL THUNDER 24	4	2024	1	2025
(WG) Multi-National Missile Defense Conference (MNC) 24	4	2024	1	2025
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)	4	2024	4	2024

Note

FY 2020 United States Indo-Pacific Command (USINDOPACOM) Joint Emerging Operational Needs (JEON) tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MX01: *Command & Control, Battle Management, Communications (C2BMC) Development Support*	614.876	112.909	114.876	128.482	-	128.482	130.808	138.840	145.446	145.502	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides additional hardware updates for C2BMC and software licenses to support protection of the system from vulnerability and cyber penetration, as well as increased operational sustainment costs in support of Combatant Command (CCMD).

A. Mission Description and Budget Item Justification

C2BMC Development Support provides operations engineering, integrated logistics, warfighter integration, deployment, and disposal of the current operational system and/or systems fielded in USSTRATCOM, USNORTHCOM, USINDOPACOM, USEUCOM, and USCENTCOM and the operation of the C2BMC Control Center. This activity provides continuous support of the development, deployment, sustainment of the C2BMC training systems, and updates training material to stay current with fielded capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Operations Engineering	95.803	92.212	102.606
Articles:	-	-	-
Description: This activity funds C2BMC support of current operational, test, and training systems. Recurring efforts include: - On-site maintenance, help-desk support, and developer reach-back support to ensure operational availability - C2BMC Command Center (CCC) provides 24 hours a day, 7 days a week, 365 days a year BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA) and C2BMC operations including system and network monitoring, system administration, and network defense against cyber-attacks - Integrated logistics support by providing a secure supply chain; reliability, availability, and maintainability (RAM) engineering; obsolescence engineering; and sparing to ensure operational availability - Cybersecurity engineering providing C2BMC Commercial-off-the-shelf (COTS) software/hardware updates and CCC upgrades that address system vulnerabilities, field quarterly updates to reduce system component vulnerability to cyber-attacks - Information System Security Officers (ISSOs) ensuring C2BMC compliance with latest cybersecurity requirements and policies - System modifications driven by Warfighter Involvement Process (WIP), Continuous Improvement Process (CIP), RAM and obsolescence engineering, and external systems such as Space-Based Infrared Sensors (SBIRS), Ground-based			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Midcourse Defense (GMD) Fire Control (GFC), Aegis, Terminal High Altitude Area Defense (THAAD), Navy Link Monitoring and Management Tool (LMMT), AN/TPY-2, standard Army communications, Defense Information Systems Agency (DISA) fiber networks, and Allied/Coalition interfaces - Combatant command (CCMD) integration providing C2BMC training, on-site Subject Matter Experts (SMEs), and surge SME support for real-world events, flight tests, ground tests, exercises, cyber assessments, and wargames - Facility modifications required to house current or future C2BMC equipment and transportation for moving C2BMC equipment - Integrated product support for tactical satellite communications (SATCOM) used in flight tests, hardened SATCOM, and associated shelters - Provide transportation for flight test equipment and SME support and analysis for numerous test, exercise, and real world events - Provide recurring proficiency training to CCMDs and keep training material and systems consistent with operational capabilities Specific and/or unique accomplishments for each FY are as follow: ***FY 2020 Plans:*** - Provides sustainment of fielded EPAA Phase 3/EOR (Spiral 8.2-3) deployed to USEUCOM, USCENTCOM, USNORTHCOM, and USINDOPACOM - Complete decommissioning activities for Medium Range Ballistic Missile (MRBM) Defense/European Phased Adaptive Approach (EPAA) Phase 1 and 2 in USEUCOM and USCENTCOM - Initiate deployment activities for Long Range Discrimination Radar (LRDR) for Homeland Defense (Spiral 8.2-5) ***FY 2021 Plans:*** - Provides sustainment of fielded EPAA Phase 3/EOR (Spiral 8.2-3) deployed to USEUCOM, USCENTCOM, USNORTHCOM, and USINDOPACOM - Provides operational planning for LRDR for Homeland Defense (Spiral 8.2-5) - Initiate hardware updates and software licenses to support protection of the system from vulnerability and operational sustainment - Field NORTHCOM user node and second geographically separated management node ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides additional C2BMC hardware and software licenses to support protection of the system from vulnerability and cyber penetration, as well as increased operational sustainment costs in support of Combatant Command (CCMD). Increase includes initial operations of FY 2021 fielded USNORTHCOM user node and second geographically separated management node.			
Title: Concurrent Test, Training, and Operations (CTTO)	17.106	22.664	25.876

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-
Description: This element provides the development and sustainment of the C2BMC Training Support System (TSS) and the Missions Specific Vendor Plug-in (MSVP) stand alone operator training devices and the Distributed Training System (DTS) for USINDOPACOM, USNORTHCOM, USEUCOM, and USCENTCOM. C2BMC connects all BMDS Elements through virtual and physical networks to facilitate integrated test, training, operations and certification within two coexistent realms. This enables the warfighter to become proficient on current and future software versions at the operational console, increases the developer's capacity to perform a variety of tests and upgrades on the operational BMDS; and decreases recall-to-mission operations times from weeks and days to hours and minutes. Recurring accomplishments include sustaining current training systems for BMDS training events for the Unified Combatant Command developing the next generation training systems, to include the integration of Red Force / Blue Force capability, to keep current with the operational system capabilities. Specific and/or unique accomplishments for each FY are as follows: ***FY 2020 Plans:*** - Continue modifications and verification testing on BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS - Initiate deployment of BMDS LRDR for Homeland Defense (Spiral 8.2-5) TSS and DTS ***FY 2021 Plans:*** - Continue modifications and verification testing of BMDS LRDR for Homeland Defense (Spiral 8.2-5) MSVP and DTS - Continue deployment activities of BMDS LRDR for Homeland Defense (Spiral 8.2-5) MSVP and DTS - Continue development/modifications on BMDS Radar MSVP and Spiral Training Systems ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase in funding from FY 2020 to FY 2021 provides MSVP and DTS training system enhancements/new modeling capability and incorporating core C2BMC algorithm changes and new defense designs elements into training devices for improved system representation.			
Accomplishments/Planned Programs Subtotals	112.909	114.876	128.482

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing

Remarks

D. Acquisition Strategy

A sole source C2BMC contract to Lockheed Martin was awarded 1st quarter FY 2012. The current ordering period is through 1st quarter FY 2025. Major team members to Lockheed are Northrop Grumman, Boeing, Raytheon, and General Dynamics. They are charged with the development, testing, fielding, training, operations and sustainment, and cyber operations support of the C2BMC system. Additionally, the Defense Information Systems Agency (DISA) supports C2BMC worldwide long-haul communications. C2BMC Program Office government, Federally Funded Research and Development Center/University Affiliated Research Center (FFRDC/UARC),

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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and Contract Support Services (CSS) personnel are also fully integrated as part of the Prime contractor's team to function in an Integrated Product Team environment. Furthermore, a sole source contract Specialized Warfighter Development Contract (SWDC) was awarded to Northrop Grumman in March 2018 (3 year base and 2 one year option periods) for continuation of the systems engineering, software development, test and integration for BMDS Overhead Persistent Infrared Architecture (BOA). A Small Business Innovation Research (SBIR) Phase III project by Sonalysts plans to include standalone trainer development which will deliver mission training simulation using core Standard Space Trainer (SST).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operations Engineering - Operations Engineering - Contract Support Services (CSS)	MIPR	MDA Various : Huntsville, AL; Colorado Springs, CO; NCR	0.771	2.586	Oct 2018	0.813	Oct 2019	0.590	Oct 2020	-		0.590	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Indirect Support	MIPR	DISA DECC/DISA TECC : Various	46.928	1.100	Oct 2018	0.000		0.000		-		0.000	0.000	48.028	0.000
Operations Engineering - Operations Engineering - Sustaining Support	C/CPAF	Jacobs Technology : Huntsville, AL; Colorado Springs, CO	1.003	2.100	Mar 2019	1.794	Mar 2020	0.000		-		0.000	0.000	4.897	0.000
Operations Engineering - Operations Engineering - Training Support	C/FPIF	Boeing : Huntsville, AL	0.280	1.056	Oct 2018	1.149	Oct 2019	1.171	Oct 2020	-		1.171	Continuing	Continuing	Continuing
Operations Engineering - Operations Engineering - Unit Personnel, Control System Improvement Sustaining Support	MIPR	Army, Navy, Air Force : Various	7.466	6.039	Oct 2018	9.162	Oct 2019	6.601	Oct 2020	-		6.601	Continuing	Continuing	Continuing
Operations Engineering - Prior year Operations Engineering no longer funded in the FYDP	Various	Various : Various	9.845	0.000		0.000		0.000		-		0.000	0.000	9.845	9.845
Operations Engineering - Unit Personnel, Control System Improvement, Sustaining Support	SS/CPFF	Lockheed Martin Team : Huntsville, AL	427.176	82.922	Dec 2018	79.294	Dec 2019	94.244	Dec 2020	-		94.244	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - (Training Enhancements)	SS/CPFF	Sonalysts : Waterford, CT	0.000	0.000		0.000		2.382	Dec 2020	-		2.382	Continuing	Continuing	Continuing
Concurrent Test, Training, and Operations (CTTO) - CTTO/Training Enhancements	MIPR	Aviation and Missile Research Development and	12.217	3.019	Dec 2018	6.904	Dec 2019	6.429	Dec 2020	-		6.429	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Engineering Center : Huntsville, AL													
Concurrent Test, Training, and Operations (CTTO) - Prior year CTTO no longer funded in the FYDP	Various	Various : Various	8.443	0.000		0.000		0.000		-		0.000	0.000	8.443	4.610
Concurrent Test, Training, and Operations (CTTO) - Training Enhancements	SS/CPIF	Lockheed Martin Team : Huntsville, AL; Colorado Springs, CO	100.747	14.087	Dec 2018	15.760	Dec 2019	17.065	Dec 2020	-		17.065	Continuing	Continuing	Continuing
		Subtotal	614.876	112.909		114.876		128.482		-		128.482	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	Project (Number/Name) MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	614.876	112.909		114.876		128.482		-		128.482	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MX01 / *Command & Control, Battle Management, Communications (C2BMC) Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MX01 Command & Control, Battle Management, Communications (C2BMC) Development Support	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	124.245	21.290	23.682	23.569	-	23.569	23.545	21.973	29.752	29.673	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	21.290	23.682	23.569
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	21.290	23.682	23.569

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	5.596	0.323	Jul 2019	0.358	Jul 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, HI, VA	3.966	3.958	Jan 2019	7.264	Oct 2019	7.899	Jul 2021	-		7.899	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various : Multi: AK, AL, CA, CO, HI, VA	22.388	0.000		0.661	Nov 2019	0.510	Nov 2020	-		0.510	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services Civilian Salaries, Travel, Training	Various	Various : Multi: AL, CA, CO, VA	40.259	17.009	Oct 2018	15.061	Nov 2019	14.580	Oct 2020	-		14.580	2.800	89.709	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	Various	Various : Multi: AL, CO, VA etc.	0.000	0.000		0.037	Oct 2019	0.050	Nov 2020	-		0.050	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	JHU/APL : AL, VA	0.000	0.000		0.301	Sep 2020	0.530	Dec 2020	-		0.530	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	52.036	0.000		0.000		0.000		-		0.000	0.000	52.036	0.000
		Subtotal	124.245	21.290		23.682		23.569		-		23.569	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	124.245	21.290		23.682		23.569		-		23.569	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603896C / *Ballistic Missile Defense Command and Control, Battle Management & Communication*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	215.695	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
MD03: *Joint Warfighter Support*	104.989	14.914	16.904	14.903	-	14.903	16.336	15.018	15.399	15.332	Continuing	Continuing
MT03: *Joint Warfighter Support Test*	95.161	31.132	32.278	32.531	-	32.531	33.187	33.826	34.848	35.574	Continuing	Continuing
MC03: *Cyber Operations*	0.146	0.150	0.156	0.157	-	0.157	0.159	0.162	0.167	0.170	0.000	1.267
MD40: *Program-Wide Support*	15.399	2.205	2.194	1.969	-	1.969	2.053	2.053	2.719	2.947	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The Joint Warfighter Support Program (JWSP) is Missile Defense Agency's (MDA's) primary means for providing direct technical support to Combatant Commands (CCMDs), the Military Services and the Joint Staff on Ballistic Missile Defense System (BMDS) development, testing, and operational support, to include Real World testing and validation of the warfighter's operational Common Integration Broadcast (CIB). It enables delivery of BMDS capabilities to Warfighters and ensures their participation in identification and development of new Ballistic Missile Defense (BMD) capabilities via the Warfighter Involvement Process (WIP). The JWSP allows the Warfighter and Missile Defense Agency to work together to identify gaps, seams, and needs in warfighting capability and enhance BMDS attributes by submitting modification and fielding requests. It also provides 24 hours a day, 7 days a week, 365 days a year BMD operational support to Warfighters worldwide. The program enables rapid response to Warfighter Requests for Information (RFIs) and Requests for Analyses (RFAs), which are especially critical to mission success in protecting U.S. forces and other defended assets during Real World threat events. The program supports improving products delivered to Warfighters through technical reviews and technical analyses supporting strategic and regional BMD planning, development of shot doctrine and BMD defense design. The JWSP also enables the inclusion of both CCMD and MDA BMD objectives in CCMD/Joint Staff-sponsored exercises and wargames, which are used to sharpen and enhance joint BMD warfighting skills.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	48.767	51.532	51.411	-	51.411
Current President's Budget	48.401	51.532	49.560	-	49.560
Total Adjustments	-0.366	0.000	-1.851	-	-1.851
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.369	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.003	0.000	-1.851	-	-1.851

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD03: *Joint Warfighter Support*	104.989	14.914	16.904	14.903	-	14.903	16.336	15.018	15.399	15.332	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

There are six primary functions in Joint Warfighter Support (MD03):

(1) Current Operations Support
(2) Combatant Command Support
(3) Military Department Engagement
(4) Operational BMDS Verification and Validation
(5) Warfighter Training Support
(6) Joint Staff Engagement

Detailed descriptions and accomplishments are provided in the following section

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Strategic Warfighter Integration	14.914	16.904	14.903
Articles:	-	-	-
Description: (1) Current Operations Support: - Manage and operate the MDA Operations Support Center (OSC) 24 hours a day, 7 days a week, 365 days a year and two MDA Operations Centers (MOCs) in Virginia and Alabama for daily execution of scheduled BMDS activities; prepare and transmit Logistic Reports. - Manage and execute the BMDS Asset Management (BAM) process of planning, coordinating, scheduling and executing access to operational and Research, Development, Test and Evaluation (RDT&E) assets operated by MDA and Warfighters dispersed globally with differing missions and competing priorities to facilitate assets in support of Warfighter BMD; Missile Warning/ Space Surveillance (MS/SS) operations; MDA Research, Development, Test and Evaluation (RDT&E), training and sustainment activities. - Lead the MDA Operations Support Planning Team (OSPT), an MDA-wide task force supporting Warfighters, Services and the Joint Staff to address real-world contingencies and crisis events.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Develop BMDS Annual Plan and BMDS Operating Schedule facilitating key stakeholder coordination and maximizing operational availability of the BMDS. - Develop and maintain the Integrated Scheduling Tool. - Facilitate major software/hardware additions to the Operational Capacity Baseline for homeland/regional defenses. - Develop and maintain the BMDS Operational Readiness Reporting System (BORRS) application to collect and report BMDS operational availability and readiness data through the network-based tool to distribute data to OSD, CCMDs, Joint Staff, Military Services, and BMDS Operators. - Provide certification training to BMDS watch officers (BWO), BMDS Safety Officers (BSO), and other Operations Support Center staff. (2) Combatant Command Support (USSTRATCOM, USNORTHCOM): - Support the Warfighter Involvement Process (WIP) and other MDA Warfighter engagement efforts by assisting Warfighters in their update to the annual BMDS Prioritized Capabilities List (PCL) and Modification and Fielding Request List (MFRL). - Support Joint Functional Component Command Integrated Missile Defense (JFCC IMD) integration by participating in the Warfighter Forum (WFF) a multi-lateral information and decision event to address CCMD, Service and Department of Defense (DoD) BMDS equities. - Assist USNORTHCOM in broadening homeland defense planning to address the full range of USNORTHCOM threats by conducting the Homeland Defense Architecture Working Group (HDAWG) and Shot Management Analysis Cell (SMAC). - Manage the Warfighter Requests for Information (RFIs); Requests for Analyses (RFAs); and Requests for Allied Participation in Tests (RFT) processes. (3) Military Department Engagement: - Facilitate and coordinate Service Boards of Directors (BODs) on Lead Service BMDS related equities, Program Objective Memorandum (POM) development and execution; element fielding, operations and maintenance, and the BMDS capability delivery process. - Maintain daily, strategic-level interfaces with Military Services and Joint Staff plan for the delivery, fielding, and operation of respective Lead Service BMDS capabilities via senior-level working groups, General Officer Air and Missile Defense and Space forums. - Support transition and transfer to the Military Services through participation in senior-level working groups, Joint Staff directorates, and facilitate General Officer forums. (4) Operational BMDS Verification and Validation: - Provide 24 hours a day, 7 days a week, 365 days a year, global system verification and validation over the operational Common Integrated Broadcast, and Shared Early Warning System for BMD early warning data.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Support Tactical Data Processor software development, MDA flight tests and other software development efforts using live real-world broadcasts of simulated missile threats. - Support Naval Board of Inspection and Survey (INSURV), Shipboard installation, Aegis On-Demand, Aegis program releases, US and Coalition operational readiness and BMD Exercise requirements to validate equipment, materiel, and tactical readiness while simultaneously providing deployment certification and crew operator qualification; verifies operational readiness of both US and Coalition partners to detect a real-world launch of a ballistic threat. (5) Warfighter Training Support: - Provide Missile Defense Space Warning tool (MDST) support to increase operator proficiency, competence, and confidence; provide initial qualification training; and ship certification for Aegis BMD crews. - Provide technical and programmatic updates for BMD Warfighter training; participates in BMD training and Education Working Group to coordinate BMD training issues with USSTRATCOM and Joint Staff. - Support Fleet Synthetic and Aegis Operator Training to ensure operational readiness of Aegis as the first step in the kill chain for BMD. - Provide Early Warning missile injects for MT03 war games and exercises and tailored support for other Joint Warfighter Support Test events (as listed in the IMTP and R-4/4A schedule). (6) Joint Staff Engagement: - Facilitate and coordinate all Joint Staff interactions with the MDA. - Maintain daily, strategic-level interfaces with the Joint Staff. ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	14.914	16.904	14.903

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions (IRES) Contract and the Specialized Warfighter Development Contract are the major performing integrated contracts. The acquisition strategy for Strategic Warfighter Integration mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDS Research, Development, Test and Evaluation (RDT&E). Strategic Warfighter Integration is operated by missile defense subject matter experts composed of Government, military, civilian personnel, Contract Support Services, and major defense contractors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Warfighter Integration - Strategic Warfighter Integration - HR A&AS	C/CPFF	TEAMS : Colorado Springs	0.551	0.125	Dec 2018	0.145	Dec 2019	0.148	Dec 2020	-		0.148	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Administrative A&AS	C/CPFF	TEAMS : Colorado Springs	1.522	0.190	Nov 2018	0.260	Nov 2019	0.265	Dec 2020	-		0.265	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Civilian Salaries/ Operations Sustainment	Allot	MDA : Colorado Springs/Huntsville, NCR	34.540	3.793	Oct 2018	4.231	Oct 2019	3.646	Oct 2020	-		3.646	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Current Operations	C/CPAF	IRES : Colorado Springs	20.693	2.470	Nov 2018	3.165	Nov 2019	1.510	Nov 2020	-		1.510	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - IT Wireless Services (JRDC/ IRES)	C/CPAF	IRES : Colorado Springs, Huntsville	3.795	0.530	Dec 2018	0.546	Dec 2019	0.557	Jan 2021	-		0.557	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic	C/CPAF	SWDC : Colorado Springs	19.588	3.450	Oct 2018	3.719	Nov 2019	3.794	Nov 2020	-		3.794	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Warfighter Integration - MDST															
Strategic Warfighter Integration - Strategic Warfighter Integration - Travel and Training	Allot	MDA : Colorado Springs, Huntsville, NCR	1.366	0.231	Oct 2018	0.238	Oct 2019	0.245	Oct 2020	-		0.245	Continuing	Continuing	Continuing
Strategic Warfighter Integration - Strategic Warfighter Integration - Warfighter Support A&AS	C/CPFF	TEAMS : Colorado Springs, Huntsville, NCR	22.934	4.125	Nov 2018	4.600	Nov 2019	4.738	Nov 2020	-		4.738	Continuing	Continuing	Continuing
		Subtotal	104.989	14.914		16.904		14.903		-		14.903	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	104.989	14.914		16.904		14.903		-		14.903	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for active contracts, Military Interdepartmental Purchase Requests, and civilian salaries on the R-3.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Strategic Integration Wargame Events in support of MT03	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD03 / *Joint Warfighter Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Strategic Integration Wargame Events in support of MT03	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT03: *Joint Warfighter Support Test*	95.161	31.132	32.278	32.531	-	32.531	33.187	33.826	34.848	35.574	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Joint Warfighter Support Test is comprised of two primary responsibilities: 1) Exercises and wargames and, 2) Warfighter operational support.

Exercises and wargames:
-Support the Warfighter to plan and conduct worldwide exercises and wargames supporting BMDS development and fielding.
-Enable the Warfighter to define, test, deploy, and employ new missile defense capabilities.
-Support Joint Functional Component Commander for Integrated Missile Defense (JFCC IMD) BMDS Table Top Exercises (TTX) to facilitate the global missile defense capability and to refine the European capability concept of operations through low-fidelity demonstration Models & Simulation (M&S).
-Examine current and future BMDS operational capabilities for Geographic (i.e., USCENTCOM, USEUCOM, and USINDOPACOM) and Strategic (i.e., USNORTHCOM and USSTRATCOM) Combatant Commands (CCMDs).
-Support the GCC Assistants to the Director (ATDs) and Liaison Officers (LNOs).
-Complete test planning for BMDS events.

Warfighter operational support (program planning and operations):
-Prepare MDA senior leadership for engagements with the Geographic Combatant Commands (GCCs) by providing logistical support and developing briefings for the GCC Assistant Test Directors (ATDs) and MDA Director.
-Interface with the GCCs on BMD operational issues by providing planning and analysis support and translating warfighter responses to MDA issues.
-Support GCC contingency activation planning for real-world contingencies and theater security cooperation programs by supervising the activation of MDA assets to use in the operational BMDS.
-Aid GCC participation in BMDS capability definition, design, development, integration, and delivery processes through the Warfighter Involvement Process (WIP) to synchronize capability delivery with operational readiness and acceptance.
-Provide resource management and administration of MT03 personnel and funding.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Wargames and Exercises	25.679	27.027	26.864
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: The Missile Defense Agency provides operational-level interfaces to the Global Combatant Commands (GCCs) and ensures Warfighter participation to develop future missile defense capabilities. The MDA will continue to enhance Warfighter operational support through internal support activities and proactive execution of Combatant Command (CCMD) interface activities. - Work with CCMDs on the inclusion of Allies and regional partners into MDA Ground and Flight tests and exercises and wargames simulations. - Provide Warfighter training simulations in direct support of flight and ground tests. - Serve as liaison between internal MDA organizations and the JFCC IMD across all functional areas to facilitate Geographic Combatant Command (GCC) participation in the BMDS capability definition, design, development, integration and delivery processes. - Support JFCC IMD and USEUCOM in the European Phased Adaptive Approach (EPAA) implementation process through the planning, testing, integration and execution of BMDS exercises and wargames. - Support Joint Staff integration of MDA models into Tier I events through the Joint, Live Virtual Constructive (JLVC) campaign. - Work with Program Offices and the Warfighter; publish a Concept of Operations that will support future MDA Models and Simulation (M&S) support to BMD exercises and wargames. - Coordinate and integrate CCMD requirements into the BMDS Integrated Master Test Plan. - Provide support to the development and update of Ballistic Missile Defense (BMD) portions of CCMD Operation Plans (OPLANS) and Contingency Plans (CONPLANS). - Engage in MDA/GCC interface and synchronization of information regarding capabilities and security cooperation strategies. - Develop and provide exercises, wargames and Table Top Exercises (TTX) in support of CCMD-specific scenarios as listed in the R4-4A schedule for the USEUCOM, USINDOPACOM, USCENTCOM and USNORTHCOM/USSTRATCOM Geographic Combatant Commands. Additional GCC interface activities by region will include: USEUCOM Engagement: - Coordinate with USEUCOM for continued MDA support of key EPAA Approach milestones in order to provide a full range of BMDS capabilities addressing ballistic missile threats to the European theater. - Work with USEUCOM to include NATO Allies and regional partners during MDA Ground tests, Flight tests, exercises and wargames in order to improve Allied - US BMDS interoperability. - Coordinate with MDA program elements to facilitate rapid agency responses to USEUCOM requests for analysis and information. Provide reach-back support for the MDA ATD and LNO in USEUCOM for activities requiring visibility by the MDA Director and Director for Test.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Coordinate with MDA Global Deployment Program Office to plan and execute actions required for deployment of BMDS assets in the USEUCOM theater of operations. USCENTCOM Engagement: - Promote CCMD leadership in developing a regional partner data sharing system supporting USCENTCOM regional IAMD architecture development. - Coordinate with MDA program elements, assisting in planning and execution activities supporting USCENTCOM's regional partners. USINDOPACOM Engagement: - Assist USINDOPACOM leadership in broadening Phased Adaptive Approach planning to address a full range of threats and integration of allies into the BMDS. - Support USINDOPACOM J3 in efforts to promote purchase of an Aegis Ashore system. - Share operational information and knowledge and help allies develop common operational procedures. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Program, Planning and Operations	5.453	5.251	5.667
Articles:	-	-	-
Description: MDA provides operational-level interface to the GCCs and ensures Warfighter participation in the development of future missile defense capabilities and requirements. The key Warfighter interface activities include: - Support the Operations Support Planning Team (OSPT) activation during heightened period of interest. - Support Warfighters, DoD Agencies, and Military Services in identifying desired missile defense capabilities and characteristics. - Obtain Warfighter participation and advice on desired operational features and approaches to system fielding throughout development. - Track analysis and responses for CCMD Requests for Analysis (RFA) and Requests for Information (RFI). - Prepare MDA senior leadership for U.S. Army, Navy, and Air Force BOD and AMD General Officer Steering Committee meetings.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide resource management and administration of BMDS Warfighter personnel and budget. - Manage travel to support exercises and wargames, Assistant to the Director (ATDs), and Liaison Officer (LNOs) as MDA representatives at the GCC HQs. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	31.132	32.278	32.531

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

In order to optimize the performance of the Ballistic Missile Defense System, MDA leverages Defense Department executive agents as well as the MDA Integrated Research and Development for Enterprise Solutions (IRES) contract.

The executing agents utilize various contracting strategies in a flexible manner to maximize their contribution to the BMDS. Products and Services are acquired by competitive means to the extent that is possible and practical.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Wargames and Exercises - Combatant Commanders (COCOM)/Wargame Support	C/CPAF	IRES/MIPR : Colorado Springs, Huntsville	56.440	17.983	Nov 2018	27.027	Nov 2019	26.864	Nov 2020	-		26.864	Continuing	Continuing	Continuing
Wargames and Exercises - Wargame Support	C/CPAF	IRES/MIPR : Colorado Springs	20.047	7.696	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program, Planning and Operations - Civilian Salaries/Operations Sustainment/Travel & Training	Allot	MDA : Colorado Springs, Huntsville, NCR	6.454	1.954	Oct 2018	2.802	Oct 2019	3.230	Oct 2020	-		3.230	Continuing	Continuing	Continuing
Program, Planning and Operations - Combatant Commanders (COCOM) Support A&AS	C/CPFF	TEAMS : Colorado Springs, Huntsville, NCR	3.274	0.982	Oct 2018	2.449	Oct 2019	2.437	Oct 2020	-		2.437	Continuing	Continuing	Continuing
Program, Planning and Operations - Government Travel & Training	Allot	MDA : Colorado Springs, Huntsville, NCR	2.032	0.756	Sep 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Program, Planning and Operations - Support to MDA Leadership A&AS	C/CPFF	TEAMS : Colorado Springs, Huntsville, NCR	6.914	1.761	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	95.161	31.132		32.278		32.531		-		32.531	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	95.161	31.132		32.278		32.531		-		32.531	Continuing	Continuing	N/A

Remarks

Prior year funding was captured in the MD03 budget project.
Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(WG) Demonstration, Table-top Exercises & Experiments 18	✦																											
(EX) Joint Live, Virtual, and Constructive 2017/18-2	✦	✦																										
(EX) GLOBAL THUNDER 19	✦																											
(EX) KEEN SWORD 19	✦																											
(EX) VIGILANT SHIELD 19	✦																											
(WG) Multi-National Missile Defense Conference (MNC) 18	✦																											
(EX) EPOCH PLANEX 20	▲																											
(EX) GLOBAL LIGHTNING 19	✦	✦																										
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 18		▲																										
(EX) EUROPEAN TEST BED 19		▲																										
(EX) Joint Project Optic Windmill 2019		✦																										
(EX) KEY RESOLVE 19		▲																										
(EX) RESILIENT SHIELD 19		▲																										
(EX) PACIFIC SENTRY 19	✦	✦	✦																									
(WG) Huntsville Wargames 19			✦	✦																								
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 19				▲																								
(WG) Space & Missile Defense Symposium 19				▲																								
(EX) AUSTERE CHALLENGE 19		✦	✦	✦	✦																							
(WG) NIMBLE TITAN 20		✧	✧	✧	✧	✧	✧	✧																				
(EX) Joint Live, Virtual, and Constructive 2019/20-1		✦	✦	✦	✦																							
(WG) Demonstration, Table-top Exercises & Experiments 19			✦	✦	✦																							
(EX) Air and Missile Defense Exercise 20-1				△																								
(EX) Combined Command Post Training TAC 2				▲																								
(EX) GLOBAL THUNDER 20				✧	✧																							

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(EX) VIGILANT SHIELD 20				✧	✧																							
(WG) Multi-National Missile Defense Conference (MNC) 19				✦	✦																							
(EX) KEEN EDGE 20				✧	✧	✧																						
(EX) JUNIPER COBRA 20					✧	✧																						
(EX) GLOBAL LIGHTNING 20					✧	✧																						
(EX) EAGLE RESOLVE 20						△																						
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19						△																						
(EX) KEY RESOLVE 20						△																						
(EX) EUROPEAN TEST BED 20						△																						
(EX) RESILIENT SHIELD 20						△																						
(EX) STEADFAST ALLIANCE 20						✧	✧																					
(EX) PACIFIC SENTRY 20						✧	✧	✧																				
(EX) Joint Live, Virtual, and Constructive 2019/20-2						✧	✧	✧	✧																			
(EX) GLOBAL RESPONSE EXERCISE 09							△																					
(WG) Demonstration, Table-top Exercises & Experiments 20							✧	✧	✧																			
(WG) BMDS Wargames 21							✧	✧	✧	✧	✧																	
(EX) AIR AND MISSILE DEFENSE EXERCISE 21								△																				
(EX) ULCHI FREEDOM GUARDIAN 20								△																				
(EX) GLOBAL RESPONSE EXERCISE 10								△																				
(WG) Multi-National Missile Defense Conference (MNC) 20								✧	✧																			
(EX) VIGILANT SHIELD 21								✧	✧																			
(EX) KEEN SWORD 21								✧	✧																			
(EX) GLOBAL THUNDER 21								✧	✧																			
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20									△																			

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(EX) AUSTERE CHALLENGE 21									✧	✧	✧	✧																
(WG) NIMBLE TITAN 22									✧	✧	✧	✧	✧	✧	✧	✧												
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20										△																		
(EX) GLOBAL LIGHTNING 21										✧	✧																	
(EX) Joint Project Optic Windmill 2021									✧	✧																		
(EX) EUROPEAN TEST BED 21										△																		
(EX) RESILIENT SHIELD 21										△																		
(EX) PACIFIC SENTRY 21										✧	✧	✧																
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21										✧	✧	✧																
(WG) Huntsville Wargames 21											✧	✧																
(WG) Demonstration, Table-top Exercises & Experiments 21											✧	✧	✧															
(EX) Joint Live, Virtual, and Constructive 2021/22-1												✧	✧	✧	✧	✧	✧											
(WG) Space & Missile Defense Symposium 21												△																
(EX) VIGILANT SHIELD 22												✧	✧															
(EX) KEEN EDGE 22												✧	✧	✧														
(EX) EPOCH PLANEX 23													△															
(EX) JUNIPER COBRA 22													✧	✧														
(EX) GLOBAL LIGHTNING 22													✧	✧														
(EX) EAGLE RESOLVE 22														△														
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21														△														
(EX) KEY RESOLVE 22														△														
(EX) EUROPEAN TEST BED 22														△														
(EX) RESILIENT SHIELD 22														△														
(EX) STEADFAST ALLIANCE 22														✧	✧													

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(EX) PACIFIC SENTRY 22														✧	✧	✧												
(EX) Joint Live, Virtual, and Constructive 2021/22-2														✧	✧	✧	✧											
(WG) Demonstration, Table-top Exercises & Experiments 22															✧	✧	✧											
(WG) BMDS Wargames 23															✧	✧	✧	✧	✧									
(EX) ULCHI FREEDOM GUARDIAN 22																△												
(EX) AIR AND MISSILE DEFENSE EXERCISE 22															✧	✧												
(EX) AIR AND MISSILE DEFENSE EXERCISE 23																△												
(WG) Multi-National Missile Defense Conference (MNC) 22																✧	✧											
(EX) VIGILANT SHIELD 23																✧	✧											
(EX) KEEN SWORD 23																✧	✧											
(EX) GLOBAL THUNDER 22																✧	✧											
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22																	△											
(EX) GLOBAL RESPONSE EXERCISE 11																	△											
(EX) GLOBAL RESPONSE EXERCISE 12																	△											
(EX) GLOBAL LIGHTNING 23																	✧	✧										
(EX) AUSTERE CHALLENGE 23																	✧	✧	✧	✧								
(WG) NIMBLE TITAN 24																	✧	✧	✧	✧	✧	✧	✧	✧				
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22																		△										
(EX) Joint Project Optic Windmill 2023																		✧										
(EX) EUROPEAN TEST BED 23																		△										
(EX) KEY RESOLVE 23																		△										
(EX) RESILIENT SHIELD 23																		△										
(EX) STEADFAST ARMOUR 23																		✧	✧									
(EX) PACIFIC SENTRY 23																		✧	✧	✧								

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
(EX) PACIFIC SENTRY 24																	✧	✧	✧									
(WG) Huntsville Wargames 23																		△										
(EX) Joint Live, Virtual, and Constructive 2023/24-1																		✧	✧	✧								
(WG) Demonstration, Table-top Exercises & Experiments 23																		✧	✧	✧								
(WG) Space & Missile Defense Symposium 23																			△									
(EX) ULCHI FREEDOM GUARDIAN 23																			△									
(EX) AIR AND MISSILE DEFENSE EXERCISE 24																			△									
(WG) Multi-National Missile Defense Conference (MNC) 23																			✧	✧								
(EX) GLOBAL THUNDER 23																			✧	✧								
(EX) VIGILANT SHIELD 24																			✧	✧								
(EX) KEEN EDGE 24																			✧	✧	✧							
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23																				△								
(EX) JUNIPER COBRA 24																				✧	✧							
(EX) GLOBAL LIGHTNING 24																				✧	✧							
(EX) EAGLE RESOLVE 24																					△							
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23																					△							
(EX) EUROPEAN TEST BED 24																					△							
(EX) KEY RESOLVE 24																					△							
(EX) RESILIENT SHIELD 24																					△							
(EX) STEADFAST ALLIANCE 24																					✧	✧						
(EX) Joint Live, Virtual, and Constructive 2023/24-2																					✧	✧	✧	✧				
(WG) Demonstration, Table-top Exercises & Experiments 24																						✧	✧	✧				
(WG) BMDS Wargames 25																						✧	✧	✧	✧	✧		
(EX) ULCHI FREEDOM GUARDIAN 24																							△					

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
(EX) GLOBAL THUNDER 24						✧	✧
(WG) Multi-National Missile Defense Conference (MNC) 24						✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(WG) Demonstration, Table-top Exercises & Experiments 18	1	2019	1	2019
(EX) Joint Live, Virtual, and Constructive 2017/18-2	1	2019	2	2019
(EX) GLOBAL THUNDER 19	1	2019	1	2019
(EX) KEEN SWORD 19	1	2019	1	2019
(EX) VIGILANT SHIELD 19	1	2019	1	2019
(WG) Multi-National Missile Defense Conference (MNC) 18	1	2019	1	2019
(EX) EPOCH PLANEX 20	1	2019	1	2019
(EX) GLOBAL LIGHTNING 19	1	2019	2	2019
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 18	2	2019	2	2019
(EX) EUROPEAN TEST BED 19	2	2019	2	2019
(EX) Joint Project Optic Windmill 2019	2	2019	2	2019
(EX) KEY RESOLVE 19	2	2019	2	2019
(EX) RESILIENT SHIELD 19	2	2019	2	2019
(EX) PACIFIC SENTRY 19	1	2019	3	2019
(WG) Huntsville Wargames 19	3	2019	4	2019
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 19	4	2019	4	2019
(WG) Space & Missile Defense Symposium 19	4	2019	4	2019
(EX) AUSTERE CHALLENGE 19	2	2019	1	2020
(WG) NIMBLE TITAN 20	2	2019	4	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-1	2	2019	1	2020
(WG) Demonstration, Table-top Exercises & Experiments 19	3	2019	1	2020
(EX) Air and Missile Defense Exercise 20-1	4	2019	4	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) Combined Command Post Training TAC 2	4	2019	4	2019
(EX) GLOBAL THUNDER 20	4	2019	1	2020
(EX) VIGILANT SHIELD 20	4	2019	1	2020
(WG) Multi-National Missile Defense Conference (MNC) 19	4	2019	1	2020
(EX) KEEN EDGE 20	4	2019	2	2020
(EX) JUNIPER COBRA 20	1	2020	2	2020
(EX) GLOBAL LIGHTNING 20	1	2020	2	2020
(EX) EAGLE RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 19	2	2020	2	2020
(EX) KEY RESOLVE 20	2	2020	2	2020
(EX) EUROPEAN TEST BED 20	2	2020	2	2020
(EX) RESILIENT SHIELD 20	2	2020	2	2020
(EX) STEADFAST ALLIANCE 20	2	2020	3	2020
(EX) PACIFIC SENTRY 20	2	2020	4	2020
(EX) Joint Live, Virtual, and Constructive 2019/20-2	2	2020	1	2021
(EX) GLOBAL RESPONSE EXERCISE 09	3	2020	3	2020
(WG) Demonstration, Table-top Exercises & Experiments 20	3	2020	1	2021
(WG) BMDS Wargames 21	3	2020	3	2021
(EX) AIR AND MISSILE DEFENSE EXERCISE 21	4	2020	4	2020
(EX) ULCHI FREEDOM GUARDIAN 20	4	2020	4	2020
(EX) GLOBAL RESPONSE EXERCISE 10	4	2020	4	2020
(WG) Multi-National Missile Defense Conference (MNC) 20	4	2020	1	2021
(EX) VIGILANT SHIELD 21	4	2020	1	2021
(EX) KEEN SWORD 21	4	2020	1	2021
(EX) GLOBAL THUNDER 21	4	2020	1	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 20	1	2021	1	2021
(EX) AUSTERE CHALLENGE 21	1	2021	4	2021
(WG) NIMBLE TITAN 22	1	2021	4	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 20	2	2021	2	2021
(EX) GLOBAL LIGHTNING 21	2	2021	3	2021
(EX) Joint Project Optic Windmill 2021	1	2021	2	2021
(EX) EUROPEAN TEST BED 21	2	2021	2	2021
(EX) RESILIENT SHIELD 21	2	2021	2	2021
(EX) PACIFIC SENTRY 21	2	2021	4	2021
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 21	2	2021	4	2021
(WG) Huntsville Wargames 21	3	2021	4	2021
(WG) Demonstration, Table-top Exercises & Experiments 21	3	2021	1	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-1	4	2021	1	2023
(WG) Space & Missile Defense Symposium 21	4	2021	4	2021
(EX) VIGILANT SHIELD 22	4	2021	1	2022
(EX) KEEN EDGE 22	4	2021	2	2022
(EX) EPOCH PLANEX 23	1	2022	1	2022
(EX) JUNIPER COBRA 22	1	2022	2	2022
(EX) GLOBAL LIGHTNING 22	1	2022	2	2022
(EX) EAGLE RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 21	2	2022	2	2022
(EX) KEY RESOLVE 22	2	2022	2	2022
(EX) EUROPEAN TEST BED 22	2	2022	2	2022
(EX) RESILIENT SHIELD 22	2	2022	2	2022
(EX) STEADFAST ALLIANCE 22	2	2022	3	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(EX) PACIFIC SENTRY 22	2	2022	4	2022
(EX) Joint Live, Virtual, and Constructive 2021/22-2	2	2022	1	2023
(WG) Demonstration, Table-top Exercises & Experiments 22	3	2022	1	2023
(WG) BMDS Wargames 23	3	2022	3	2023
(EX) ULCHI FREEDOM GUARDIAN 22	4	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 22	3	2022	4	2022
(EX) AIR AND MISSILE DEFENSE EXERCISE 23	4	2022	4	2022
(WG) Multi-National Missile Defense Conference (MNC) 22	4	2022	1	2023
(EX) VIGILANT SHIELD 23	4	2022	1	2023
(EX) KEEN SWORD 23	4	2022	1	2023
(EX) GLOBAL THUNDER 22	4	2022	1	2023
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 22	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 11	1	2023	1	2023
(EX) GLOBAL RESPONSE EXERCISE 12	1	2023	1	2023
(EX) GLOBAL LIGHTNING 23	1	2023	2	2023
(EX) AUSTERE CHALLENGE 23	1	2023	4	2023
(WG) NIMBLE TITAN 24	1	2023	4	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 22	2	2023	2	2023
(EX) Joint Project Optic Windmill 2023	2	2023	2	2023
(EX) EUROPEAN TEST BED 23	2	2023	2	2023
(EX) KEY RESOLVE 23	2	2023	2	2023
(EX) RESILIENT SHIELD 23	2	2023	2	2023
(EX) STEADFAST ARMOUR 23	2	2023	3	2023
(EX) PACIFIC SENTRY 23	2	2023	4	2023
(EX) PACIFIC SENTRY 24	2	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MT03 / *Joint Warfighter Support Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
(WG) Huntsville Wargames 23	3	2023	3	2023
(EX) Joint Live, Virtual, and Constructive 2023/24-1	3	2023	1	2024
(WG) Demonstration, Table-top Exercises & Experiments 23	3	2023	1	2024
(WG) Space & Missile Defense Symposium 23	4	2023	4	2023
(EX) ULCHI FREEDOM GUARDIAN 23	4	2023	4	2023
(EX) AIR AND MISSILE DEFENSE EXERCISE 24	4	2023	4	2023
(WG) Multi-National Missile Defense Conference (MNC) 23	4	2023	1	2024
(EX) GLOBAL THUNDER 23	4	2023	1	2024
(EX) VIGILANT SHIELD 24	4	2023	1	2024
(EX) KEEN EDGE 24	4	2023	2	2024
(EX) JOINT AIR AND MISSILE DEFENSE EXERCISE SERIES 23	1	2024	1	2024
(EX) JUNIPER COBRA 24	1	2024	2	2024
(EX) GLOBAL LIGHTNING 24	1	2024	2	2024
(EX) EAGLE RESOLVE 24	2	2024	2	2024
(EX) EUROPEAN AIR & MISSILE DEFENSE EXERCISE 23	2	2024	2	2024
(EX) EUROPEAN TEST BED 24	2	2024	2	2024
(EX) KEY RESOLVE 24	2	2024	2	2024
(EX) RESILIENT SHIELD 24	2	2024	2	2024
(EX) STEADFAST ALLIANCE 24	2	2024	3	2024
(EX) Joint Live, Virtual, and Constructive 2023/24-2	2	2024	1	2025
(WG) Demonstration, Table-top Exercises & Experiments 24	3	2024	1	2025
(WG) BMDS Wargames 25	3	2024	3	2025
(EX) ULCHI FREEDOM GUARDIAN 24	4	2024	4	2024
(EX) GLOBAL THUNDER 24	4	2024	1	2025
(WG) Multi-National Missile Defense Conference (MNC) 24	4	2024	1	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC03: *Cyber Operations*	0.146	0.150	0.156	0.157	-	0.157	0.159	0.162	0.167	0.170	0.000	1.267
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project verifies and validates that cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryption devices, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. They assure that validated IT products are listed on the DOD Approved Products List (APLITS). There is an additional requirement to routinely identify findings and prepare a report with recommendations. The Warfighter Strategic Integration directorate (DDW) requires this support in the IT product evaluation provided. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act of 2014 (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Strategic Warfighter Integration Software Assurance Support	0.150	0.156	0.157
Articles:	-	-	-

Description: Perform manual and automated software code analysis, using GFE tools (e.g. Fortify 360), to detect false positives, weaknesses, and vulnerabilities.
1) Verify and validate cybersecurity and/or cybersecurity-enabled products (firewalls, data/network encryptors, routers, Intrusion Detection Systems, etc.) used within the MDA infrastructure have a current and Evaluated Assurance Level (EAL) certification and rating. Validate IT products are listed on the DoD Approved Products List (APLITS).
2) Participate in meetings with customers to review software analysis findings and proposed courses of action for remediation.
3) Prepare a comprehensive report detailing the weaknesses and vulnerabilities found. Document the references to files and line numbers.
4) Maintain a record of all software code analysis documentation and organized in accordance with Government policy.

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE

FY 2021 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.150	0.156	0.157

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Warfighter Integration Software Assurance Support - DDW Cyber Support (ICVA)	C/CPFF	TEAMS : COS	0.146	0.150	Dec 2018	0.156	Dec 2019	0.157	Feb 2021	-		0.157	Continuing	Continuing	Continuing
		Subtotal	0.146	0.150		0.156		0.157		-		0.157	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.146	0.150		0.156		0.157		-		0.157	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC03 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MC03 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC03 Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	15.399	2.205	2.194	1.969	-	1.969	2.053	2.053	2.719	2.947	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	2.205	2.194	1.969
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.205	2.194	1.969

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various Multi: AL, CO, CA, VA : Various	0.859	0.046	Jul 2019	0.033	Jul 2020	0.060	Jul 2021	-		0.060	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	MDA : Multi:AK,AL, CA, CO, VA	5.370	1.060	Jan 2019	1.200	Jan 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	ALATEC , INC, : AL, CO, VA	7.316	0.000		0.961	May 2020	1.909	Jul 2021	-		1.909	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services (Reqn)	Reqn	Various : Multi:AK, AL, CA, CO, VA	0.397	1.099	Jun 2019	0.000		0.000		-		0.000	0.000	1.496	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	1.457	0.000		0.000		0.000		-		0.000	0.000	1.457	0.000
		Subtotal	15.399	2.205		2.194		1.969		-		1.969	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.399	2.205		2.194		1.969		-		1.969	Continuing	Continuing	N/A

Remarks

Award Dates reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603898C / *Ballistic Missile Defense Joint Warfighter Support*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	472.704	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
MD22: *Missile Defense Integration and Operations Center (MDIOC)*	451.221	45.117	53.103	52.519	-	52.519	52.860	54.484	56.054	57.290	Continuing	Continuing
MC22: *Cyber Operations*	2.616	0.595	0.634	0.638	-	0.638	0.650	0.663	0.684	0.698	Continuing	Continuing
MD40: *Program-Wide Support*	18.867	5.977	2.424	2.199	-	2.199	2.211	2.310	3.060	3.346	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) is the Missile Defense Agency's (MDA) field operating activity in Colorado Springs, Colorado. The MDIOC provides necessary infrastructure and support services through a mission execution platform for MDA elements/components and designated Combatant Commanders' Missile Defense System (MDS) operations executing missions at the MDIOC. The Integration Center is the organization responsible for providing a single, integrated set of skilled personnel matrixed from across MDA to manage this mission. The MDIOC mission facilities consist of a highly secure research and development complex and a consolidated support facility located at Schriever Air Force Base, just east of North American Aerospace Defense Command (NORAD) and United States Northern Command (USNORTHCOM). The MDIOC provides mission critical system technical capabilities and subject matter expertise in a dedicated and adaptable environment that enables developers, testers, and operators to evolve, assess and deliver the capabilities for layered missile defense execution for homeland defense and theater/regional support. The MDIOC interfaces with the Information Technology and Information Assurance Enterprise to provide high availability access to worldwide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise for all MDA directed activities and events. The MDIOC functions as the mission control for BMDS distributed ground tests and system wide flight tests enabling the mission and test directors to control both main and associated test operations using secure voice, test, and mission network hubs from the MDIOC. The MDIOC also functions as the only system-level integration and interoperability mission execution platform for BMDS fire control; and it provides the physical interface between the developers and the Combatant Command (CCMD) warfighters.

MDIOC mission facilities contribute to the BMDS by directly supporting the concept of Concurrent Test, Training, and Operations (CTTO) for the BMDS by providing mission assurance, engineering integration, resource scheduling, configuration management, and implementation development support for MDA and BMDS-level test, training, and operational mission execution.

MDIOC Major Program Goals:
- Provide the capabilities and services necessary to support mission assurance, engineering integration, resource scheduling for ground and flight tests, configuration

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*

management, and implementation development support of on-site activities
- Ensure around the clock support and restoral of designated BMDS operational activities
- Improve interface with designated CCMD missile defense activities; host/support the headquarters and operations center for the United States Strategic Command Joint Functional Component Command - Integrated Missile Defense
- Maintain and improve the reliability, availability, and maintainability of MDIOC mission critical systems

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	58.125	56.161	57.446	-	57.446
Current President's Budget	51.689	56.161	55.356	-	55.356
Total Adjustments	-6.436	0.000	-2.090	-	-2.090
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.176	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-5.260	0.000	-2.090	-	-2.090

Change Summary Explanation

Decrease in FY2019 reflects reprioritization of funding to support higher Agency priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD22: *Missile Defense Integration and Operations Center (MDIOC)*	451.221	45.117	53.103	52.519	-	52.519	52.860	54.484	56.054	57.290	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) sustains and operates a 24 hours a day, 7 days a week, 365 days a year mission complex for critical research, development, testing, training, and operations for Missile Defense System (MDS) activities. The MDIOC supports the Ground-based Midcourse Defense Mission Control Center Facility, as well as the Command, Control, Battle Management, and Communications (C2BMC) Integration and Test Centers and the C2BMC Experimentation Laboratories. It provides infrastructure support for the Space Tracking and Surveillance System's (STSS) Missile Defense Space Center (MDSC); and the Targets and Countermeasures' (TC) Mission Control Center - Targets (MCC-T). The MDIOC also provides developmental support to the Enterprise Sensors Laboratory (ESL) composed of a common satellite ground station and sensor netting test bed for designated MDS elements. The MDIOC supports MDS test events based on the Integrated Master Test Plan (IMTP). It supports MDS Critical Engagement Conditions testing and analysis through the operation of the Test Execution Control node for distributed MDS ground tests. During system flight tests, the MDIOC provides infrastructure (power; Heating, Ventilation and Air Conditioning; and communications) support to the Flight Test Director and crew, and ensures the protection of facility and test assets throughout the test window. Further, the MDIOC provides the facilities that support operations of the Missile Defense Element, manned by the U.S. Army 100th Missile Defense Brigade, the United States Northern Command (USNORTHCOM) C2BMC Command and Control Center (CCC), the United States Strategic Command's (USSTRATCOM's) Joint Functional Component Command-Integrated Missile Defense (JFCC-IMD) and the Missile Defense Agency (MDA) Warfighter Support Center. In addition, the MDIOC supports the MDA Operations Support Center, which provides situational awareness on the health and status of the end-to-end MDS, and provides network subject matter expertise and technical reach back for the program elements and Combatant Commanders. The MDIOC hosts MDS wargames and exercises in support of the warfighter, and delivers the requisite infrastructure to integrate the modeling and simulation assets that form system-level constructive simulations for full-envelope MDS performance assessments, with surrogate capability for MDS ground tests. The MDIOC maintains a technical repository of MDS Implementation Architectures for real-time operations and configuration control; provides state change management and asset management technical support for the BMDS; and provides the technical environment for BMDS Watch Officers, Safety Officers, and Information Assurance Officers to perform their assigned duties. The MDIOC also supports the operations of the Joint Early Warning Laboratory (JEWL), which provides USSTRATCOM with quick response analyses of real-world launches, and rapid anomaly identification and resolution.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Infrastructure Systems and Support	16.029	18.496	18.476
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: RECURRING: MDIOC Communications and Special Purpose Processing Node (SPPN): - Establish a DoD compliant SPPN capable of meeting the unique network and data center services required to develop and deploy a layered BMDS to defend the United States - Provide distinctive specifications and provisioning requirements associated with the MDA Research, Development, Test and Evaluation (RDT&E) Mission - Provide capabilities that dynamically interconnect and integrate multiple RDT&E systems to large data sets, and enable collaboration in near real-time with National Research Laboratories and Test Ranges; and Defense Industrial Base industry partners throughout the BMDS acquisition lifecycle - Construct the SPPN infrastructure with routers, switches, firewalls, and intrusion detection systems that provide IT support to over 10,500 MDA classified/unclassified users worldwide - Provide network operations and network monitoring; development of detailed solutions, designs, and plans; Disaster Recovery and Continuity of Operations rehearsals; internet access management; and web filtering - Sustain core communications distribution services across the MDA Enterprise - Plan, engineer, and implement sustainment projects for general IT services and business systems consistent with the IT architecture roadmap - Acquire and distribute mission critical unclassified and secure communication capability to resident MDA elements/components and BMDS and Warfighter operational elements. - Provide computer hosting of specified threat models and support the integration of other threat tools as required. End User Support: - Sustain End User core service support via an Integrated Service Desk 24 hours a day, 7 days a week, 365 days a year for administrative and business information systems for unclassified and classified users - Monitor networks for user compliance with DoD policies and report incidents - Maintain Printing and Copy Services - Sustain email services (Exchange servers, BlackBerry Enterprise Services servers and archiving storage area networks) - Sustain file services (file servers and storage area networks) - Maintain Directory Services (Active Directory and domain controller servers)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Maintain Authentication services (Public Key Infrastructure/Common Access Card) - Maintain current hardware and software licenses for IT operational systems - Maintain IT life-cycle asset management of end user devices (desktops, laptops, monitors, printers, thin clients, and BlackBerrys) Hardware and Software Asset Management: - Manage government property and IT hardware and software in accordance with the Federal Acquisition Regulations (FAR)/DoD FAR Supplements (DFARs) to include accountability, reporting, warehouse management, asset transportation and excess asset management - Maintain an inventory of IT hardware and software assets connected or used in the Unclassified Local Area Network (ULAN), Classified Local Area Network (CLAN), Secret Internet Protocol Router Network (SIPRNET) and Top Secret/Special Compartmented Information (TS/SCI) networks - Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Facilities and Maintenance	10.793	14.395	12.417
Articles:	-	-	-
Description: RECURRING: Host Tenant Support (Electrical, Gas, Sewer, Water, Steam, Chilled Water, Waste Water, Landscaping, Refuse Removal, and Communications Support): - Procure utility services through 50th Air Force Space Wing (Host Base) - Sustain utility infrastructure and delivery systems Environmental, Safety and Occupational Health (ESOH): - Maintain and update the program accident prevention plan - Provide required industrial safety training to facility services personnel - Procure and distribute personal protection equipment for contracted activities			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Ensure compliance with Hazardous Waste, Hazardous Material Recycling, and National Environmental Policy Act (NEPA) programs - Conduct recurring safety and environmental audits Facilities Operations and Sustainment: - Provide 24 hours a day, 7 days a week, 365 days a year, facility maintenance break/fix response for all facility systems (electrical; Heating, Ventilation, and Air Conditioning; plumbing; locksmith) with a response time of 15 minutes after normal duty hours - Conduct preventative maintenance inspections (PMIs) for all building systems Facilities Engineering: - Conduct Management Process Facility Installation Standard Audits - Provide risk management analysis and mitigation plans - Maintain infrastructure drawings and configuration management databases - Develop and document facility long range planning programming - Provide consulting services, preliminary designs and engineering rough order of magnitude estimates for required infrastructure buildout changes Missile Defense Integration and Operations Center (MDIOC) Operating Expenses: - Lease General Services Administration (GSA) vehicles and a commercial warehouse - Calibration of measuring and monitoring equipment - Repair of classified and unclassified networks Facility Services: - Provide custodial services for over 675,000 square feet of floor space in Buildings 720 and 730 - Provide Copy Center and Shuttle Services for over 2,000 personnel - Provide in and out of civilian and contractor support services personnel - Conduct personnel moves to include cubicle and workstation setup, teardown, and reconfiguration - Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects reductions in Facilities and Maintenance due to contract efficiencies on the Integrated Research and Development Enterprise Solutions (IRES) Contract.			
Title: Engineering and Event Services	9.690	11.778	13.951
Articles:	-	-	-
Description: RECURRING: - Provide Mission Assurance by ensuring the successful execution of Concurrent Test, Training, and Operations (CTTO) activities at the MDIOC facility - Ensure independent verification, and coordinate customer validation of all activities, work products and requirements fulfilled by MDIOC Engineering - Provide Risk Management by identifying, assessing, and prioritizing risks. Coordinate resources to minimize, monitor and control the probability and impact of events. Develop strategies to manage threats, including avoidance, reduction, transfer and retention - Ensure Coordination and Integration through a proactive approach of sharing critical information necessary for the successful conduct of CTTO activities in a dynamic environment - Provide Systems Engineering by developing effective solutions through a structured, repeatable process for MDIOC engineering activities. Provide governance and training to stakeholders, enforce policy, establish and maintain a unified board structure for the vetting and implementation of requirements - Ensure Configuration Management so that CTTO events are not disrupted by multiple competing activities - Maintain the Technical Baseline to establish a common reference, and implement a formalized process that provides stability across the MDIOC - Provide Change Management to the Technical Baseline, IT, and MDIOC physical infrastructure. Research how any changes may affect CTTO activities, and determine when change is least likely to impact key functionality. Ensure all changes, across the technical baseline, are clearly recorded and identified on a near-real-time basis - Provide effective requirements management by documenting decisions and information generated during requirements development in conjunction with the design solution processes			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide Event Architecture and Engineering Design by coordinating design and implementation of technical architectures for all major MDIOC hosted/supported CTTO activities. Maintain a repository of architectures for real-time configuration management - Provide cradle to grave event management for MDIOC supported CTTO events - Provide a Mission Planning Element to oversee the event support life cycle provided by the MDIOC engineering and event support platform. Ensure the fulfillment of technical, personnel, facility, and cybersecurity requirements - Provide a Mission Execution Element to ensure asset protection and incident response for all MDIOC supported CTTO events. - Ensure Organizational Integration by establishing and enforcing seamless integration across the MDIOC. Provide a repeatable process for information sharing and coordination - Provide Cybersecurity to ensure the protection of MDIOC networks, computers, programs and data from attack, damage or unauthorized access - Provide Contract Program Management including business, finance, contract administration and management. Identify and manage cross-project dependencies. Conduct activities within established cost, schedule, and performance parameters - Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY2020 to FY2021 provides increased rigor in mission assurance and configuration management as part of the integrated research and development enterprise solutions (IRES) contract.			
Title: Operations and Sustainment	4.083	4.934	4.198
Articles:	-	-	-
Description: RECURRING: - Includes Civilian and Contract Service Support for operations and sustainment of all Missile Defense Integration and Operations Center (MDIOC) activities contributing to the mission execution platform - Provide quality event planning, coordination, logistics, security access and host support for all MDIOC events and visitors - Deliver integrated service coordination for all MDIOC event and protocol support			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Training and Travel - Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Infrastructure Systems Repair, Sustainment, and Critical Upgrades	4.522	3.500	3.477
Articles:	-	-	-
Description: RECURRING: - Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity upgrade to improve mission assurance to critical mission areas within Building 720; Fire Suppression System Compliance Project - Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	45.117	53.103	52.519

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Integrated Research and Development for Enterprise Solutions (IRES) Contract is the major performing integrated contract. The acquisition strategy for MDIOC mission execution is to employ a contract to perform designated integration and sustainment tasks to conduct BMDS Research, Development, Test and Evaluation (RDT&E). The MDIOC is operated by missile defense subject matter experts composed of government, military, civilian personnel, MDIOC Contract Support Services, and major defense contractors.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Infrastructure Systems and Support - Infrastructure Systems/Support	C/CPIF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	1.000	0.000		18.496	Nov 2019	18.476	Dec 2020	-		18.476	Continuing	Continuing	Continuing
Infrastructure Systems and Support - MDIOC JRDC/ IRES	C/CPAF	MDIOC/Northrop Grumman Mission Systems : Colorado Springs, CO	174.776	16.029	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Custodial/ Mailroom/Drivers	C/FFP	MDIOC/Ability One/ Venturi : Colorado Springs, CO	5.537	1.205	Dec 2018	1.992	Dec 2019	2.032	Dec 2020	-		2.032	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC GSA / Leases / Calibration	MIPR	Various (GSA, Warehouses) : Colorado Springs, CO	7.701	0.643	Nov 2018	0.260	Oct 2019	0.278	Nov 2020	-		0.278	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC IRES	C/CPIF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	7.880	5.393	Nov 2018	8.347	Jan 2020	6.257	Dec 2020	-		6.257	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC MIPRs	C/FFP	MDIOC/Misc : Colorado Springs, CO	93.364	0.276	Oct 2018	0.424	Nov 2019	0.405	Nov 2020	-		0.405	Continuing	Continuing	Continuing
Facilities and Maintenance - MDIOC Utilities	MIPR	50th Space Wing : Schriever AFB, CO	23.320	3.276	Oct 2018	3.372	Oct 2019	3.445	Oct 2020	-		3.445	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Event Services - MDIOC IRES	C/CPAF	MDIOC /Jacobs Technology Inc. : Colorado Springs, CO	74.026	9.690	Nov 2018	11.778	Nov 2019	13.951	Nov 2020	-		13.951	Continuing	Continuing	Continuing
Operations and Sustainment - Civilian Salaries	Allot	MDIOC : Colorado Springs, CO	26.422	2.184	Oct 2018	2.864	Oct 2019	2.391	Oct 2020	-		2.391	Continuing	Continuing	Continuing
Operations and Sustainment - Support Services	C/CPFF	MiDAESS/TEAMS Multi : Colorado Springs, CO	20.958	1.849	Nov 2018	2.020	Oct 2019	1.757	Oct 2020	-		1.757	Continuing	Continuing	Continuing
Operations and Sustainment - Travel and Training	Allot	MDIOC : Colorado Springs, CO	0.753	0.050	Nov 2018	0.050	Nov 2019	0.050	Oct 2020	-		0.050	Continuing	Continuing	Continuing
Infrastructure Systems Repair, Sustainment, and Critical Upgrades - MDIOC IRES	C/CPAF	MDIOC/Jacobs Technology Inc. : Colorado Springs, CO	15.484	4.522	Jan 2019	3.500	Jan 2020	3.477	Dec 2020	-		3.477	Continuing	Continuing	Continuing
		Subtotal	451.221	45.117		53.103		52.519		-		52.519	Continuing	Continuing	N/A

Remarks

Funds for utilities and base communications are specified in the Inter-service Support Agreement with the 50th Space Wing. In addition, the Missile Defense Integration and Operations Center (MDIOC) provides Technical Contract Support Services employees, for MDIOC operations and oversight of the Integrated Research and Development for Enterprise Solutions (IRES) contract, as well as funding for IRES work as required by the government.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	451.221	45.117		53.103		52.519		-		52.519	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant)(FY 2019)	✦	✦	✦	✦																								
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)	✧	✧	✧	✧	✧	✧																						
Replace/repair drainage/sewer system (Phase III -Building 720)	✦	✦	✦	✦																								
Fire Suppression System Compliance Project (two quadrants)(FY 2019)		✦	✦	✦																								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2020					✧	✧	✧	✧																				
Install Ambient Air Economizer (greening initiative) 2020					✧	✧	✧	✧																				
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops) 2020					✧	✧	✧	✧																				
Fire Suppression System Compliance Project (two quadrants)(FY 2020)						✧	✧	✧																				
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2021									✧	✧	✧	✧																
Fire Suppression System Compliance Project (two quadrants)(FY 2021)										✧	✧	✧																
Availability/Arc Flash/Short Circuit Coordination Study 2021											✧																	
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2022													✧	✧	✧	✧												
Fire Suppression System Compliance Project (two quadrants) (FY2022)													✧	✧	✧	✧												
Fire Suppression System Compliance Project (two quadrants) (FY2023)																	✧	✧	✧	✧								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2023																	✧	✧	✧	✧								
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2024																					✧	✧	✧	✧				
Fire Suppression System Compliance Project (two quadrants) 2024																					✧	✧	✧	✧				

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2025							✧ ✧ ✧ ✧
Fire Suppression System Compliance Project (two quadrants) 2025							✧ ✧ ✧ ✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant)(FY 2019)	1	2019	4	2019
Re-purpose basement space to accommodate IT and Infrastructure support personnel (Phase IV)	1	2019	2	2020
Replace/repair drainage/sewer system (Phase III -Building 720)	1	2019	4	2019
Fire Suppression System Compliance Project (two quadrants)(FY 2019)	2	2019	4	2019
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2020	1	2020	4	2020
Install Ambient Air Economizer (greening initiative) 2020	1	2020	4	2020
Replace Heating, Ventilation, and Air Conditioning (HVAC) Chilled Water Pumps (North and South Loops) 2020	1	2020	4	2020
Fire Suppression System Compliance Project (two quadrants)(FY 2020)	2	2020	4	2020
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2021	1	2021	4	2021
Fire Suppression System Compliance Project (two quadrants)(FY 2021)	2	2021	4	2021
Availability/Arc Flash/Short Circuit Coordination Study 2021	3	2021	3	2021
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2022	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2022)	1	2022	4	2022
Fire Suppression System Compliance Project (two quadrants) (FY2023)	1	2023	4	2023
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2023	1	2023	4	2023
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2024	1	2024	4	2024

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD22 / *Missile Defense Integration and Operations Center (MDIOC)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Fire Suppression System Compliance Project (two quadrants) 2024	1	2024	4	2024
Heating, Ventilation, and Air Conditioning end-of-life component replacement and capacity for Building 720 (one quadrant) 2025	1	2025	4	2025
Fire Suppression System Compliance Project (two quadrants) 2025	1	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC22: *Cyber Operations*	2.616	0.595	0.634	0.638	-	0.638	0.650	0.663	0.684	0.698	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The Missile Defense Integration and Operations Center (MDIOC) conducts Cyber Defensive Operations through Key Management Infrastructure and Information Assurance Training which interfaces with the Information Technology/Information Assurance Enterprise to provide secure communications, network health and status monitoring, mission critical restoral capability, and technical expertise.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Cyber Defensive Operations	0.595	0.634	0.638
Articles:	-	-	-

Description: RECURRING:
The Missile Defense Integration and Operations Center (MDIOC) conducts Defensive Cyber Operations in the following categories:
Key Management Infrastructure
- Interface with the Information Technology/Information Assurance Enterprise to provide for the generation, production, control and distribution, and training for utilizing the keying material used with the Agency's cryptographic devices
Information Assurance Training
- Maintain an Information Assurance (IA) certified workforce through continuous IA training as required by DoD Directive 8570

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE

FY 2021 Plans:
- SEE ABOVE

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A			
Accomplishments/Planned Programs Subtotals	0.595	0.634	0.638

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cyber Defensive Operations - Cyber Defensive Operations	C/CPAF	MDIOC/IRES : Jacobs Technology Inc.	2.616	0.595	Jan 2019	0.634	Jan 2020	0.638	Jan 2021	-		0.638	Continuing	Continuing	Continuing
		Subtotal	2.616	0.595		0.634		0.638		-		0.638	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.616	0.595		0.634		0.638		-		0.638	Continuing	Continuing	N/A

Remarks
N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC22 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MC22 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC22 Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	18.867	5.977	2.424	2.199	-	2.199	2.211	2.310	3.060	3.346	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	5.977	2.424	2.199
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	5.977	2.424	2.199

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	0.527	0.340	Jul 2019	0.036	Jul 2020	0.000		-		0.000	0.241	1.144	0.000
Program Wide Support - Agency Operations and Support Services	Reqn	Various : Multi: AK, AL, CA, CO, VA	12.831	2.437	Aug 2019	2.388	Oct 2019	0.066	Oct 2020	-		0.066	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services.	C/CPFF	Various : Alatec INC, AL, CO, VA	0.198	0.000		0.000		2.133	May 2021	-		2.133	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: CO	0.000	3.200	Dec 2018	0.000		0.000		-		0.000	0.000	3.200	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	5.311	0.000		0.000		0.000		-		0.000	0.000	5.311	0.000
		Subtotal	18.867	5.977		2.424		2.199		-		2.199	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	18.867	5.977		2.424		2.199		-		2.199	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603904C / *Missile Defense Integration and Operations Center (MDIOC)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603906C / *Regarding Trench*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	78.961	16.512	22.424	11.863	-	11.863	12.192	12.424	12.802	13.067	Continuing	Continuing
MD35: *Regarding Trench*	78.961	16.512	22.424	11.863	-	11.863	12.192	12.424	12.802	13.067	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	16.916	22.424	12.012	-	12.012
Current President's Budget	16.512	22.424	11.863	-	11.863
Total Adjustments	-0.404	0.000	-0.149	-	-0.149
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.404	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.149	-	-0.149

Change Summary Explanation

Further program details are reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	688.891	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
MX46: *Sea Based X-Band Radar Development Support*	664.928	119.789	123.089	113.618	-	113.618	130.537	126.222	138.132	160.708	Continuing	Continuing
MD40: *Program-Wide Support*	23.963	6.111	5.067	4.700	-	4.700	5.394	5.288	7.450	9.272	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects completion of vessel 5-year recertification and a major in port maintenance period.

A. Mission Description and Budget Item Justification

The Sea Based X-Band Radar (SBX) is an advanced X-band radar that provides the capability for mid-course acquisition, tracking, discrimination and hit-assessment of missile threats. The SBX radar is mounted on a mobile, ocean-going, semi-submersible platform, enabling it to cover any region of the globe. The SBX supports the Missile Defense System (MDS) Homeland Defense mission by tracking and discriminating sophisticated Intercontinental Ballistic Missile (ICBM) threats.

SBX operates at sea for MDS flight and ground test participation or in an active, operational status when indications and warnings signal the need for enhanced discrimination. The SBX is located in a Pacific port when not required at sea. The SBX maintains vessel certifications for operations at sea as well as software compatibility with the MDS.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	136.715	128.156	119.452	-	119.452
Current President's Budget	125.900	128.156	118.318	-	118.318
Total Adjustments	-10.815	0.000	-1.134	-	-1.134
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.816	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-9.999	0.000	-1.134	-	-1.134

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*

Change Summary Explanation

Decrease in FY 2019 reflects the realignment to Agency priority - Homeland Defense Radar - Hawaii contract award funding.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MX46: *Sea Based X-Band Radar Development Support*	664.928	119.789	123.089	113.618	-	113.618	130.537	126.222	138.132	160.708	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of vessel 5-year recertification and a major in port maintenance period.

A. Mission Description and Budget Item Justification

This project provides developmental operations and support of the SBX Radar and its four major sub-systems: the self-propelled vessel; the X-Band Radar (XBR); the In-Flight Interceptor Communications System Data Terminal; and the communications network. Developmental operations and support activities include operation and sustainment of the vessel, developmental operation and sustainment of the XBR, limited XBR software support and vessel and shore side security. The FY 2021 budget reflects the continued development required to deliver MDS enhanced discrimination capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Vessel Operations and Support	57.162	67.563	64.347
Articles:	-	-	-
Description: Vessel Operations and Support provides for sustainment of the SBX vessel for full operations. This effort maintains annual surveys and U.S. Coast Guard Certifications to ensure readiness for operational contingencies, provides for resupply of SBX, and conducts in port and underway maintenance. The SBX participates in MDS ground tests and flight tests per the Integrated Master Test Plan (IMTP). This effort also provides force protection for SBX and military flight deck upgrades, future air charters, and Variable Speed Drive (VSD) upgrades. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of vessel 5-year recertification and a major in port maintenance period.			
Title: XBR Operations and Support	62.627	55.526	49.271

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-
Description: This effort operates and sustains the XBR at full operations, operates and sustains SBX communications systems, performs mission integration functions, and provides support for contingency operations with manning for improved readiness enabling rapid response time from notification to underway. XBR Operations and Support maintains limited software sustainment for system capability with the MDS and fields additional XBR capability to the Warfighter with the MDS capability increment. This effort also provides precision track, discrimination, and hit assessment for engagement support in MDS ground tests and flight tests per the approved IMTP. Additional development efforts include continuing XBR x86 software development and testing for initial fielding to increase the XBR processing capabilities, and Liquid Conditioning and Circulations System (LCCS) upgrades. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of a major in port maintenance period.			
Accomplishments/Planned Programs Subtotals	119.789	123.089	113.618

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603891C: *Special Programs - MDA*	418.722	512.098	420.216	-	420.216	448.064	386.824	313.780	301.189	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Control, Battle Management & Communication											
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing

Remarks

D. Acquisition Strategy

SBX is contractor operated and maintained through a variety of contracts between the Navy and MDA. SBX-1 Vessel Management and Security contracts are managed by Military Sealift Command. The SBX radar is operated and maintained on contracts managed by MDA.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Vessel Operations and Support - Force Protection	MIPR	Military Sealift Command : VA	0.000	5.700	Feb 2019	6.381	Oct 2019	6.482	Oct 2020	-		6.482	Continuing	Continuing	Continuing
Vessel Operations and Support - Fuel	MIPR	Military Sealift Command : VA	55.390	11.965	Jan 2019	8.256	Oct 2019	10.535	Oct 2020	-		10.535	Continuing	Continuing	Continuing
Vessel Operations and Support - Navy Program Management Office	MIPR	Military Sealift Command : VA	6.731	1.189	Oct 2018	2.639	Oct 2019	2.910	Oct 2020	-		2.910	Continuing	Continuing	Continuing
Vessel Operations and Support - Navy Transition Office	MIPR	US Navy : AL	5.732	0.000		0.000		0.000		-		0.000	0.000	5.732	0.000
Vessel Operations and Support - Operational Support Vessel (OSV Resupply)	MIPR	Military Sealift Command : VA	28.299	17.441	Feb 2019	17.412	Oct 2019	15.009	Oct 2020	-		15.009	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Operations & Support (Vessel)	MIPR	Military Sealift Command : VA	189.661	11.000	Oct 2018	23.856	Oct 2019	20.598	Oct 2020	-		20.598	Continuing	Continuing	Continuing
Vessel Operations and Support - SBX Vessel Maintenance	MIPR	Tote : HI/NJ	36.963	0.000		0.000		0.000		-		0.000	0.000	36.963	0.000
Vessel Operations and Support - Vessel Mission Integration	C/FFP	Gryphon Tech. : AL/ HI	58.348	9.867	Dec 2018	9.019	Dec 2019	8.813	Dec 2020	-		8.813	0.000	86.047	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
XBR Operations and Support - Civilian Salaries/ Travel	Allot	MDA : Various	0.000	0.000		2.038	Oct 2019	1.893	Oct 2020	-		1.893	Continuing	Continuing	Continuing
XBR Operations and Support - Contract Support Services	Various	MDA : Various	0.000	0.000		1.200	Oct 2019	1.542	Oct 2020	-		1.542	Continuing	Continuing	Continuing
XBR Operations and Support - FFRDC/UARC	MIPR	MITRE : AL	0.000	0.000		0.000		0.653	Nov 2020	-		0.653	Continuing	Continuing	Continuing
XBR Operations and Support - Network And Infrastructure Services	C/CPAF	Jacobs Engineering : AL, CO, HI, NM, VA	0.000	0.420	Jan 2019	0.000		0.439	Jan 2021	-		0.439	Continuing	Continuing	Continuing
XBR Operations and Support - SBX Communications Support	SS/CPIF	Boeing : AL/HI	12.841	2.700	Jan 2019	1.579	Jan 2020	2.520	Jan 2021	-		2.520	Continuing	Continuing	Continuing
XBR Operations and Support - XBR Operations & Support	SS/CPIF	Raytheon : AL/AK/HI	270.963	59.507	Dec 2018	50.709	Dec 2019	42.224	Dec 2020	-		42.224	Continuing	Continuing	Continuing
		Subtotal	664.928	119.789		123.089		113.618		-		113.618	Continuing	Continuing	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	664.928	119.789		123.089		113.618		-		113.618	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GTI-19 Sprint 3 (BMDS Ground Test)				✦																								
GTI-07c (N/I) (BMDS Ground Test)					✦																							
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)							△																					
GTD-08a (N/I) (BMDS Ground Test)										✧	✧																	
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)													✧															
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)															✧													
GTD-08b (N/I) (BMDS Ground Test)																✧												
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)																		✧	✧									
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)																			✧	✧								
GTD-11 (N/I) (BMDS Ground Test)																				✧								

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MX46 / *Sea Based X-Band Radar Development Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-19 Sprint 3 (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020
GTD-08a (N/I) (BMDS Ground Test)	2	2021	3	2021
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)	1	2022	1	2022
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)	3	2022	3	2022
GTD-08b (N/I) (BMDS Ground Test)	4	2022	4	2022
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	2	2023	3	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	23.963	6.111	5.067	4.700	-	4.700	5.394	5.288	7.450	9.272	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency program elements (PEs) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	6.111	5.067	4.700
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	6.111	5.067	4.700

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	9.154	0.000		0.000		0.000		-		0.000	0.000	9.154	0.000
Program Wide Support - Program Wide Support - Agency Operations Management	Various	Various Multi: : AK, AL, CA, CO, VA	1.901	0.093	Jul 2019	0.076	Jul 2020	0.142	Jul 2021	-		0.142	Continuing	Continuing	Continuing
Program Wide Support - Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	MDA Multi : AK, AL, CA, CO, VA	0.000	0.000		0.000		1.606	Jan 2021	-		1.606	Continuing	Continuing	Continuing
Program Wide Support - Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various Multi: : AK, AL, CA, CO, VA	12.690	6.018	Mar 2019	4.991	Nov 2019	2.799	Nov 2020	-		2.799	Continuing	Continuing	Continuing
Program Wide Support - Program Wide Support - Agency Operations and Support Services (FFP)	C/FFP	Various Multi: : VA, WA	0.218	0.000		0.000		0.153	Jun 2021	-		0.153	Continuing	Continuing	Continuing
		Subtotal	23.963	6.111		5.067		4.700		-		4.700	Continuing	Continuing	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	23.963	6.111		5.067		4.700		-		4.700	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603907C / *Sea Based X-Band Radar (SBX)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,558.391	300.000	300.000	300.000	-	300.000	300.000	300.000	300.000	300.000	Continuing	Continuing
MD26: *Arrow Weapon System*	511.645	163.000	159.000	173.000	-	173.000	173.000	173.000	173.000	173.000	Continuing	Continuing
MD34: *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS))*	1,046.746	137.000	141.000	127.000	-	127.000	127.000	127.000	127.000	127.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Content supports expected contributions from Israel per international agreements.

A. Mission Description and Budget Item Justification

Since 1986, the United States (U.S.) and the State of Israel have cooperated on missile defense. Currently, the Missile Defense Agency (MDA) has two major projects with Israel to develop and improve their indigenous capability to defend against short and medium range ballistic missiles. These include the Arrow Weapon System (AWS) (MD26) and the Short-Range Ballistic Missile Defense, also known as the David's Sling Weapon System (MD34). Within these projects MDA along with Israeli Missile Defense Organization (IMDO) develops and produces weapon systems, conducts tests, and exercises interoperability between U.S. Ballistic Missile Defense System (BMDS) and the Israeli Missile Defense Architecture.

The U.S. and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which "Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year." These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	300.000	300.000	300.000	-	300.000
Current President's Budget	300.000	300.000	300.000	-	300.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD26: *Arrow Weapon System*	511.645	163.000	159.000	173.000	-	173.000	173.000	173.000	173.000	173.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli Arrow Weapon System Program.

A. Mission Description and Budget Item Justification

Israeli Arrow Weapon System (AWS): This system includes block upgrades to the AWS components which enhances capabilities against evolving medium range threats by increasing the total defended area. AWS elements include the Arrow-2 and Arrow-3 missiles and launchers, Citron Tree Battle Management Center (BMC), Green Pine (GP) and Super Green Pine (SGP) Radars, and the Hazelnut Tree Launcher Control Center (LCC).

Arrow Block 5 development incorporates a Long Range Detection Suite (LRDS) that consists of an unmanned aerial vehicle (UAV) Airborne Early Warning System (ABEWS) and Sharp Eye Radar for increased sensor range, early detection and enhanced raid size capacity. In addition, a new variant of Arrow-2 (M6) interceptor will be developed. The program also includes the continued development of Arrow's interoperability with U.S. BMDS.

The U.S. and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which "Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year." These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Arrow Weapon System	156.638	153.940	167.940
Articles:	-	-	-
Description: The Arrow Weapon System (AWS) continues Block 5 spiral development and target development. Included is the integration of Block 5 assets, which consists of the Arrow-3 missile, launcher, Long Range Detection Suite (LRDS) and Arrow-2 (M6) interceptor. Continue proven Interoperability with U.S. Assets and enhancements to existing AWS System Components. Specific and/or unique planned accomplishments to each FY are as follows:			
FY 2020 Plans: -Conduct Block 5 Flight Test proving improved system performance			
FY 2021 Plans: -Conduct Block 5 Flight Test proving improved system performance			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Ground Test Integrated Israel- GTI-ISR 21 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding profile mirrors the Program Funding Baseline that has been coordinated with IMDO based on the Strategic Plan of the MOU between Israel and the U.S. Program increase will be for M6 development.			
Title: Israeli Test Bed (ITB)	3.535	3.535	3.535
Articles:	-	-	-
Description: The Israeli Test Bed (ITB) provides experiments to evaluate Human Machine Interface (HMI) battle management and integration of Block 5 AWS Techniques Tactics and Procedures (TTPs) and CONOPS. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Israeli Systems Architecture and Integration (ISA&I)	2.827	1.525	1.525
Articles:	-	-	-
Description: The Israeli Systems Architecture and Integration (ISA&I) conducts studies to assess Israel's future 2025 Missile Defense Architecture. This identifies the preferred missile defense architecture and reference threat for 10-15 year future epoch and interoperability special studies on regional threats and growth path options. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:*** -SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Funding profile mirrors the Program Funding Baseline that has been coordinated with IMDO based on the Strategic Plan of the MOU between Israel and the U.S. Decrease reflects level of effort required and negotiated with IMDO.			
Accomplishments/Planned Programs Subtotals	163.000	159.000	173.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The MDA - U.S. Israeli Cooperative Program Office jointly manages the Arrow Program with IMDO to ensure that all systems are delivered with quality on time, on budget, and meet the needs of the warfighter. The program funding is equitably funded between the U.S. and Israel with Israel providing matching contributions. However, a portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMDO or MDA dependent on what is most advantageous to the Joint Governments. In regard to AWS, IMDO contracts on behalf of U.S. government with Israel Aerospace Industries (IAI). IAI subcontracts with Israeli and U.S. companies. For the ITB, the MDA contracts directly with Elbit Systems, Ltd. while IMDO provides an equitable share of the funding to the U.S. Finally, MDA provides funding and contracts directly with WALES, Ltd. for the ISA&I program.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Arrow Weapon System - AWS	C/CPFF	Israel Aerospace Industries (IAI) : Israel	450.755	156.638	Dec 2018	153.940	Dec 2019	167.940	Dec 2020	-		167.940	Continuing	Continuing	Continuing
Israeli Test Bed (ITB) - ITB	C/FFP	Elbit Systems : Israel	35.350	3.535	Nov 2018	3.535	Dec 2019	3.535	Nov 2020	-		3.535	Continuing	Continuing	Continuing
Israeli Systems Architecture and Integration (ISA&I) - ISA&I	C/FFP	Wales LTD : Israel	25.540	2.827	Oct 2018	1.525	Dec 2019	1.525	Dec 2020	-		1.525	Continuing	Continuing	Continuing
		Subtotal	511.645	163.000		159.000		173.000		-		173.000	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	511.645	163.000		159.000		173.000		-		173.000	Continuing	Continuing	N/A

Remarks

Contract cost reflect U.S. contribution only.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019	✦	✦	✦	✦																								
Israeli Test Bed Experiments FY 2019	✦	✦	✦	✦																								
Arrow Weapon System Flight Test (1 of 3) FY 2019	✦	✦	✦	✦																								
Arrow Weapon System Flight Test (2 of 3) FY 2019	✦	✦	✦	✦																								
Arrow Weapon System Flight Test (3 of 3) FY 2019	✦	✦	✦	✦																								
Israeli Test Bed Experiments FY 2020					✧	✧	✧	✧																				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020					✧	✧	✧	✧																				
Arrow Weapon System Flight Test FY 2020					✧	✧	✧	✧																				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021									✧	✧	✧	✧																
Israeli Test Bed Experiments FY 2021									✧	✧	✧	✧																
Arrow Weapon System Flight Test FY 2021									✧	✧	✧	✧																
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022													✧	✧	✧	✧												
Israeli Test Bed Experiments FY 2022													✧	✧	✧	✧												
Arrow Weapon System Flight Test FY 2022													✧	✧	✧	✧												
Israeli Test Bed Experiments FY 2023																	✧	✧	✧	✧								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023																	✧	✧	✧	✧								
Arrow Weapon System Flight Test FY 2023																	✧	✧	✧	✧								
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2024																					✧	✧	✧	✧				
Israeli Test Bed Experiments FY 2024																					✧	✧	✧	✧				
Arrow Weapon System Flight Test FY 2024																					✧	✧	✧	✧				
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2025																									✧	✧	✧	✧
Israeli Test Bed Experiments FY 2025																									✧	✧	✧	✧
Arrow Weapon System Flight Test FY 2025																									✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (1 of 3) FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (2 of 3) FY 2019	1	2019	4	2019
Arrow Weapon System Flight Test (3 of 3) FY 2019	1	2019	4	2019
Israeli Test Bed Experiments FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2020	1	2020	4	2020
Arrow Weapon System Flight Test FY 2020	1	2020	4	2020
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2021	1	2021	4	2021
Israeli Test Bed Experiments FY 2021	1	2021	4	2021
Arrow Weapon System Flight Test FY 2021	1	2021	4	2021
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2022	1	2022	4	2022
Arrow Weapon System Flight Test FY 2022	1	2022	4	2022
Israeli Test Bed Experiments FY 2023	1	2023	4	2023
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2023	1	2023	4	2023
Arrow Weapon System Flight Test FY 2023	1	2023	4	2023
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2024	1	2024	4	2024
Israeli Test Bed Experiments FY 2024	1	2024	4	2024
Arrow Weapon System Flight Test FY 2024	1	2024	4	2024
Israeli Test Bed Exercise to include Ground Test (GT) Support FY 2025	1	2025	4	2025
Israeli Test Bed Experiments FY 2025	1	2025	4	2025

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD26 / *Arrow Weapon System*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Arrow Weapon System Flight Test FY 2025	1	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD34: *Short Range Ballistic Missile Defense (SRBMD) (David's Sling Weapon System (DSWS))*	1,046.746	137.000	141.000	127.000	-	127.000	127.000	127.000	127.000	127.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This project encompasses the Missile Defense Agency's (MDA) U.S.-Israeli cooperative program for the Israeli David's Sling Weapon System Program.

A. Mission Description and Budget Item Justification

Short Range Ballistic Missile Defense (SRBMD): SRBMD, also known as the David`s Sling Weapon System (DSWS), is designed to counter short range rockets, cruise missiles, and tactical ballistic missiles and is integrated into the Israeli Missile Defense Architecture. The DSWS includes the Stunner Interceptor, Missile Firing Unit (MFU), Multi-Mission Radar (MMR), Launch Site Controller (LSC), Data Link (DL), Elevated Sensor (ES), and the Golden Almond Battle Management Center (BMC).

The United States (U.S.) and State of Israel entered into a Memorandum of Understanding (MOU) on September 2016, in which "Such funding, should over a ten year period beginning in FY 2019 and ending in FY 2028, be provided at a level of $500 million per year." These funds will be distributed between the Israeli Programs in Research Development Test & Evaluation (RDT&E) and Procurement Funds.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: SRBMD Program	137.000	141.000	127.000
Articles:	-	-	-
Description: The scope of the DSWS covers system development, testing, and integration of spiral software development for Blocks 2-3. Block 2 will add capability to defend against medium range and cruise missiles. Block 3 will provide robust defense capability and add significant detection capability to the Israeli Air Defense Architecture. Recurring Planned Accomplishments include: - Conduct Testing of the DSWS - Continue Blocks 2 and 3 Spiral Development of the DSWS - Establish and Continue Interoperability with Israeli Air Missile Defense Network Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Continue development of the Next Generation Multi-Mission Radar -Develop enhanced Stunner capability ***FY 2021 Plans:*** -Complete DSWS Block 2 Development -Continue Block 3 enhanced DSWS capability development -Conduct System Flight Tests ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding profile mirrors the Program Funding Baseline that has been coordinated with IMDO based on the Strategic Plan of the MOU between Israel and the U.S. Delta reflects funding within MOU moved to support M6 Development in AWS.			
Accomplishments/Planned Programs Subtotals	137.000	141.000	127.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The MDA- U.S. Israeli Cooperative Program Office jointly manages the DSWS Program with IMDO to ensure that all systems are delivered with quality on time, on budget, and meet the needs of the warfighter. The program funding is equitably funded between the U.S. and Israel with Israel providing matching contributions. However, a portion of the Israeli cost share comes from non-financial contributions such as previously completed work prior to joint program initiation. Contracts are awarded by IMDO or MDA dependent on what is most advantageous to the Joint Governments. In regard to DSWS, IMDO contracts on behalf of U.S. government with Rafael. Rafael subcontracts with Israeli and U.S. companies.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SRBMD Program - SRBMD Program	C/CPFF	Rafael : Israel	1,046.746	137.000	Dec 2018	141.000	Dec 2019	127.000	Dec 2020	-		127.000	Continuing	Continuing	Continuing
		Subtotal	1,046.746	137.000		141.000		127.000		-		127.000	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,046.746	137.000		141.000		127.000		-		127.000	Continuing	Continuing	N/A

Remarks

Contract cost reflect U.S. contribution only.

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
System Flight Test #6 FY 2019	✦	✦	✦	✦																								
System Flight Test #7 FY 2021									✧	✧	✧	✧																
System Flight Test #8 FY 2022													✧	✧	✧	✧												
System Flight Test #9 FY 2023																	✧	✧	✧	✧								
System Flight Test #10 FY 2024																					✧	✧	✧	✧				
System Flight Test #11 FY 2025																									✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603913C / *Israeli Cooperative Programs*	**Project (Number/Name)** MD34 / *Short Range Ballistic Missile Defense (SRBMD)(David's Sling Weapon System (DSWS))*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
System Flight Test #6 FY 2019	1	2019	4	2019
System Flight Test #7 FY 2021	1	2021	4	2021
System Flight Test #8 FY 2022	1	2022	4	2022
System Flight Test #9 FY 2023	1	2023	4	2023
System Flight Test #10 FY 2024	1	2024	4	2024
System Flight Test #11 FY 2025	1	2025	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	2,370.998	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
MT04: *BMDS Test Program*	2,245.623	465.268	371.710	354.569	-	354.569	361.796	371.778	365.669	385.245	Continuing	Continuing
MC04: *Cyber Operations*	22.251	30.419	12.524	8.706	-	8.706	8.800	8.802	9.069	9.256	Continuing	Continuing
MD40: *Program Wide Support*	103.124	14.605	15.504	15.027	-	15.027	15.314	15.944	20.211	22.760	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from Fiscal Year (FY) 2020 to FY 2021 reflects changes in accordance with the Integrated Master Test Plan (IMTP) and the elimination of the Consolidated Test Center (CTC) from the Agency Program.

The FY 2021 funding request was reduced by $0.4 million during DWR to reduce Facilities Sustainment, Restoration, and Modernization (FSRM) Projects.

The FY 2021 funding request was reduced by $1.245 million during DWR to reduce Civilian Labor.

The FY 2021 funding request was reduced by $1.555 million during DWR to reduce contractor support.

The FY 2021 funding request was erroneously reduced in PE 0603915C Ballistic Missile Defense System (BMDS) Targets by $3.5 million during DWR to reduce Facilities Sustainment Restoration and Modernization (FSRM) Projects. MDA moved reduction to appropriate PE 0603914C Ballistic Missile Defense System (BMDS) Test.

The funding request for FY 2021 includes Joint Emergent Operational Need (JEON) PC-0021 requirements.

A. Mission Description and Budget Item Justification

Missile Defense Agency (MDA) utilizes a disciplined system engineering process to develop and integrate the Ballistic Missile Defense System (BMDS) into an effective, layered defense against ballistic missiles of all ranges during all phases of flight. This process consists of the following steps: Plan, Define, Design, Build, Test and Verify, Assess, and Deliver BMDS Capability, followed by transfer of selected capabilities. The BMDS Test Program Element (PE) is responsible for testing that provides critical data to: determine validity of models and simulations used to verify and assess BMDS capabilities; validate that Elements and Components are properly designed, built, and integrated; and provide confidence that the BMDS will perform as designed. Results from the Test and Verify step provide feedback into the Plan, Define, and Design steps to identify areas for system improvements. Key to the systems engineering process is Modeling and Simulation (M&S), which reflects the integrated operational system's performance. Confidence in M&S is based on a comprehensive Verification, Validation, and Accreditation (VV&A) process. The BMDS Test Program, as documented in the Integrated Master Test Plan (IMTP), has a primary emphasis to provide the data necessary to verify and assess BMDS capabilities

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*

in support of Technical Capability Declarations, and to anchor BMDS M&S. As models are validated and accredited, MDA and the BMDS Operational Test Agency (OTA) Team will utilize these models to assess BMDS capabilities through a campaign of ground testing.

BMDS Test Program Functions include:
- Represent MDA as the single test authority to the test and evaluation community, international cooperative program representatives, and other organization representatives
- Develop and implement MDA test policy, standards, tools, products, and processes to enable effective tests while balancing MDA and element programmatic needs
- Develop an IMTP that compiles all MDA test objectives, test schedules, and funding requirements from the year of execution through the Future Years Defense Program (FYDP) time period and beyond
- Act as the single point of contact in MDA for all external ranges and common test resources
- Provide, maintain, and develop common test resources and infrastructure required to execute tests in the MDA Test Program by leveraging element laboratories, ranges, executing agents, and functional expertise, as applicable
- Certify that test personnel are trained and equipped to conduct safe and effective tests
- Provide test personnel and support services to plan and execute tests
- Collect, archive, and distribute all MDA test data/information

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	515.897	395.924	417.946	-	417.946
Current President's Budget	510.292	399.738	378.302	-	378.302
Total Adjustments	-5.605	3.814	-39.644	-	-39.644
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.814			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.205	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-5.400	0.000	-39.644	-	-39.644

Change Summary Explanation

Increase in FY 2020 reflects Congressional plus up for cybersecurity activities.

Decrease in FY 2021 reflects changes in accordance with the Integrated Master Test Plan (IMTP) and the elimination of the Consolidated Test Center (CTC) from the Agency Program.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT04: *BMDS Test Program*	2,245.623	465.268	371.710	354.569	-	354.569	361.796	371.778	365.669	385.245	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2020 to FY 2021 decrease reflects IMTP changes

A. Mission Description and Budget Item Justification

The Test Program provides consolidated Missile Defense Agency (MDA) capabilities and resources to support the management and execution of Ballistic Missile Defense System (BMDS) and Element-level testing.

The MDA Test Program is responsible for all BMDS testing and relies on BMDS Systems Engineering to provide the system test objectives that define the test architecture by developing, updating, coordinating, and assessing the IMTP. The MDA Test Program plans and executes BMDS test events and develops the necessary test policy, test plans, and test infrastructure to conduct an effective test program. The goals of this budget project are to sustain and improve a robust testing program and to enhance Modeling and Simulation (M&S) efforts to provide, in conjunction with flight and ground testing, confidence to the Combatant Commanders that the missile defense system works.

Activities are grouped into six major areas: 1) Program Planning and Operations; 2) Flight Test; 3) Ground Test; 4) Test Infrastructure; 5) Engineering Test Analysis; and 6) United States Indo-Pacific Command (USINDOPACOM) Joint Emerging Operational Needs (JEON).

Note: MDA has modified the GMD test program to reinforce the Agency's commitment to reducing concurrency risk in the development program and to inform the deployment of GBIs with improved capabilities. Due to the cancellation of the RKV program, the GMD flight Test Program is under review.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Planning and Operations	95.091	95.465	93.402
Articles:	-	-	-
Description: The BMDS Test program is responsible for the following Program Planning and Operational activities: - Provide BMDS Operational Test Agency (OTA) System Team funding for civilian salaries and personnel support of system-level testing and conduct cybersecurity assessments of BMDS. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-92, Sec. 1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DASD(DT&E)) to include planning, coordination, and execution of Cooperative			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Serve as the MDA Test Interface/Liaison to the DOT&E, DASD ((DT&E)), Joint Functional Component Command for Integrated Missile Defense (JFCC IMD), Joint Interoperability Test Command (JITC) and the Service OTAs. - Maintain a professional and diverse civilian workforce for flight and ground test support events. - Establish, maintain and execute the BMDS Test program budget. - Provide Integrated Master Test Plan cost modeling. - Provide day-to-day Test Functional Area (TFA) management. - Provide Test organizational property accountability. - Establish and standardize Test issuance documents. - Provide external interface services to support execution of the Ballistic Missile Defense System (BMDS) test program. - Manage Test contracting and acquisition activities as well as manpower activities ensuring proper integration of contracts, support agreements; oversight and maintenance of the Test Directorate Inter/Intra-agency Acquisition Review (IAR) database. - Provide oversight and coordination of test policy guidance to ensure compliance and strategic synchronization across the Test Directorate and the MDA. - Manage travel, including travel to support IMTP flight and ground test events. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Flight Test	45.181	38.786	15.398
Articles:	-	-	-
Description: The Flight Test Execution program solely reflects the Integrated Master Test Plan (IMTP) cost model. The program integrates, manages, and executes flight tests using certified personnel and standardized processes and products to support Ballistic Missile Defense System (BMDS) fielding to the warfighter. - Develop flight test training requirements for Test Directors and other console operators. - Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-92, Sec. 1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of Flight Tests. - Identify mission risks and implement mitigation practices as required ensuring safe and successful test outcomes. - Provide a Failure Response Team to ensure implementation of the response plan and capture lessons learned for process improvement. - Train test personnel for each flight test and maintain training records for all test personnel. - Train and resource System Mission Managers to lead Integrated Event Test Team mission management and readiness activities across all four test event phases for System and Element flight test and contingency operations. - Complete test planning for BMDS Flight Test events. - Conduct mission planning and range coordination activities; provide communications security equipment and management for BMDS Flight Test events. - Design and develop the Lessons Learned database. - Execute Flight Test events in accordance with the R-4 schedule. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Execute Flight Test events in accordance with the R-4 schedule. ***FY 2021 Plans:*** - Execute Flight Test events in accordance with the R-4 schedule. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP requirements.			
Title: Ground Test	53.148	78.221	61.902
Articles:	-	-	-
Description: The Ground Test Execution program plans, designs, and executes BMDS ground tests in support of flight test risk reduction; BMDS fielding decisions; and Doctrine, Organization, Training, Materiel, Leadership and Education, and Personnel and Facilities (DOTMLPF) assessments. In addition, enables the warfighter to effectively employ, maintain, and sustain the BMDS and participate in the development of future missile defense capabilities through efficient ground testing. - Conduct System Pre-Mission Tests (SPMTs) as required to support BMDS Flight Test Risk Reduction Analysis. - Refine and continue development of the Ground Test Mission Directors, System Mission Manager and Mission Director training plan.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2018, Pub. L. No. 1159, *164, Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments. - Develop and manage the cybersecurity test organization including plans, policy and strategy, resources, and tracking of information and coordinating Cyber test schedules in support of the IMTP. - Execute baseline Ground Tests in accordance with the IMTP. Maintain Ground Test Infrastructure: - Execute ground test planning activities supporting MDA test requirements and priorities to include test design, test integration, digital assessment, and international testing. - Maintain the hardware-in-the-loop (HWIL) Labs and communication test assets. - Maintain Advanced Research Center (ARC) infrastructure and networks, complete accreditation activities and ensure cyber compliance of all ARC enclaves. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Execute the following Ground Tests in FY 2020: GTI-07c, GT-20 Sprint (BL 5.4), GT-20 Sprint (JEON), GTI-08 (N/P), GTI-ISR (21) (International) Risk Reduction Test. - Execute planning phase of CONOPS to support CI/CAT requirements, which begin execution first quarter FY 2021. - Initiate planning for the following Ground Tests in FY 2021: GTI-09 Sprint 1 EUCOM/CENTCOM (E/C), GTI-09 Sprint 2 (E/C), GTD-08a NORTHCOM/USINDOPACOM (N/I), GTI-ISR (21) Formal Testing. - Plan, coordinate, and execute Cybersecurity Activities in Development and Operations Test (DT/OT) environments (Platform (Element) level and Systems of System Level) as identified in the IMTP for Cyber activities. - Plan, coordinate, and execute Element Cybersecurity Experiments (ECEs) to provide an early cyber assessment of the platforms. - Continue to incorporate cybersecurity testing requirements into the BMDS ground tests to include planning for cyber requirements in FY20 GTI-08 (N/P). - Identify efficiencies gained in USINDOPACOM cyber activities from lessons learned as documented in previous cyber activities. - Execute infrastructure projects to maintain integrity and viability of ARC facility. ***FY 2021 Plans:*** - Execute the following Ground Tests in FY 2021: GTI-09 Sprint 1 EUCOM/CENTCOM (E/C), GTI-09 Sprint 2 (E/C), GTD-08a NORTHCOM/USINDOPACOM (N/I), GTD-09 (E/C), GTI-21 Sprint 1, GTI-08, GTI-ISR (21) Formal Testing.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Plan, coordinate, and execute Cybersecurity Activities in Development and Operations Test (DT/OT) environments (Platform (Element) level and Systems of System Level) as identified in the IMTP for Cyber activities. - Plan, coordinate, and execute Element Cybersecurity Experiments (ECEs) to provide an early cyber assessment of the platforms. - Continue to incorporate cybersecurity testing requirements into the BMDS ground tests. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects a decrease in amount of funding for ARC upgrades.			
Title: Test Infrastructure	175.221	114.589	115.412
Articles:	-	-	-
Description: The BMDS Test Program procures, maintains, and manages test resource infrastructure and provides all resources and requirements in support of a robust IMTP schedule in six primary functions: 1) Flight Test Ranges 2) Sea Based Mobile Assets 3) Airborne Optics 4) Flight Test Communications 5) IMTP Development & Data Management The primary function responsibilities are as follows: Flight Test Ranges: - Maintain the MDA unique range facilities and mobile sensors, communication, data processing and dissemination infrastructure to support a broad spectrum of test requirements including metric tracking, target characterization, and multi-spectral imagery of BMDS phenomena. - Construct the new Wake Island communications facility and provide enhancements to the fiber backbone providing Flight Test Communications Network (FTCN) services to remote sites. - Facilities Sustainment Restoration/Modernization (FSRM) Funds are required to repair, upgrade, and sustain numerous facilities, test infrastructure, and equipment maintained by MDA world-wide. Sea Based Mobile Assets: - Provide Sea Based Systems (SBS) continued sustainment of test instrumentation ships, Pacific Collector and Pacific Tracker, and associated telemetry and radar systems. Airborne Optics:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Maintain existing Gulfstream Aircraft (HALOs) that collect radiometric and photo-documentary performance data for strategic and tactical defense systems flight and ground tests. - Three replacements are HALO Fleet Renewal Program procured in FY 2019; Modification work ongoing since they are scheduled to complete in FY 2022 Flight Test Communications: - Provide operations and maintenance support for the Flight Test Communications Network at Wake Island. - Maintain accreditation for the Transportable Telemetry Systems (TTS), Pacific Collector Range Safety System (PCRSS), and the Flight Test Communications Network (FTCN). IMTP Development & Data Management: - Establish authority and maintain configuration control of the test baseline. - Develop, update, coordinate and deliver the IMTP, coordinated within MDA and External stakeholders (Director, Operational Test and Evaluation (DOT&E); the Deputy Assistant Secretary of Defense for Developmental Test and Evaluation (DASD(DT&E)); the Joint Functional Component Command for Integrated Missile Defense (JFCC IMD); the Service Operational Test Agencies (OTAs)); and the Joint Interoperability Test Command (JITC)); and provides an affordable and executable test plan to meet Warfighter needs and National Security commitments. - Coordinate the IMTP Special Access Programs (SAP) Annex with respect to changes to SAP Program Test Baseline and synchronize with the collateral IMTP. - Manage the approved test baseline by assessing all proposed changes to the BMDS Test Schedule and Test Configurations for each BMDS test event identified in the IMTP. - Support the Developmental Baseline Reviews and the annual BMDS Accountability Reviews to assess baseline execution risk and verify BMDS components are consistent with the approved test baseline. - Update and maintain the classified Test Resource Mission Planning-Tool (TRMP-T(C)) database. - Execute Flight Test Design Analysis ensuring test designs are safe and sufficient to meet test objectives. - Develop and maintain integrated test tools to support Truth Data Requirements Documents, Truth Data Packages, on-site Truth Quick-Look product development, pre- and post-test analysis test planning, and resource de-confliction; Integrated Data Management Plans (IDMPs), Data Handling Plans (DHPs), Cybersecurity documentation, data planning and management, library operations, deployment process; infrastructure requirements process; and test operations support. - Provide analytical capability for Flight and Ground test planning to include: test design feasibility assessments, truth data and sensor analysis, truth data requirements documentation and data packages; flight safety analysis and flight safety data packages; and telemetry link margin, collision avoidance, and pre- and post-test trajectory analyses. - Review BMDS component programs' content on a quarterly basis to ensure consistency with the approved IMTP.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Maintain and extend the Directorate of Test Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cybersecurity defense for ground test network systems. Continue to define cybersecurity investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data. - Maintain accreditation of the Orion Voice Switch Conferencing System (VSCS). - Co-chair the Signature Working Group to review all signature models and identify technical limitations associated with radar and optical signatures used to support Ballistic Missile Defense System (BMDS) ground and flight testing. - Manage the Missile Defense Data Center (MDDC) Program and its library, operations, and infrastructure providing centralized data management, archival, and distribution services. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete 3 sensor integration, perform airworthiness flight tests, and mission systems ground and flight tests for the first new HALO system (HALO-IR). - Complete modifications on the second and third Gulfstream-550 ARC as part of the ABS (HALO) Fleet Renewal Program. - Design, test, and integrate the Airborne Sensors Primary Sensor replacement into the second and third Gulfstream-550. - Complete the Business Case Analysis (BCA) on replacement of the Pacific Tracker and Pacific Collector vessels. - Refresh flight test support equipment and the fleet of utility vehicles at Wake Island. - Install phase 2 and 3 of the Maritime Acquisition and Range Safety System (MARSS) on board the Mobile At-Sea Sensor Ship (MATSS) to replace the aging Mobile Range Safety System (MRSS) currently on board. - - Continue execution of the Meck Island Power Plant Replacement Project to include all power generation, switchgear, controls, Life Support Area, and downstream power distribution system components. - Release 2.0 NSITE Software to support all flight and ground test events. ***FY 2021 Plans:*** - Prepare to field the first new, Gulfstream-550 based HALO system, HALO-IR in late FY 2021/early FY 2022. - Complete Airborne Sensors Primary Sensor replacement development and testing HALO replacement. - Integrate into HALO-IIR and HALO-IIIR complete ground testing, and prepare for flight testing and fielding in FY 2022. - Implement a distributed communications hub architecture facilitating near-simultaneous flight test mission operations. - Modernize Mobile Communications Suite - 2 (MCS-2) to meet emerging MDA flight test communications requirements for remote sites. - Continue Wake Island projects include Wake Housing Design, replace MDA Diesel Vehicles Fleet, and Building 1512 repairs. - Support Facilities, Sustainment, Restoration, and Modernization (FSRM) efforts. ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- N/A			
Title: Engineering and Test Analysis	24.727	27.049	21.291
Articles:	-	-	-
Description: The Engineering and Test Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event: - Design test architecture, define test objectives and evaluation criteria, define target requirements, and generate ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor Models and Simulations. - Produce threat data for BMDS ground and flight tests. - Coordinate with BMDS Operational Test Agency (OTA) to address test issues, disposition them, coordinate them, and recommend action plans to achieve closure. - Deliver HWIL M&S integration test cases. - Integrate, test, and deliver end-to-end BMDS simulations supporting ground test missions. - Analyze system-level interoperability. - Conduct modeling and technical analysis for Combatant Command wargames and exercises. - Utilize M&S for pre-test assessment and post-test review, and M&S updates. - Provide test configuration management risk assessments and anomaly/deficiency review, assessment and closure. - Analyze test results to identify verification and validation data collection shortfalls and reassign objectives to future test events as required. - Document BMDS test observations for system-level test anomalies and coordinate the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS). - Upgrade test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite (MARS)) to enhance analysis capability and efficiency. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP requirements.			
Title: USINDOPACOM Joint Emerging Operational Needs Statement (JEONS)	71.900	17.600	47.164

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Articles:	-	-	-
Description: USINDOPACOM Joint Emergent Operational Need Statement (JEON) Testing. - Continue flight and ground testing associated with USINDOPACOM JEON program per IMTP schedule. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue flight and ground testing associated with USINDOPACOM JEON program per IMTP schedule. ***FY 2021 Plans:*** - Complete testing for USINDOPACOM JEON ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides for completion of testing associated with USINDOPACOM JEON.			
Accomplishments/Planned Programs Subtotals	465.268	371.710	354.569

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing

Remarks

D. Acquisition Strategy

The BMDS Test Program acquisition strategy is consistent with the MDA capabilities-based acquisition strategy that emphasizes testing, evolutionary acquisition, and knowledge-based funding. Test directs a team of various internal staff (government and scientific, engineering and technical assistance support), executing agents (including DoD agencies, Service Organizations, Laboratories and Program Offices, Federally Funded Research and Development Center (FFRDC) and other MDA programs to execute the various diverse efforts within the BMDS test program through competition. When a specific effort/activity being conducted, acquired, or maintained requires the use of an executing agent, respective headquarter regulations are used to conform the acquisition strategy.

The MDA IMTP establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation (VV&A) of the BMDS Models and Simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting M&S, which is used to validate and assess system performance. With this test approach, MDA will establish confidence that the M&S used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning and Operations - IMTP Planning and Data Management Tools	C/FP	Various : AL	140.088	0.000		0.000		0.000		-		0.000	0.000	140.088	0.000
Program Planning and Operations - Lab Analysis Infrastructure	MIPR	MIT-LL/Aerospace : AL/CA/MA	73.204	0.000		0.000		0.000		-		0.000	0.000	73.204	0.000
Program Planning and Operations - Operational Test Agency	MIPR	ATEC/Aberdeen Proving Grounds : MD	97.252	20.975	Nov 2018	21.624	Nov 2019	24.860	Nov 2020	-		24.860	Continuing	Continuing	Continuing
Program Planning and Operations - Support to Flight Testing	C/CPAF	Northrop Grumman/ Lockheed Martin : AL/CO	72.822	0.000		0.000		0.000		-		0.000	0.000	72.822	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Planning and Operations - Support to Ground Testing	C/CPAF	MDIOC/JRDC/IRES/ Northrop Grumman : AL/CO/VA/DC	28.675	0.000		0.000		0.000		-		0.000	0.000	28.675	0.000
Program Planning and Operations - Support to Test Resources	C/CPAF	Various : AL	30.969	0.000		0.000		0.000		-		0.000	0.000	30.969	0.000
Program Planning and Operations - Test Functional Management Office	C/CPFF	Various : AL/VA/CO/ MA	352.187	74.116	Nov 2018	73.841	Nov 2019	68.542	Nov 2020	-		68.542	Continuing	Continuing	Continuing
Flight Test - IMTP Flight Testing	MIPR	94th AMDC/AFGSC/ H'ville Operations Support Center/ NAWC/NRL/Ronald Reagan Test Site /NAVWAR/ Vandenberg AFB/ WSMR/CCDC AVMC/NSWC/ PMRF/611th CES/611th ASUS/ AEDC : AL/CA/CO/ HI	264.502	45.181	Oct 2018	38.786	Oct 2019	15.398	Oct 2020	-		15.398	Continuing	Continuing	Continuing
Ground Test - Ground Test Infrastructure	MIPR	Naval Information Warfare Systems Command : AL/CA	0.000	47.576	Oct 2018	69.411	Oct 2019	60.270	Oct 2020	-		60.270	Continuing	Continuing	Continuing
Ground Test - IMTP Ground Testing	MIPR	Aviation & Missile Research & Development/LTPO/ Naval Information Warfare Systems Command : AL/CO/ CA	59.246	5.572	Oct 2018	8.810	Oct 2019	1.632	Oct 2020	-		1.632	Continuing	Continuing	Continuing
Test Infrastructure - Ground Test Infrastructure	MIPR	Naval Information Warfare Systems Command : AL/CA	27.501	0.000		0.000		0.000		-		0.000	0.000	27.501	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Infrastructure - Airborne Optics Mobile Assets	C/IDIQ	Various : L3/JHU/ APL/TX/MD/AZ/TN	208.063	63.677	Feb 2019	24.424	Feb 2020	11.668	Feb 2021	-		11.668	Continuing	Continuing	Continuing
Test Infrastructure - Core Ground Test Labs and HWILS	C/IDIQ	Colsa/CCDC Aviation & Missile Center : AL/MD/FL/ CA/OH/CO	193.698	0.000		0.000		0.000		-		0.000	0.000	193.698	0.000
Test Infrastructure - Enhanced GT Capability Assets	C/IDIQ	Colsa/Northrop Gurmman : AL/CO/ FL/MD/HI	41.604	0.000		0.000		0.000		-		0.000	0.000	41.604	0.000
Test Infrastructure - Facilities Sustainment, Restoration & Modernization	MIPR	SMDC/Northrup Grumman/Colsa : AL/CO/NM	21.803	26.049	Nov 2018	0.000		0.608	Nov 2020	-		0.608	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Communications	C/IDIQ	ASI/WSMR : Gray Research/NRL/ NAWC/CA/MD/NCR/ NM/AL/MA	116.393	28.932	Nov 2018	21.015	Nov 2019	32.434	Nov 2020	-		32.434	Continuing	Continuing	Continuing
Test Infrastructure - Flight Test Ranges	C/IDIQ	SMDC/SNL/PMRF : NAWC/WSMR/ AMRDEC/NG/AK/AL/ CA/HI/NM/CO	87.491	13.654	Nov 2018	13.807	Nov 2019	13.186	Nov 2020	-		13.186	Continuing	Continuing	Continuing
Test Infrastructure - IMTP Planning & Data Management Tools	C/FP	Various : AL	18.894	28.809	Nov 2018	33.725	Nov 2019	31.131	Nov 2020	-		31.131	Continuing	Continuing	Continuing
Test Infrastructure - Sea Based Mobile Assets	MIPR	MARAD/NAWC/ Hanscom AFB : AL/ CA/MD/NCR/NM/MA	98.218	14.100	Nov 2018	21.618	Nov 2019	26.385	Nov 2020	-		26.385	Continuing	Continuing	Continuing
Test Infrastructure - Support to Test Resources	MIPR	Various : AL	146.104	0.000		0.000		0.000		-		0.000	0.000	146.104	0.000
Engineering and Test Analysis - CSS Support	C/CPFF	Various : AL	28.519	6.196	Nov 2018	6.517	Nov 2019	6.624	Nov 2020	-		6.624	Continuing	Continuing	Continuing
Engineering and Test Analysis - FFRDA/UARC 2	MIPR	Aerospace : CA	0.755	0.085	Nov 2018	0.000		0.000		-		0.000	0.000	0.840	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering and Test Analysis - FFRDC/UARC	MIPR	MITRE : VA	3.187	0.000		0.000		0.000		-		0.000	0.000	3.187	0.000
Engineering and Test Analysis - Industry Support	C/CPAF	Boeing : AL	24.303	2.392	Nov 2018	0.000		0.000		-		0.000	0.000	26.695	0.000
Engineering and Test Analysis - Industry Support - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	1.848	0.200	Nov 2018	0.000		0.000		-		0.000	0.000	2.048	0.000
Engineering and Test Analysis - Industry Support 2	C/CPAF	COLSA : AL, CO	0.000	0.000		2.332	Nov 2019	2.040	Nov 2020	-		2.040	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support	MIPR	CCDC Aviation & Missile Center : AL	90.983	15.854	Nov 2018	18.200	Nov 2019	12.627	Nov 2020	-		12.627	Continuing	Continuing	Continuing
Engineering and Test Analysis - OGA Support - NME	MIPR	LTPO : AL	5.114	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
USINDOPACOM Joint Emerging Operational Needs Statement (JEONS) - USINDOPACOM - JEON	SS/IDIQ	Lockheed Martin : Sunnyvale CA/ Huntsville, AL	12.200	71.900	Nov 2018	17.600	Nov 2019	47.164	Nov 2020	-		47.164	Continuing	Continuing	Continuing
		Subtotal	2,245.623	465.268		371.710		354.569		-		354.569	Continuing	Continuing	N/A

Remarks

Recategorized and streamlined BMDS Test cost category content to better align test priorities.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,245.623	465.268		371.710		354.569		-		354.569	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603914C / *Ballistic Missile Defense Test*	MT04 / *BMDS Test Program*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	▲																											
FTI-03 (OTA, OT Intercept Flight Test)	▲																											
FTG-11 (OT) (GM, OT Intercept Flight Test)		▲																										
GT-18 Sprint 3 (N/P) (BMDS Ground Test)		✦																										
AST-17		▲																										
AST-18		▲																										
FTX-34 (AEGIS AA, DT Tracking Exercise Flight Test)		▲																										
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)			▲																									
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)			▲																									
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)			▲																									
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)			▲																									
GTI-19 Sprint 1 (N/P) (BMDS Ground Test)			✦																									
GTD-07b (N/P) (BMDS Ground Test)			✦																									
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)				▲																								
FTT-23 (TH, DT Intercept Flight Test)				▲																								
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)				✦																								
Warfighter TP 07b (BMDS Ground Test)				✦																								
FTP-16 E1 (I8-1) (OTHER, DT Intercept Flight Test)				▲																								
GTI-19 Sprint 3 (BMDS Ground Test)				✦																								
FTA-01 E1				▲																								
FTA-01 E2				▲																								
FTA-01 E3				▲																								
GTI-19 Sprint 4 (E/C) (BMDS Ground Test)				✦																								
GTI-07c (N/I) (BMDS Ground Test)					✦																							

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTX-39 (LTPO, DT Target Only Flight Test)					▲																							
FTP-16 E2 (I8-1) (OTHER, DT Intercept Flight Test)					▲																							
Israeli Cooperative Intercept Flight Test - FY 2020					✧	✧	✧	✧																				
FEX-01 (OTHER, DT Tracking Exercise FT)					✧	✧	✧	✧																				
HAWC-4 (OTHER, DT Tracking Exercise Flight Test)					✧	✧	✧	✧																				
TBG-1 (OTHER, DT Tracking Exercise Flight Test)					✧	✧	✧	✧																				
Israeli Cooperative Intercept Flight Test - FY 2019 Retest					✧	✧	✧	✧																				
HAWC-5 (OTHER, DT Tracking Exercise Flight Test)					✧	✧	✧	✧																				
HAWC-7 (OTHER, DT Tracking Exercise Flight Test)					✧	✧	✧	✧																				
Other Flight Test Not Identified					✧	✧	✧	✧	✧	✧	✧	✧																
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)						△																						
FTP-27 E1 (LTPO, DT/OT Flight Test)						△																						
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)						✧																						
GTI-20 Sprint 1(E/C) (BMDS Ground Test)						✧																						
FTP-27 E2 (LTPO, DT/OT Flight Test)						△																						
GTD-07b (AA) (BMDS Ground Test)							✧																					
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)							△																					
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)							△																					
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)								△																				
FTP-17 E1 (I8-2.1) (OTHER, DT Intercept Flight Test)								△																				
FTP-17 E2 (I8-2.1) (OTHER, DT Intercept Flight Test)								△																				
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)									△																			
FTP-21 (P8.1.1)(LTPO, DT Intercept Flight Test)									△																			
GM BVT-03 (GM, DT Interceptor Only Flight Test)									△																			

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GTI-08a (N/I) (BMDS Ground Test)									✧																			
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)									△																			
Israeli Cooperative Intercept Flight Test - FY 2021									✧	✧	✧	✧																
TBG-2 (OTHER, DT Tracking Exercise Flight Test)									✧	✧	✧	✧																
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)										✧																		
FTT-21 (TH, DT Intercept Flight Test)										△																		
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)										✧																		
GTD-08a (N/I) (BMDS Ground Test)										✧	✧																	
FTX-26 (OT) (SN, OT Target Only Flight Test)											△																	
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)											✧																	
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)											△																	
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)											△																	
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)											△																	
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)											△																	
FTX-42 (OTHER, DT Target Only Flight Test)											△																	
GTI-ISR (21) (BMDS Ground Test)												✧																
FTP-23 (LTPO, DT/OT Intercept Flight Test)												△																
FTP-24 (LTPO, DT Intercept Flight Test)												△																
GTD-09 (E/C) (BMDS Ground Test)												✧																
FTM-46 (Blk IIA decision)													△															
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)													✧															
Israeli Cooperative Intercept Flight Test - FY 2022													✧	✧	✧	✧												
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)														△														
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)														△														

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603914C / *Ballistic Missile Defense Test*	MT04 / *BMDS Test Program*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GM CTV-03+ (GM, DT Interceptor Only Flight Test)													△															
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)													△															
FTP-19 (I8-4) (LTPO, DT Intercept Flight Test)													△															
FTP-20 (I8-5) (LTPO, OT Intercept Flight Test)													△															
FTP-25 (LTPO, OT Intercept Flight Test)														△														
FTT-25 (TH Intercept Flight Test)														△														
GTI-ASI (22)														✧														
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)														✧														
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)															△													
Pacific Dragon-22 (Interoperability Japan)															△													
GTD-08b (N/I) (BMDS Ground Test)															✧													
FTG-17 (GM, DT Intercept Flight Test)																△												
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)																△												
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)																△												
Israeli Cooperative Intercept Flight Test - FY 2023																✧	✧	✧	✧									
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)																	✧	✧										
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)																	✧	✧										
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																		△										
FTT-24 (TH, DT Intercept Flight Test)																		△										
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)																		✧	✧									
FTX-28 E1-E3 (TH, DT Target Only Flight Test)																			△									
GTD-11 (N/I) (BMDS Ground Test)																			✧									
GTI-ISR (23) (BMDS Ground Test)																			✧									
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																			△									

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603914C / *Ballistic Missile Defense Test*	MT04 / *BMDS Test Program*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTG-18 (GM, DT/OT Intercept Flight Test)																					△							
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)																					△							
JFTX-01 E1 (JAPAN, DT/OT Target Only Flight Test)																					△							
JFTX-01 E2 (JAPAN, DT/OT Target Only Flight Test)																					△							
Israeli Cooperative Intercept Flight Test - FY 2024																					✧	✧	✧	✧				
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																						✧						
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)																						△						
GTI-ASI (24) (BMDS Ground Test)																						✧						
GTD-10 (E/C) (BMDS Ground Test)																							✧					
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests																							△					
FTT-22 (TH Intercept Flight Test)																							△					
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)																								✧				
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																									✧			
FTO-04 (GM, OT Intercept Flight Test)																									△			
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)																										✧		
GTI-ISR (25) (BMDS Ground Test)																										✧	✧	
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																											✧	
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)																												△
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)																												△
GTD-13 (N/I) (BMDS Ground Test)																												✧
FTM-35 (Aegis BL9 FOT&E)																												
GTD-12 (E/C) (BMDS Ground Test)																												
GTI-ASI (26) (BMDS Ground Test)																												
FTO-05 (OTA, OT Intercept Flight Test)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GT-18 Sprint 3 (N/P) (BMDS Ground Test)	2	2019	2	2019
AST-17	2	2019	2	2019
AST-18	2	2019	2	2019
FTX-34 (AEGIS AA, DT Tracking Exercise Flight Test)	2	2019	2	2019
FS-19 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2019	3	2019
FS-19 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2019	3	2019
FS-19 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2019	3	2019
GTI-19 Sprint 1 (N/P) (BMDS Ground Test)	3	2019	3	2019
GTD-07b (N/P) (BMDS Ground Test)	3	2019	3	2019
FTM-31 E2 (AEGIS 5.1, DT Intercept Flight Test)	4	2019	4	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)	4	2019	4	2019
Warfighter TP 07b (BMDS Ground Test)	4	2019	4	2019
FTP-16 E1 (I8-1) (OTHER, DT Intercept Flight Test)	4	2019	4	2019
GTI-19 Sprint 3 (BMDS Ground Test)	4	2019	4	2019
FTA-01 E1	4	2019	4	2019
FTA-01 E2	4	2019	4	2019
FTA-01 E3	4	2019	4	2019

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-19 Sprint 4 (E/C) (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
FTP-16 E2 (I8-1) (OTHER, DT Intercept Flight Test)	1	2020	1	2020
Israeli Cooperative Intercept Flight Test - FY 2020	1	2020	4	2020
FEX-01 (OTHER, DT Tracking Exercise FT)	1	2020	4	2020
HAWC-4 (OTHER, DT Tracking Exercise Flight Test)	1	2020	4	2020
TBG-1 (OTHER, DT Tracking Exercise Flight Test)	1	2020	4	2020
Israeli Cooperative Intercept Flight Test - FY 2019 Retest	1	2020	4	2020
HAWC-5 (OTHER, DT Tracking Exercise Flight Test)	1	2020	4	2020
HAWC-7 (OTHER, DT Tracking Exercise Flight Test)	1	2020	4	2020
Other Flight Test Not Identified	1	2020	4	2021
FTM-32 (AEGIS SBT, DT/OT Intercept Flight Test)	2	2020	2	2020
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)	2	2020	2	2020
GTI-20 Sprint 1(E/C) (BMDS Ground Test)	2	2020	2	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	3	2020	3	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
FTP-17 E1 (I8-2.1) (OTHER, DT Intercept Flight Test)	4	2020	4	2020
FTP-17 E2 (I8-2.1) (OTHER, DT Intercept Flight Test)	4	2020	4	2020
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
FTP-21 (P8.1.1)(LTPO, DT Intercept Flight Test)	1	2021	1	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GM BVT-03 (GM, DT Interceptor Only Flight Test)	1	2021	1	2021
GTI-08a (N/I) (BMDS Ground Test)	1	2021	1	2021
FTM-33 (AEGIS SBT, DT/OT Intercept Flight Test)	1	2021	1	2021
Israeli Cooperative Intercept Flight Test - FY 2021	1	2021	4	2021
TBG-2 (OTHER, DT Tracking Exercise Flight Test)	1	2021	4	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)	2	2021	2	2021
GTD-08a (N/I) (BMDS Ground Test)	2	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FS-21 E1 (AEGIS 5.1, DT Interceptor Only Flight Test)	3	2021	3	2021
FS-21 E2 (AEGIS 5.1, DT Target Only Flight Test)	3	2021	3	2021
FS-21 E3 (AEGIS 5.1, DT Target Only Flight Test)	3	2021	3	2021
FS-21 E4 (AEGIS 5.1, DT Intercept Flight Test)	3	2021	3	2021
FTX-42 (OTHER, DT Target Only Flight Test)	3	2021	3	2021
GTI-ISR (21) (BMDS Ground Test)	4	2021	4	2021
FTP-23 (LTPO, DT/OT Intercept Flight Test)	4	2021	4	2021
FTP-24 (LTPO, DT Intercept Flight Test)	4	2021	4	2021
GTD-09 (E/C) (BMDS Ground Test)	4	2021	4	2021
FTM-46 (Blk IIA decision)	1	2022	1	2022
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)	1	2022	1	2022
Israeli Cooperative Intercept Flight Test - FY 2022	1	2022	4	2022
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

Events	Start		End	
	Quarter	Year	Quarter	Year
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
FTP-18 (I8-3) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
FTP-19 (I8-4) (LTPO, DT Intercept Flight Test)	2	2022	2	2022
FTP-20 (I8-5) (LTPO, OT Intercept Flight Test)	2	2022	2	2022
FTP-25 (LTPO, OT Intercept Flight Test)	3	2022	3	2022
FTT-25 (TH Intercept Flight Test)	3	2022	3	2022
GTI-ASI (22)	3	2022	3	2022
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)	3	2022	3	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
Pacific Dragon-22 (Interoperability Japan)	4	2022	4	2022
GTD-08b (N/I) (BMDS Ground Test)	4	2022	4	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)	1	2023	1	2023
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	1	2023	1	2023
Israeli Cooperative Intercept Flight Test - FY 2023	1	2023	4	2023
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2023	3	2023
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	2	2023	3	2023
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	3	2023	3	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023
FTX-28 E1-E3 (TH, DT Target Only Flight Test)	4	2023	4	2023
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023
GTI-ISR (23) (BMDS Ground Test)	4	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MT04 / *BMDS Test Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)	1	2024	1	2024
JFTX-01 E1 (JAPAN, DT/OT Target Only Flight Test)	1	2024	1	2024
JFTX-01 E2 (JAPAN, DT/OT Target Only Flight Test)	1	2024	1	2024
Israeli Cooperative Intercept Flight Test - FY 2024	1	2024	4	2024
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)	2	2024	2	2024
GTI-ASI (24) (BMDS Ground Test)	2	2024	2	2024
GTD-10 (E/C) (BMDS Ground Test)	3	2024	3	2024
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests	3	2024	3	2024
FTT-22 (TH Intercept Flight Test)	3	2024	3	2024
FTX-41 (Aegis BL10, SPY-6)	3	2024	3	2024
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)	4	2024	4	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	1	2025	1	2025
FTO-04 (GM, OT Intercept Flight Test)	1	2025	1	2025
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)	2	2025	2	2025
GTI-ISR (25) (BMDS Ground Test)	2	2025	3	2025
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	3	2025	3	2025
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)	4	2025	4	2025
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2025	4	2025
GTD-13 (N/I) (BMDS Ground Test)	4	2025	4	2025
FTM-35 (Aegis BL9 FOT&E)	1	2026	1	2026
GTD-12 (E/C) (BMDS Ground Test)	1	2026	1	2026
GTI-ASI (26) (BMDS Ground Test)	3	2026	3	2026
FTO-05 (OTA, OT Intercept Flight Test)	4	2026	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC04: *Cyber Operations*	22.251	30.419	12.524	8.706	-	8.706	8.800	8.802	9.069	9.256	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Ballistic Missile Defense (BMD) Test Cyber Operations sustain Missile Defense Agency (MDA) Risk Management Framework (RMF) Standards, Computer Network Defense Service Provider and Controls Validation Testing activities: validation results; risk assessments; and reviews of proposed Program Manager/Information Systems Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense Test program. It maintains the Certification and Accreditation (C&A) data repository, capturing the RMF documentation (artifacts, validation results, and Cybersecurity Risk Assessment results, and Authorizing Official (AO) accreditation decisions) and POA&Ms on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Systems Security Officer/Security Controls Assessor (SCA) and AO. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Systems Modernization Act (FISMA) of 2014. The MDA Information Technology Networks and Systems (ICTA) and Cross Domain Solution (CDS) provide oversight and guidance for implementing standard CDS security policies across the BMDS. The Network Operations Security Center (DNOSC) is the Local Control Center (LCC) (Tier 3) that protects, detects, characterizes, reports, and mitigates cyber threats through real-time continuous monitoring for flight and ground test assets.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	30.419	12.524	8.706
Articles:	-	-	-
Description: The BMDS Test Network/System Certification and Accreditation program will: - Provide cyber security program oversight of all MDA Test Directorate (DT) information systems, networks, sponsored remote sites, ground and flight test infrastructure, and exercise/war game infrastructures. This includes management of: cyber security compliance and authorization; cyber security training and awareness; information system secure configuration; assessment and incident management; and computer network defense. - Fund Ballistic Missile Defense Test Program Information Systems Security Manager (ISSM) civilian salaries. - Conduct cyber security/information assurance engineering and architecture planning for the BMDS Test Program information technology systems. - Plan and test the Cybersecurity controls for BMDS. - Develop DT NIST certification and accreditation packages.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Leverage Cross Domain Solution (CDS) as single authority implementing standard security policies for test and across the BMDS. - Maintain and extend the Support System (DTSS) classified Computer Network Defense Service Provider (CNDSP) to support network cyber security defense for ground test network systems. - Continue to define cyber security investments, risks and benefits used to reduce vulnerabilities and protect critical administrative and test data. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue upgrades to cybersecurity infrastructure. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease in FY 2021 reflects Congressional plus-ups in FY 2019 and FY 2020.			
Accomplishments/Planned Programs Subtotals	30.419	12.524	8.706

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Cybersecurity Civ	MIPR	MDA : Various	1.697	0.454	Nov 2018	0.494	Oct 2019	0.520	Oct 2020	-		0.520	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Cybersecurity Operations	MIPR	Teledyne Brown/ CCDC Aviation & Missile Center : AL	11.159	5.170	Oct 2018	8.520	Nov 2019	4.319	Nov 2020	-		4.319	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Cybersecurity Support	C/IDIQ	Torch Technologies : Various	9.395	24.795	Oct 2018	3.510	Nov 2019	3.867	Nov 2020	-		3.867	Continuing	Continuing	Continuing
		Subtotal	22.251	30.419		12.524		8.706		-		8.706	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	22.251	30.419		12.524		8.706		-		8.706	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC04 Cyber Operations	✦	✦	✦	✦																								
MC04 Cyber Operations Planned					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MC04 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC04 Cyber Operations	1	2019	4	2019
MC04 Cyber Operations Planned	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	103.124	14.605	15.504	15.027	-	15.027	15.314	15.944	20.211	22.760	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency Program Element (PEs) each Fiscal Year (FY) based on the total Agency budget, and therefore fluctuates per PE by FY.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	14.605	15.504	15.027
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	14.605	15.504	15.027

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	5.123	0.221	Jul 2019	0.232	Jul 2020	0.883	Jul 2021	-		0.883	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AL, CA, CO, VA	0.245	0.000		0.000		5.786	Nov 2020	-		5.786	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	89.599	10.700	Mar 2019	15.272	May 2020	8.358	May 2021	-		8.358	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance - SRM	MIPR	Various : Multi: AK,AL,CA,VA	8.157	3.684	Mar 2019	0.000		0.000		-		0.000	0.000	11.841	0.000
		Subtotal	103.124	14.605		15.504		15.027		-		15.027	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	103.124	14.605		15.504		15.027		-		15.027	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603914C / *Ballistic Missile Defense Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	2,868.419	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
MC05: *Cyber Operations*	0.753	6.236	0.913	1.698	-	1.698	1.744	1.786	1.828	1.860	Continuing	Continuing
MT05: *BMDS Targets Program*	2,749.134	538.644	521.181	513.139	-	513.139	568.626	496.372	492.154	509.322	Continuing	Continuing
MD40: *Program Wide Support*	118.532	16.469	20.845	21.296	-	21.296	23.569	20.870	26.643	29.493	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects reduced hardware purchases for the Intermediate Range Ballistic Missiles (IRBM) Type 1 / Type 2 (T1/T2) and Intercontinental Ballistic Missiles (ICBM) targets, as well as a change in the number and types of targets required for the mix of flight tests in the Missile Defense System (MDS) Integrated Master Test Plan (IMTP).

The FY 2021 funding request was erroneously reduced in PE 0603915C by $3.5 million during DWR to reduce Facilities Sustainment Restoration and Modernization (FSRM) Projects. MDA moved reduction to appropriate PE 0603914C Ballistic Missile Defense System (BMDS) Test.

The funding request for FY 2021 includes Joint Emergent Operational Need (JEON) PC-0021 requirements.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Targets Program provides centrally managed targets and countermeasures development and procurement for a cost effective, integrated system-level approach to BMDS testing. Based on engineering assessments of threat intelligence data, the BMDS Targets Program develops, builds, and supports the launch of Short Range Ballistic Missile (SRBM: Less than 1000 Kilometer range) targets, Medium Range Ballistic Missile (MRBM: 1000-3000 Kilometer Range) targets, Intermediate Range Ballistic Missile (IRBM: 3000-5500 Kilometer Range) targets, Intercontinental Ballistic Missile (ICBM: Greater than 5500 Kilometer range) targets, and Multi-Class Components to test, verify, and validate the performance of the BMDS against threats. The BMDS Targets Program provides an economical and reliable inventory of targets, which are representative of feasible future threats and support demonstration of the capability of the evolving layered missile defense system in a simultaneous test and operations threat environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	561.352	554.171	513.964	-	513.964
Current President's Budget	561.349	542.939	536.133	-	536.133
Total Adjustments	-0.003	-11.232	22.169	-	22.169
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-11.232			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.008	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.005	0.000	22.169	-	22.169

Change Summary Explanation

Decrease in FY 2020 reflects Congressional reduction for MRBM target contract award delay.

Increase in FY 2021 provides the type 5 countermeasures, modified ballistic reentry vehicle and autonomous flight safety system development, and IMTP flight test adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC05: *Cyber Operations*	0.753	6.236	0.913	1.698	-	1.698	1.744	1.786	1.828	1.860	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Defense Cyber Operations sustains Missile Defense Agency (MDA) Department of Defense (DoD) Information Assurance Certification and Accreditation Program (DIACAP), Risk Management Framework Standards, Computer Network Defense Service Provider and Controls Validation Testing (CVT) activities; analysis of validation results; risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Ballistic Missile Defense (BMD) Target program. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&M on all MDA information systems. This project supports the monitoring and tracking of Cybersecurity mitigations detailed in Information Technology security POA&Ms. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer/Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	6.236	0.913	1.698
Articles:	-	-	-

Description: The Network/Systems C&A project sustains the MDA DIACAP and CVT activities, analysis of validation results, risk assessments and reviews of proposed PM/IAM POA&Ms for MDA BMD Test program mission systems. It maintains the C&A data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance (IA) Risk Assessment results, and DAA accreditation decisions) and POA&M on all MDA information systems.
Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE.

FY 2021 Plans:
- SEE ABOVE.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Increase from FY 2020 to FY 2021 provides increased cyber requirements to ensure identification of cybersecurity threats, technical requirements, and risk mitigation to supporting the protection of the IA posture of the MDS and Test systems.			
Accomplishments/Planned Programs Subtotals	6.236	0.913	1.698

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Windows 10 Upgrade	C/CPAF	Northrop Grumman Innovative Systems (NGIS) : Chandler, AZ	0.000	5.000	Dec 2018	0.000		0.000		-		0.000	0.000	5.000	0.000
		Subtotal	0.000	5.000		0.000		0.000		-		0.000	0.000	5.000	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Information Assurance 1	MIPR	Missile Defense Agency : Huntsville, AL	0.221	0.126	Nov 2018	0.176	Nov 2019	0.182	Nov 2020	-		0.182	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Information Assurance 2	C/IDIQ	MiDAESS/TEAMS : Various	0.532	1.110	Nov 2018	0.737	Nov 2019	1.516	Nov 2020	-		1.516	Continuing	Continuing	Continuing
		Subtotal	0.753	1.236		0.913		1.698		-		1.698	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.753	6.236		0.913		1.698		-		1.698	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may occur incrementally throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC05 Cyber Activities (FY 2019)	✦	✦	✦	✦																								
MC05 Cyber Activities					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MC05 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC05 Cyber Activities (FY 2019)	1	2019	4	2019
MC05 Cyber Activities	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT05: *BMDS Targets Program*	2,749.134	538.644	521.181	513.139	-	513.139	568.626	496.372	492.154	509.322	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects reduced hardware purchases for the Medium Range Ballistic Missile (MRBM) Type 1 / Type 2 (T1/T2) and Intercontinental Ballistic Missiles (ICBM) targets, as well as a change in the number and types of targets required for the mix of flight tests in the MDS IMTP.

A. Mission Description and Budget Item Justification

The mission of the Ballistic Missile Defense System (BMDS) Targets Program is to provide an economical and reliable inventory of targets that are representative of feasible future threats. These targets enable demonstration of BMDS capabilities in operationally realistic scenarios. The BMDS Targets Program develops and acquires four target types across four target classes. The classes include: Short Range Ballistic Missiles (SRBM), Medium Range Ballistic Missiles (MRBM), Intermediate Range Ballistic Missiles (IRBM), and Intercontinental Ballistic Missiles (ICBM). The target types (Type 1-4) designate the complexity of the target within its class. Type-1 (T1) targets are simple baseline configurations. Type-2 (T2) targets have increased capability or complexity. Type-3 (T3) targets have unique configurations. Type-4 (T4) targets are subscale targets.

The BMDS Targets Program develops and provides Modified Ballistic Re-Entry Vehicles (MBRV) and Countermeasures that can be used across the spectrum of target types and classes. The BMDS Targets Program provides target digital models that enable the Missile Defense Agency (MDA) weapon system program offices to simulate end to end sensor and interceptor performance during pre-mission analysis. The BMDS Targets Program also provides maintenance, aging surveillance, refurbishment, and routine testing of government furnished equipment boosters and target components.

The BMDS Targets Program carefully plans the year of execution to assure the best use of appropriated funds. However, the BMDS Targets Program must be flexible in its execution of the program in order to respond to emerging real world threats or changes in the intelligence community estimates of when a threat will be deployed. The BMDS Targets Program must also work with BMDS systems engineers on a continuing basis to align the targets program to the BMDS need to demonstrate capabilities as reflected in MDA's Integrated Master Test Plan (IMTP). The BMDS Targets Program makes every effort to reduce instability in contracts, production base and budget while managing in this dynamic work environment.

The BMDS Targets Program develops and builds targets and countermeasures at multiple locations including: Orlando, FL; Huntsville, AL; and Chandler, AZ. Storage and maintenance facilities are also located throughout the country including: Huntsville, AL; White Sands, NM; Ogden, UT; Tooele, UT; and Cape Canaveral Air Force Station, FL.

The BMDS Targets Program consists of four major areas: Consumables, Program Planning and Operations, Resources, and Flight Test Execution.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Consumables - Short Range Ballistic Missiles (SRBM)	26.425	51.437	47.016
Articles:	-	-	-
Description: Consumables include SRBM target hardware development and manufacturing. Target development includes non-recurring engineering, MBRVs, Countermeasures, and launch support equipment for BMDS flight testing as required by the MDS IMTP. Target development provides air, sea, and ground launch capabilities to maximize flexibility in MDA test design. Development activities include requirements decomposition, design, modeling and simulation, qualification testing, and characterization. The BMDS Targets Program Office manages target configuration, component interface specifications, range integration, reliability, mission assurance, and costs. The BMDS Targets Program ensures target designs are producible, reliable, and affordable. Target manufacturing includes the build of targets and target components that are required to execute the MDS IMTP. Manufacturing includes government furnished equipment and new component acquisition, assembly, and integration. Also included are target characterization, quality and mission assurance, transportation, and logistics support. The BMDS Targets Program delivers fully assembled and integrated targets to the BMDS Test Program. Future revisions to the IMTP will likely affect target types and quantities noted in the Planned Accomplishments. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SRBM T4-B - deliver Ship Set 26 to support a pre-ship readiness review and flight test in FY 2020 -Future short range ballistic missile (subscale) targets - continue development efforts, continue manufacture of SRBM T4 Ship Sets 1, 2, and 3 to support pre-ship readiness reviews in FY 2022, and initiate manufacturing of SRBM T4 Ship Set 4 to support pre-ship readiness review in FY 2023 ***FY 2021 Plans:*** -Future short range ballistic missile (subscale) targets - continue development efforts, continue manufacture of SRBM T4 Ship Sets 1, 2, and 3 to support pre-ship readiness reviews and flight tests in FY 2023, in accordance with IMTP 21.1 schedule -Continue manufacturing of SRBM Black Dagger Ship Set #2 to support pre-ship readiness review and flight test in FY 2023 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Consumables - Medium Range Ballistic Missiles (MRBM)	248.152	135.834	217.894
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: MRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** -MRBM Type 3 Configuration 2 (MRBM T3C2) - deliver Ship Set 6 to support a flight test in FY 2020, continue manufacturing of Ship Set 7 to support a pre-ship readiness review and flight test in FY 2022 -MBRV-7 - continue recurring engineering efforts and manufacturing of MBRV-7 front sections to support MRBM flight tests -MRBM T1/T2 - continue manufacturing of Ship Sets 2-4 to support pre-ship readiness reviews in FY 2020 (Ship Set 2), FY 2021 (Ship Set 3), and FY 2022 (Ship Set 4); initiate manufacturing of Ship Sets 5 and 6 to support pre-ship readiness reviews in FY 2023 -MRBM T4 - continue manufacturing of Ship Sets 5-7 to support flight tests in FY 2021; initiate manufacturing of Ship Set 8 to support a pre-ship readiness review in FY 2021 -Continue non-recurring engineering efforts for the MRBM Re-Entry Vehicle development and build -Continue development and manufacture of advanced target ***FY 2021 Plans:*** -MRBM Type 3 Configuration 2 (MRBM T3C2) - continue manufacturing of Ship Sets 6 and 7 to support pre-ship readiness reviews and flight tests in FY 2023, in accordance with IMTP 21.1 schedule -MBRV-7 - continue recurring engineering efforts and manufacturing of MBRV-7 front sections to support MRBM flight tests -MRBM T1/T2 - continue manufacturing and qualification of Ship Sets 3-6 to support pre-ship readiness reviews and flight tests in FY 2022 (Ship Sets 3-5) and FY 2024 (Ship Sets 6 and 7) -MRBM T4 - continue manufacturing of Ship Sets 4-6 to support pre-ship readiness reviews and flight tests in FY 2023 (Ship Set 4) and FY 2024 (Ship Sets 5 and 6) -Advanced Target - continue development and manufacturing of Ship Sets 1 and 2 to support a pre-ship readiness reviews and flight tests in FY 2022 (Ship Set 1) and FY 2023 (Ship Set 2) -Continue development efforts for MRBM Countermeasures ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the addition of the advanced target autonomous flight safety system development and build, MRBM T1/T2 manufacturing and qualification, and development of MRBM countermeasures to support IMTP 21.1.			
Title: Consumables - Intermediate Range Ballistic Missiles (IRBM)	61.050	82.752	55.485
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: IRBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** -IRBM T1/T2 - deliver Ship Set 10 to support pre-ship readiness review and a flight test in FY 2020; continue manufacturing and integration of Ship Sets 11-14 to support pre-ship readiness reviews in FY 2021 (Ship Set 12), FY 2022 (Ship Set 11), FY 2024 (Ship Set 14) and FY 2026 (Ship Set 13) -MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support IRBM flight tests -Continue development efforts for IRBM Countermeasures ***FY 2021 Plans:*** -IRBM T1/T2 - deliver Ship Set 10 to support pre-ship readiness review and a flight test in FY 2021; continue manufacturing and integration of Ship Sets 11-14 to support pre-ship readiness reviews in FY 2022 (Ship Sets 11-13) and FY 2024 (Ship Set 14), in accordance with IMTP 21.1 schedule -MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support IRBM flight tests -Continue development efforts for IRBM Countermeasures ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects reduced hardware purchases for the IRBM T1/T2 prime contract.			
Title: Consumables - Intercontinental Ballistic Missiles (ICBM)	66.205	74.281	43.484
Articles:	-	-	-
Description: ICBM target hardware development and manufacturing is consistent with the Description found in the Consumables-SRBM section. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** -ICBM T1/T2 - deliver Ship Set 3 to support pre-ship readiness review and Aegis SM-3 Block IIA Missile flight test in FY 2020 (Ship Set 3); continue manufacturing Ship Sets 4 and 5 to support pre-ship readiness reviews in FY 2023 (Ship Set 4), and FY 2024 (Ship Set 5)			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support ICBM flight tests ***FY 2021 Plans:*** -ICBM T1/T2 - continue manufacturing Ship Sets 4 and 5 to support pre-ship readiness reviews in FY 2023 (Ship Set 4) and FY 2024 (Ship Set 5); initiate manufacturing of Ship Set 6 to support pre-ship readiness review in FY 2025 -MBRV-8 - perform additional characterization on the MBRV-8 and continue recurring engineering efforts and manufacturing of MBRV-8 front sections to support ICBM flight tests -Continue development efforts for ICBM Countermeasures ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects reduced hardware purchases for ICBM targets required for the mix of flight tests in the MDS IMTP.			
Title: Consumables - Joint Emergent Operational Need Statement (JEON)	4.500	9.600	6.564
Articles:	-	-	-
Description: Description: Target development and build to support near term capability improvements and Priority 1, 2 and 3 efforts for United States Indo-Pacific Command (USINDOPACOM) Joint Emergent Operational Need (JEON). The 3 priorities include: 1) PATRIOT launch on remote from THAAD battery data; 2) THAAD / Missile Segment Enhancement (MSE) Integration Part 1; 3) THAAD remote launcher Part 1. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE - Deliver SRBM Black Dagger Ship Set 3 to support a pre-ship readiness review and JEON flight test in FY 2021 ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the completion of JEON testing.			
Title: Program Planning & Operations	76.312	62.759	60.741
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Program Planning and Operations provides for government management of the BMDS Targets Program. Included in this effort is program and business management, program administration, technical and testing oversight, verification of hardware and software development, government manpower and infrastructure to develop, test and sustain the BMDS Targets Program Office system and components. Other Government Agency (OGA) and Federally Funded Research and Development Research Centers (FFRDC) are used for highly specialized skill sets not available internal to Targets for specific time periods. Recurring yearly planned accomplishments include the following: -Provide technical and business management support activities, financial management, cost and schedule performance analysis cost estimation and analysis, and integration activities -Provide program oversight, subcontract management, quality assurance, verification of hardware and software development, and technical and testing oversight -Ensure BMDS Targets compliance with internal and external direction, policies, and regulations -Conduct Internal Program Plans that align with the MDA approved IMTP -Provide program and technical management of target launch operations activities to include oversight of mission planning, range coordination, and mission requirements Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Resources	28.142	51.040	52.632
Articles:	-	-	-
Description: BMDS Target Resources consist of two sub-elements: Systems Engineering/Program Management and Logistics. Systems Engineering/Program Management provides technical direction to meet Target Program requirements while balancing cost, schedule, performance, and risk. It conducts functional requirements allocation to product lines, defines product line specifications/interfaces, performs configuration and data management, and follows guidelines for design reviews. It performs target system analysis to verify system performance, defines target program baselines, controls flight test configurations, and			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
conducts pre and post-flight analysis. It identifies treaty and environmental issues and develops plans for issue resolution. It provides Quality, Safety, and Mission Assurance operations to ensure compliance with MDA requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered for test events. It also includes Single Stimulation Framework (SSF)/Objective Simulation Framework (OSF) compatible Modeling and Simulation (M&S) execution and improvements to evolve M&S capability; trajectory analyses; signature analyses and characterization; studies to assess alternative target and platform solutions; assessments of risk management; and design approval of government furnished equipment. Specific Systems Engineering Planned Accomplishments include: -Continue Program Management and Business Operations for target components to provide a framework for overall management of the BMDS Targets Program -Continue providing classified network connections to OGAs so their subject matter experts can be used to support Target requirements -Continue analyses of future target Launch Vehicles, Re-Entry Vehicles, and launch platforms to ensure they are threat representative and that the Agency is making use of available technology in our future designs -Continue performing Pedigree Reviews to ensure high probability of mission success -Continue information technology and classified network support to ensure sensitive target information is not compromised -Continue Software Independent Verification and Validation (IV&V) to provide risk reduction of flight missions for target systems under development BMDS Targets Program Logistics support provides target storage, aging surveillance, and transportation of target hardware in support of BMDS testing. Also included are integrated logistics support for facilities, inventory maintenance, spare parts, aging surveillance, disposal, special testing for rocket motor propellants, and other hazardous material handling. This task manages and oversees accountability of all government furnished equipment and contractor acquired property. Logistics also provides common support equipment for launch vehicles, MBRVs, countermeasures, and all up integrated target rounds. It also supports launch site activations through the transportation of support equipment to various test sites. Specific Targets Logistics Planned Accomplishments include: -Continue Multi-Class Inventory storage, aging surveillance, maintenance of existing assets, and transportation support that ensured availability of MBRV and ground support equipment -Conduct disposal actions of inert assets Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Flight Test Execution	27.858	53.478	29.323
Articles:	-	-	-
Description: Flight Test Execution is performed by the Target Launch Operations group. This group conducts target mission planning, coordinates target range and mission requirements, and provides target technical information to the MDA's General Counsel to support treaty approvals. The Target Launch Operations Group is the primary link between the target developer and the BMDS test community, incorporating target system constraints into the BMDS mission countdown and launch constraints. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Conduct final target integration with the test range and launch operations of a MRBM target in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) firing two SM-6 Dual II -Conduct final target integration with the test range and launch operations of two SRBM targets in support of Aegis BMD BL 9.C2 Software demonstrating a salvo engagement (2) Missile Segment Enhancement firing four SM-6 Dual II -Conduct final target integration with the test range and accomplish launch operations of an ICBM target in support of an Aegis BL 9.C2 DDG demonstration of lethal intercept with a SM-3 Blk IIA missile using Engage-on-Remote (EoR) quality tracks via C2BMC from AN/TPY-2 -Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of two IRBM targets and one MRBM target in support of an operational engagement using a Regional / Theater BMDS Architecture -Conduct final target integration with the test range and launch operations of a MRBM target in support of Aegis BMD BL 9.C2 Software demonstrating an engagement firing an SM-3Blk II ***FY 2021 Plans:*** -Conduct final target integration with the test range and launch operations of two SRBM targets in support of Aegis BMD BL 9.C2.1 Software demonstrating a salvo engagement (2) firing four SM-6 Dual II -Conduct final target integration with the test range and accomplish launch operations of an SRBM (non-separating) in support of a THAAD Remote Launch Interoperability with PATRIOT -Conduct final target integration with the test range and accomplish launch operations of an MRBM in support of PATRIOT Post Deployment Build (PDB) 8.1 engagement using Launch on Remote from THAAD			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Conduct final target integration with the test range and Forward Staging Area to accomplish launch operations of an IRBM in support of a simulated GMD (GS 8 SW) engagement through Weapons Task Plan (WTP) ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the number and types of targets required for the mix of flight tests in the MDS IMTP.			
Accomplishments/Planned Programs Subtotals	538.644	521.181	513.139

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The BMDS Targets Program delivers targets and countermeasures for the MDS in support of the MDA's flight test program. The BMDS Targets Program requirements are derived from the MDS Integrated Master Test Plan (IMTP) and the Target System Performance Specification (TSPS).

The BMDS Targets Program is currently in various acquisition and contracting stages to deliver targets and countermeasures per the TSPS by range class: Short Range Ballistic Missile (SRBM), Medium Range Ballistic Missile (MRBM), Intermediate Range Ballistic Missile (IRBM), and Inter-Continental Ballistic Missile (ICBM). These targets are designed in accordance with the TSPS and delivered to support flight test requirements as identified in the IMTP. Each target class may be solicited, evaluated, and competitively awarded independently in IMTP 'need date' priority order.

The BMDS Targets Program competitively awarded a prime contract in 2011 to Orbital Sciences Corporation (wholly-owned subsidiary of Northrop Grumman Innovation Systems (NGIS)) with a period of performance (PoP) of March 2011 through September 2025 for air-launched IRBM targets. This award included two follow-on options, one for eight IRBM targets exercised in 2014 and another for six IRBM targets exercised in 2017. Two IRBM targets were added on the contract in 2018 to support the BMDS Acceleration.

The BMDS Targets Program conducted a limited competition in 2012 and awarded a contract modification to Orbital Sciences Corporation (wholly-owned subsidiary of NGIS) with a PoP of October 2012 through September 2025 for the development and delivery of ICBM targets. This award included two ICBM Stage Zero Retrofit Kits to be installed in existing air-launched IRBM targets. Four ICBM Stage Zero Kits were added in 2018.

The BMDS Targets Program competitively awarded a prime contract in 2016 to Orbital Sciences Corporation (wholly-owned subsidiary of NGIS) with a PoP of July 2016 to December 2020 for three MRBM T3c2 targets. This award included options for up to four MRBM T3c2 targets.

The BMDS Targets competitively awarded a prime contract to L-3 Communications/Coleman Aerospace Corporation (now owned by Aerojet Rocketdyne since 2017) with a PoP of October 2013 through December 2027 to provide six MRBM targets. Six additional targets were added to the contract in 2019 to incorporate Joint

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
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Emergent Operational Need (JEON) requirements. There is a contract Option for six additional targets. The first target from this contract was successfully launched on 4QFY19.

The SRBM T4 and MRBM T4 (previously called the Aegis Readiness Assessment Vehicles (ARAVs)) target are historically and currently acquired through the Naval Surface Warfare Center Port Hueneme Division White Sands (NSWC PHD WS) via Military Interdepartmental Purchase Requests (MIPRs) funding transactions. NSWC PHD WS has unique sounding rocket expertise and access to existing contracts that makes this a beneficial relationship for both parties. The BMDS Targets Program Office awarded the Type-4 Subscale Targets contract to Orbital Sciences Corporation (wholly-owned subsidiary of NGIS) in late September 2019 to allow for an organic contracting vehicle for the Type-4 targets. This Type-4 Subscale contract has a base quantity of four SRBMs, five MRBMs, with options for up to 17 SRBMs and 7 MRBMs. To further reduce mission and schedule risk, the BMDS Targets Program Office will maintain relationship with NSWC PHD WS as a backup plan/surge support to provide emerging and quick turn target requirements. In addition, for other short and medium range subscale targets with special/unique guidance requirements; the BMDS Targets Program Office, also through MIPRs, acquires targets through the US Army Space and Missile Defense Command (USASMDC).

The BMDS Targets Program Future Acquisition Strategy is based on two premises. The first is to utilize existing capabilities/infrastructure and sustain an industrial base to deliver targets. The second is to initiate acquisitions that delivers low cost/affordable targets that emulate evolving threats. The Acquisition Strategy is proceeding through the MDA Acquisition Panel/Board reviews for decision-making. Depending on the approved outcome, multiple Request for Proposals may be released for future target acquisitions.

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Product Development ($ in Millions)

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Consumables - Short Range Ballistic Missiles (SRBM) - 10	FFRDC	Sandia National Lab : Albuquerque, NM	4.771	3.701	Dec 2018	0.000		2.184	Dec 2020	-		2.184	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 11	FFRDC	MIT Lincoln Laboratory : Hanscom AFB, Lexington, MA	0.000	0.000		0.000		1.022	Dec 2020	-		1.022	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 12	MIPR	Space and Missile Defense Command : Huntsville, AL	0.000	0.072	Nov 2018	0.000		4.362	Nov 2020	-		4.362	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 13	MIPR	Marshall Space Flight Center : Huntsville, AL	0.000	0.169	Jan 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 14	MIPR	Defense Finance and Accounting Service : Indianapolis, IN	0.000	7.407	Jan 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 2	MIPR	Naval Surface Warfare Center, Port Hueneme : Port Hueneme, CA	79.595	6.687	Nov 2018	5.413	Nov 2019	2.280	Nov 2020	-		2.280	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 7	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	20.965	0.000		0.000		0.000		-		0.000	0.000	20.965	20.965
Consumables - Short Range Ballistic Missiles (SRBM) - 8	C/CPIF	Northrop Grumman Innovation Systems : Chandler, AZ	0.000	8.299	Sep 2019	45.804	Nov 2019	36.504	Nov 2020	-		36.504	Continuing	Continuing	Continuing
Consumables - Short Range Ballistic Missiles (SRBM) - 9	FFRDC	Johns Hopkins University Applied Physics Laboratory : Laurel, MD	12.553	0.090	Dec 2018	0.220	Dec 2019	0.664	Dec 2020	-		0.664	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 1	C/CPAF	Lockheed Martin Space Systems	455.573	11.009	Nov 2018	0.000		21.565	Nov 2020	-		21.565	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

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		Company : Huntsville, AL													
Consumables - Medium Range Ballistic Missiles (MRBM) - 10	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	106.832	55.613	Nov 2018	35.894	Nov 2019	13.102	Nov 2020	-		13.102	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 11	MIPR	Naval Surface Warfare Center : Crane, IN	0.011	0.000		0.000		0.020	Nov 2020	-		0.020	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 15	FFRDC	Applied Physics Lab/Johns Hopkins University : Laurel, MD	2.151	14.990	Dec 2018	2.878	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 16	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	0.000	0.000		2.966	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 17	MIPR	Space and Missile Systems Center : Albuquerque, NM	3.321	0.000		6.446	Nov 2019	0.000		-		0.000	0.000	9.767	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 18	MIPR	Yuma Proving Grounds : Yuma, AZ	0.316	0.000		0.000		0.062	Nov 2020	-		0.062	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 19	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.187	0.000		0.000		0.000		-		0.000	0.000	0.187	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 2	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	280.133	87.010	Nov 2018	59.465	Nov 2019	84.915	Nov 2020	-		84.915	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 20	MIPR	Defense Finance and Accounting Service : Indianapolis, IN	0.010	0.820	Jan 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 21	MIPR	Cape Canaveral 45th Space Wing : Cape Canaveral, FL	0.742	0.000		0.000		0.864	Nov 2020	-		0.864	Continuing	Continuing	Continuing

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Consumables - Medium Range Ballistic Missiles (MRBM) - 22	FFRDC	Georgia Tech Research Institute : Huntsville, AL	4.946	0.000		0.000		3.814	Dec 2020	-		3.814	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 23	MIPR	Pacific Missile Range Facility : Barking Sands, HI	1.058	0.000		0.000		0.000		-		0.000	0.000	1.058	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 24	MIPR	US Army Redstone Test Center : Huntsville, AL	0.404	0.000		0.000		0.000		-		0.000	0.000	0.404	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 25	MIPR	30th Space Wing : Vandenberg AFB, CA	0.242	0.000		0.000		0.000		-		0.000	0.000	0.242	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 26	FFRDC	MIT Lincoln Laboratory : Hanscom AFB, Lexington, MA	0.000	0.000		0.000		10.446	Dec 2020	-		10.446	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 27	MIPR	National Security Agency : Fort Meade, MD	0.000	0.014	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 3	FFRDC	Sandia National Laboratories : Albuquerque, NM	4.600	57.467	Dec 2018	20.200	Dec 2019	50.796	Dec 2020	-		50.796	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 4	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	8.324	21.125	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Medium Range Ballistic Missiles (MRBM) - 7	MIPR	Space and Missile Defense Command : Huntsville, AL	6.113	0.000		0.000		0.000		-		0.000	0.000	6.113	0.000
Consumables - Medium Range Ballistic Missiles (MRBM) - 8	C/CPAF	Northrop Grumman Innovation Systems : Chandler, AZ	0.000	0.000		7.906	Nov 2019	32.310	Nov 2020	-		32.310	Continuing	Continuing	Continuing

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Product Development ($ in Millions)

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Consumables - Medium Range Ballistic Missiles (MRBM) - 9	MIPR	Defense Information Systems Agency : Fort Meade, MD	0.105	0.104	Nov 2018	0.079	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	567.394	47.913	Nov 2018	68.081	Nov 2019	49.247	Nov 2020	-		49.247	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 12	MIPR	Naval Air Weapons Station : China Lake, CA	0.000	0.000		0.121	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 15	FFRDC	Sandia National Laboratories : Albuquerque, NM	10.769	0.000		5.717	Dec 2019	0.659	Dec 2020	-		0.659	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 16	FFRDC	Georgia Tech Research Institute : Atlanta, GA	1.923	0.000		3.417	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 17	MIPR	Space and Missile Systems Center : Albuquerque, NM	0.000	1.881	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 18	MIPR	Naval Surface Warfare Center : Crane, IN	0.003	0.000		0.000		0.000		-		0.000	0.000	0.003	0.000
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 19	MIPR	L3 Communications/ Coleman Aerospace : Orlando, FL	0.000	4.406	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 20	MIPR	Redstone Arsenal Garrison : Huntsville, AL	0.000	0.160	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Consumables - Intermediate Range Ballistic Missiles (IRBM) - 21	MIPR	United States Army Sustainment Command : Rock Island Arsenal, IL	0.000	0.002	Nov 2018	0.000		0.000		-		0.000	0.000	0.002	0.000
Consumables - Intermediate Range Ballistic Missiles (IRBM) - 4	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	64.607	6.688	Nov 2018	5.416	Nov 2019	5.579	Nov 2020	-		5.579	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 1	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	241.349	30.707	Nov 2018	74.101	Nov 2019	38.273	Nov 2020	-		38.273	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 10	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	22.376	0.000		0.000		0.000		-		0.000	0.000	22.376	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 14	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	0.330	0.000		0.000		0.000		-		0.000	0.000	0.330	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 15	FFRDC	MIT Lincoln Laboratory : Hanscom AFB, Lexington, MA	8.399	12.084	Jan 2019	0.000		0.000		-		0.000	0.000	20.483	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 16	C/CPAF	Orbital/Alliant Techsystems : Magna, UT	0.000	4.978	Dec 2018	0.000		5.126	Nov 2020	-		5.126	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 17	MIPR	Georgia Tech Applied Research : Atlanta, GA	0.000	5.595	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 18	MIPR	Naval Surface Warfare Center : Indian Head, MD	0.000	0.393	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 19	MIPR	Sandia National Lab : Albuquerque, NM	0.000	12.332	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

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Consumables - Intercontinental Ballistic Missiles (ICBM) - 20	C/CPFF	Venturi Aerospace : Huntsville, AL	0.000	0.116	Nov 2018	0.000		0.000		-		0.000	0.000	0.116	0.000
Consumables - Intercontinental Ballistic Missiles (ICBM) - 4	MIPR	Naval Air Weapons Station : China Lake, CA	0.605	0.000		0.096	Nov 2019	0.085	Nov 2020	-		0.085	Continuing	Continuing	Continuing
Consumables - Intercontinental Ballistic Missiles (ICBM) - 5	MIPR	Naval Surface Warfare Center, Dahlgren Division : Dahlgren, VA	0.071	0.000		0.084	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Joint Emergent Operational Need Statement (JEON) - 1	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	34.900	0.000		9.600	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Consumables - Joint Emergent Operational Need Statement (JEON) - 2	MIPR	White Sands Missile Range : White Sands, NM	0.000	0.000		0.000		0.181	Nov 2020	-		0.181	Continuing	Continuing	Continuing
Consumables - Joint Emergent Operational Need Statement (JEON) - 3	MIPR	Naval Surface Warfare Division - Port Hueneme : Port Hueneme, CA	0.000	0.000		0.000		5.090	Nov 2020	-		5.090	Continuing	Continuing	Continuing
Consumables - Joint Emergent Operational Need Statement (JEON) - 4	MIPR	Space and Missile Defense Command : Huntsville, AL	0.000	4.500	Dec 2018	0.000		1.293	Nov 2020	-		1.293	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 1	C/CPAF	Targets TEAMS Support : Huntsville, AL	229.605	45.781	Nov 2018	35.165	Nov 2019	28.293	Nov 2020	-		28.293	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 10	MIPR	Missile Defense Agency : Huntsville, AL	169.563	27.695	Nov 2018	26.153	Nov 2019	29.674	Nov 2020	-		29.674	Continuing	Continuing	Continuing

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Program Planning & Operations - Program Planning and Operations - 12	C/FFP	Network Management Resources : Chantilly, VA	2.983	0.191	Nov 2018	0.123	Nov 2019	0.146	Nov 2020	-		0.146	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 13	MIPR	Naval Surface Warfare Center : Crane, IN	0.048	0.000		0.111	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 14	FFRDC	Mitre Corporation : Huntsville, AL	0.314	0.301	Dec 2018	0.162	Dec 2019	0.347	Dec 2020	-		0.347	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	4.441	1.986	Dec 2018	0.834	Dec 2019	2.085	Dec 2020	-		2.085	Continuing	Continuing	Continuing
Program Planning & Operations - Program Planning and Operations - 7	MIPR	US Army Aviation & Missile Command : Huntsville, AL	5.402	0.358	Nov 2018	0.211	Nov 2019	0.196	Nov 2020	-		0.196	0.000	6.167	0.000
Resources - Resources/ Logistics - 37	FFRDC	Aerospace Corporation : El Segundo, CA	2.978	3.572	Nov 2018	1.843	Nov 2019	4.093	Nov 2020	-		4.093	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 40	MIPR	Army Information Management Command : San Antonio, TX	0.081	0.000		0.000		0.334	Nov 2020	-		0.334	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 41	MIPR	Marshall Space Flight Center : Huntsville, AL	0.012	0.022	Dec 2018	0.011	Dec 2019	0.021	Dec 2020	-		0.021	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 42	MIPR	Dugway Proving Ground : Dugway, UT	0.015	0.023	Dec 2018	0.013	Dec 2019	0.028	Dec 2020	-		0.028	Continuing	Continuing	Continuing

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Resources - Resources - TBD	TBD	Future ILS/Systems Engineering Support : TBD	0.000	0.000		32.424	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 1	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	48.153	0.100	Nov 2018	0.198	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 12	MIPR	Redstone Arsenal Garrison : Huntsville, AL	3.410	0.000		0.014	Nov 2019	0.668	Nov 2020	-		0.668	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 18	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	3.260	0.101	Nov 2018	0.148	Nov 2019	0.831	Nov 2020	-		0.831	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 2	C/CPFF	Orbital/Alliant Techsystems : Magna, UT	1.449	0.000		0.000		0.000		-		0.000	0.000	1.449	0.000
Resources - Resources/ Logistics - 25	MIPR	Tooele Army Depot : Tooele, UT	1.376	0.229	Dec 2018	0.450	Dec 2019	0.471	Dec 2020	-		0.471	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 34	C/CPFF	Inuteq, Corp. : Beltsville, MD	2.660	0.386	Nov 2018	0.832	Nov 2019	0.841	Nov 2020	-		0.841	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 36	MIPR	Tobyhanna Army Depot : Tobyhanna, PA	2.581	1.623	Nov 2018	0.884	Nov 2019	1.589	Nov 2020	-		1.589	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 43	MIPR	US Army Corps of Engineers : Huntsville, AL	0.000	0.000		0.000		0.008	Nov 2020	-		0.008	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 44	C/CPAF	Jacobs Engineering Group : Huntsville, AL	0.000	0.000		0.000		0.140	Nov 2020	-		0.140	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 45	MIPR	Redstone Test Center : Huntsville, AL	0.000	0.000		0.000		0.119	Nov 2020	-		0.119	Continuing	Continuing	Continuing

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Resources - Resources/ Logistics - 46	MIPR	Space and Missile Systems Center : Albuquerque, NM	0.000	0.100	Dec 2018	0.000		5.833	Nov 2020	-		5.833	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 47	MIPR	Space and Missile Defense Command : Huntsville, AL	0.000	0.066	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 48	C/CPFF	Venturi Aerospace : Huntsville, AL	0.000	0.910	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 49	C/CPFF	Special Aerospace Services : Boulder, CO	0.000	0.295	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 5	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	9.453	0.000		0.281	Nov 2019	0.620	Nov 2020	-		0.620	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 50	MIPR	Missile Defense Agency : Huntsville, AL	0.000	0.021	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Logistics - 7	MIPR	Missile Defense Agency : Huntsville, AL	8.720	0.000		0.174	Nov 2019	1.625	Nov 2020	-		1.625	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 1	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	111.460	0.103	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 14	MIPR	Naval Air Warfare Center : Point Mugu, CA	6.688	0.960	Nov 2018	0.000		0.671	Nov 2020	-		0.671	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 17	MIPR	Defense Finance & Accounting Service : Indianapolis, IN	0.244	0.000		0.287	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 18	MIPR	Redstone Arsenal Garrison : Huntsville, AL	0.000	0.655	Nov 2018	0.035	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Resources/ Systems Engineering - 19	FFRDC	Sandia National Lab : Albuquerque, NM	5.821	4.857	Dec 2018	0.000		5.215	Dec 2020	-		5.215	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 2	FFRDC	Aerospace Corporation : El Segundo, CA	21.553	4.709	Dec 2018	3.969	Dec 2019	4.944	Dec 2020	-		4.944	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 20	MIPR	Space and Missile Defense Command : Huntsville, AL	0.720	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 21	C/CPAF	Draper Laboratory : Cambridge, MA	0.000	0.491	Nov 2018	0.000		0.467	Nov 2020	-		0.467	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 22	MIPR	Missile Defense Agency : Huntsville, AL	0.000	0.000		0.000		13.778	Nov 2020	-		13.778	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 6	FFRDC	Johns Hopkins University, Applied Physics Lab : Baltimore, MD	5.327	1.649	Nov 2018	0.823	Nov 2019	0.932	Nov 2020	-		0.932	Continuing	Continuing	Continuing
Resources - Resources/ Systems Engineering - 8	MIPR	Aviation & Missile Research, Dev & Eng Center : Huntsville, AL	63.944	7.270	Nov 2018	8.654	Nov 2019	9.404	Nov 2020	-		9.404	Continuing	Continuing	Continuing
Flight Test Execution - 1	MIPR	Missile Defense Agency : Huntsville, AL	7.132	0.084	Oct 2018	2.829	Oct 2019	15.292	Nov 2020	-		15.292	Continuing	Continuing	Continuing
Flight Test Execution - 10	MIPR	Hickam Field : Pearl Harbor, HI	0.410	0.000		0.052	Dec 2019	0.015	Dec 2020	-		0.015	Continuing	Continuing	Continuing
Flight Test Execution - 11	MIPR	Redstone Army Airfield : Redstone Arsenal, AL	0.075	0.000		0.062	Dec 2019	0.111	Dec 2020	-		0.111	Continuing	Continuing	Continuing
Flight Test Execution - 12	MIPR	Redstone Test Center : Huntsville, AL	0.238	0.000		0.075	Nov 2019	0.010	Nov 2020	-		0.010	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 13	C/CPAF	Orbital Sciences Corporation : Chandler, AZ	9.813	4.597	Nov 2018	3.894	Nov 2019	3.732	Nov 2020	-		3.732	Continuing	Continuing	Continuing
Flight Test Execution - 14	MIPR	Naval Air Warfare Center : Pt. Mugu, CA	0.865	0.000		3.848	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 15	C/CPAF	Lockheed Martin Space Systems Company : Huntsville, AL	0.000	0.000		0.089	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 17	MIPR	Columbus Air Force Base : Columbus, MS	0.000	0.000		0.025	Dec 2019	0.012	Dec 2020	-		0.012	Continuing	Continuing	Continuing
Flight Test Execution - 18	MIPR	Naval Surface Warfare Center : Dahlgren, VA	0.147	0.185	Nov 2018	0.275	Nov 2019	0.169	Nov 2020	-		0.169	Continuing	Continuing	Continuing
Flight Test Execution - 19	MIPR	National Security Agency : Fort Meade, MD	0.026	0.155	Nov 2018	0.068	Dec 2019	0.247	Dec 2020	-		0.247	Continuing	Continuing	Continuing
Flight Test Execution - 2	MIPR	Defense Finance and Accounting Services : Indianapolis, IN	18.156	7.967	Oct 2018	10.364	Nov 2019	4.100	Nov 2020	-		4.100	Continuing	Continuing	Continuing
Flight Test Execution - 20	MIPR	Naval Surface Warfare Center : Port Hueneme, CA	2.168	0.000		7.137	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 21	MIPR	Aviation and Missile Research Dev and Eng Center : Huntsville, AL	0.040	0.015	Nov 2018	0.000		0.042	Nov 2020	-		0.042	Continuing	Continuing	Continuing
Flight Test Execution - 22	MIPR	Andersen AFB : Guam	0.577	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 23	MIPR	Defense Logistics Agency : Fort Belvoir, VA	0.126	0.017	Nov 2018	0.000		0.099	Nov 2020	-		0.099	Continuing	Continuing	Continuing
Flight Test Execution - 24	MIPR	Kauai Test Facility : Kauai, HI	0.202	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 25	MIPR	Space and Missile Defense Command : Huntsville, AL	0.000	4.133	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 26	C/CPAF	Orbital/Alliant Techsystems : Magna, UT	0.000	0.703	Dec 2018	0.000		0.000		-		0.000	0.000	0.703	0.000
Flight Test Execution - 28	MIPR	Space and Missile Systems Center : Albuquerque, NM	0.000	1.501	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 29	MIPR	Sandia National Lab : Albuquerque, NM	0.000	0.605	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 3	MIPR	Pacific Missile Range Facility : Barking Sands, HI	19.492	0.940	Nov 2018	4.925	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 4	MIPR	Reagan Test Site : Kwajalein Atoll	9.670	0.168	Nov 2018	7.228	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - 5	MIPR	Edwards Air Force Base : Lancaster, CA	15.780	0.500	Nov 2018	7.627	Nov 2019	4.295	Nov 2020	-		4.295	Continuing	Continuing	Continuing
Flight Test Execution - 6	MIPR	US Army Yuma Proving Ground : Yuma, AZ	1.502	0.200	Nov 2018	1.593	Nov 2019	0.499	Nov 2020	-		0.499	Continuing	Continuing	Continuing
Flight Test Execution - 7	MIPR	Eglin Air Force Base : Eglin AFB, FL	0.684	0.000		0.210	Nov 2019	0.113	Nov 2020	-		0.113	Continuing	Continuing	Continuing
Flight Test Execution - 8	C/CPAF	L3 Communications/ Coleman Aerospace : Orlando, FL	2.393	5.900	Nov 2018	1.448	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - 9	MIPR	Air Force Research Laboratory : Wright Patterson AFB, OH	1.699	0.188	Dec 2018	1.729	Dec 2019	0.587	Dec 2020	-		0.587	Continuing	Continuing	Continuing
		Subtotal	2,749.134	538.644		521.181		513.139		-		513.139	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2,749.134	538.644		521.181		513.139		-		513.139	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may occur incrementally throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0603915C / *Ballistic Missile Defense Targets*	MT05 / *BMDS Targets Program*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)			▲																									
Award Future Subscale Targets Contract				▲																								
ICBM Pre-Ship Readiness Review (Ship Set 3)						△																						
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)						△																						
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)								△																				
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)								△																				
SRBM Black Dagger Pre-Ship Readiness Review (Ship Set 3)									△																			
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)										△																		
MRBM T4-B Pre-Ship Readiness Review (Ship Set 24)										△																		
MRBM T4-B Pre-Ship Readiness Review (Ship Set 25)										△																		
SRBM PF Zombie Pre-Ship Readiness Review (Ship Set 1)										△																		
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)													△															
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)														△														
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)														△														
MRBM Advanced Target Pre-Ship Readiness Review (Ship Set 1)															△													
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																△												
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)																△												
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 13)																△												
SRBM Black Dagger Pre-Ship Readiness Review (Ship Set 2)																	△											
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)																	△											
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)																		△										
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 1)																		△										
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 2)																		△										
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 3)																		△										

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MRBM Advanced Target Pre-Ship Readiness Review (Ship Set 2)																			△									
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)																				△								
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 4)																				△								
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)																					△							
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 5)																						△						
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 6)																						△						
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)																						△						
MRBM Type 1/Type2 Pre-Ship Readiness Review (Ship Set 7)																						△						
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)																								△				
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)																											△	
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 9)																											△	
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 10)																											△	
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 11)																											△	
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 15)																												△

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 1)	3	2019	3	2019
Award Future Subscale Targets Contract	4	2019	4	2019
ICBM Pre-Ship Readiness Review (Ship Set 3)	2	2020	2	2020
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 5)	2	2020	2	2020
SRBM T4-G Pre-Ship Readiness Review (Ship Set 1)	4	2020	4	2020
SRBM T4-G Pre-Ship Readiness Review (Ship Set 2)	4	2020	4	2020
SRBM Black Dagger Pre-Ship Readiness Review (Ship Set 3)	1	2021	1	2021
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 10)	2	2021	2	2021
MRBM T4-B Pre-Ship Readiness Review (Ship Set 24)	2	2021	2	2021
MRBM T4-B Pre-Ship Readiness Review (Ship Set 25)	2	2021	2	2021
SRBM PF Zombie Pre-Ship Readiness Review (Ship Set 1)	2	2021	2	2021
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 11)	1	2022	1	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 3)	2	2022	2	2022
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 12)	2	2022	2	2022
MRBM Advanced Target Pre-Ship Readiness Review (Ship Set 1)	3	2022	3	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	4	2022	4	2022
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	4	2022	4	2022
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 13)	4	2022	4	2022
SRBM Black Dagger Pre-Ship Readiness Review (Ship Set 2)	2	2023	2	2023
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 6)	2	2023	2	2023
MRBM Type 3/Configuration 2 Pre-Ship Readiness Review (Ship Set 7)	3	2023	3	2023
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 1)	3	2023	3	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MT05 / *BMDS Targets Program*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 2)	3	2023	3	2023
SRBM Type 4 Pre-Ship Readiness Review (Ship Set 3)	3	2023	3	2023
MRBM Advanced Target Pre-Ship Readiness Review (Ship Set 2)	3	2023	3	2023
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 4)	4	2023	4	2023
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 4)	4	2023	4	2023
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 14)	1	2024	1	2024
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 5)	2	2024	2	2024
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 6)	2	2024	2	2024
MRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)	2	2024	2	2024
MRBM Type 1/Type2 Pre-Ship Readiness Review (Ship Set 7)	2	2024	2	2024
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 5)	4	2024	4	2024
ICBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 6)	3	2025	3	2025
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 9)	3	2025	3	2025
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 10)	3	2025	3	2025
MRBM Type 4 Pre-Ship Readiness Review (Ship Set 11)	3	2025	3	2025
IRBM Type 1/Type 2 Pre-Ship Readiness Review (Ship Set 15)	4	2025	4	2025

Note

FY 2020 United States Indo-Pacific Command (USINDOPACOM) Joint Emerging Operational Needs (JEON) tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	118.532	16.469	20.845	21.296	-	21.296	23.569	20.870	26.643	29.493	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	16.469	20.845	21.296
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	16.469	20.845	21.296

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various; Multi : AL, CA, CO, VA	6.741	0.254	Jul 2019	0.313	Jul 2020	0.000		-		0.000	0.000	7.308	0.000
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	MDA : Multi: AK, AL, CA, CO, VA	0.000	0.000		0.000		0.434	Nov 2020	-		0.434	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Mantech Security Mission Assurance Corporation : Multi: AL, CO, CA, VA	0.000	2.422	Apr 2019	2.968	Dec 2019	6.906	Oct 2020	-		6.906	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi:AL, CA, CO, VA	22.796	11.000	Apr 2019	17.054	Jun 2020	12.985	May 2021	-		12.985	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support, International, and Materiel and Readiness	MIPR	Various Multi: : AK, AL, CA, CO, HI, VA	0.623	0.000		0.510	Jul 2020	0.545	Oct 2020	-		0.545	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	C/CPAF	Various : Multi: AL, VA	0.000	0.000		0.000		0.426	Aug 2021	-		0.426	Continuing	Continuing	Continuing
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AK, AL, CA, VA	24.724	2.793	May 2019	0.000		0.000		-		0.000	0.000	27.517	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	63.648	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	118.532	16.469		20.845		21.296		-		21.296	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	118.532	16.469		20.845		21.296		-		21.296	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0603915C / *Ballistic Missile Defense Targets*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	228.020	312.074	264.520	67.389	-	67.389	73.214	97.454	60.156	56.076	Continuing	Continuing
MD98: *Directed Energy Demonstrator Development*	91.574	224.771	116.266	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
MD99: *Discrimination Sensor Demonstrator Development*	108.733	74.710	132.187	64.237	-	64.237	69.845	93.065	56.599	52.528	Continuing	Continuing
MT99: *Technology Maturation Initiatives Test*	11.892	0.502	6.324	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.718
MC98: *Cyber Operations*	0.633	5.430	0.475	0.475	-	0.475	0.464	0.470	0.479	0.489	Continuing	Continuing
MD40: *Program Wide Support*	15.188	6.661	9.268	2.677	-	2.677	2.905	3.919	3.078	3.059	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects the reduction and reallocation of funding for Directed Energy Demonstrator Development (Laser Scaling) to higher priority Department investments, the completion of passive Electro Optical/Infrared (EO/IR) missile tracking tests and demonstrations, and removal of advanced sensor participation from the Integrated Master Test Plan (IMTP).

The FY 2021 funding request was reduced by $109.0 million during DWR to cancel BMD specific Laser Development.

A. Mission Description and Budget Item Justification

Technology Maturation Initiatives (TMI) demonstrates the utility of directed energy for missile defense. Missile Defense Agency's directed energy plan incrementally demonstrates and improves the constituent components required to execute a directed energy kill chain; acquisition, tracking, and lethality. The efforts shape future MDS acquisition choice by advancing the technology readiness levels of emerging and developing technology, while simultaneously assessing the performance and contributions to the MDS architecture. TMI includes analysis, development, demonstration, systems engineering and test efforts to examine, develop, and improve directed energy systems, disruptive directed energy concepts, sensors, and future missile defense technologies.

MDA will develop cost effective demonstrators to address specific technology risks and will focus on the following:
- Conduct sensor and directed energy system and subsystem tests to validate performance against emerging advanced threats
- Integrate an advanced sensor into an airborne platform to provide discrimination of lethal objects and other advanced sensor applications
- Develop a compact, ruggedized advanced sensor testbed that evolves technologies matured in lab and ground testing to a host platform demonstrating potential applications for persistent overhead discrimination

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*

Directed Energy Demonstrator Development (DEDD) addresses technology risk reduction and maturation for high powered strategic lasers, beam control, lethality, and related technologies. The efforts are tightly coupled with OUSD(R&E) High Energy Laser Development Road Map, and are essential to mature strategic laser technology. Beginning in FY 2021 this effort transitions from TMI to OUSD(R&E).

Discrimination Sensor Demonstrator Development (DSDD) includes the development of an advanced sensor to discriminate lethal objects beginning with airborne platforms to introduce sensors into the MDS, followed by integration of the sensor on other platforms in the future. The advanced sensor incorporates incrementally developed, integrated, and tested next-generation sensors and electronics to demonstrate Launch-on-Remote, Engage-on-Remote, discrimination and handover improvements for missile defense. These advanced sensors improve the probability of engagement success for stressing threats, expand the MDS battle space and increase the ability to negate larger raid sizes. They also help develop the associated concept of operations and provide the basis for a quick reaction precision tracking capability to augment radar. MDA may use this sensor to address emerging advanced threats.

Cyber Operations will make investments to provide enabling capabilities and asset protection to support all sensor and directed energy technical maturation initiatives.

MDA collaborates with the Combatant Commands, Defense Advanced Research Projects Agency, Department of Energy, Directed Energy Joint Transition Office, Military Departments, National Laboratories and OUSD(R&E) in a systems engineering based strategy to research, analyze, develop and test directed energy weapons technology.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	316.822	303.458	336.139	-	336.139
Current President's Budget	312.074	264.520	67.389	-	67.389
Total Adjustments	-4.748	-38.938	-268.750	-	-268.750
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-38.938			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-3.268	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-1.480	0.000	-268.750	-	-268.750

Change Summary Explanation

Decrease in FY 2020 reflects the Congressional reduction for Neutral Particle Beam and flight test.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*

Decrease in FY 2021 reflects the reduction and reallocation of funding for Directed Energy Demonstrator Development (Laser Scaling) to higher priority Department investments, the cancellation of the Neutral Particle Beam (NPB), and removal of advanced sensor participation from the Integrated Master Test Plan (IMTP).

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD98: *Directed Energy Demonstrator Development*	91.574	224.771	116.266	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the reduction and reallocation of Directed Energy Demonstrator Development (Laser Scaling) funding to higher priority Department investments.

A. Mission Description and Budget Item Justification

The Directed Energy Demonstrator Development (DEDD) project develops, integrates, and tests the component technologies required to scale electric lasers to hundreds of kilowatts. Laser scaling focuses on maturing laser capability to levels sufficient to enter into the OUSD(R&E) High Energy Laser Road Map efforts. The DEDD project provides the necessary technology, test data, and operations familiarity to successfully transition to a higher power directed energy weapon.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Directed Energy Demonstrator Development	224.771	116.266	0.000
Articles:	-	-	-

Description: Laser scaling develops, integrates, and tests the component technologies required for scaling electric lasers while maintaining excellent size, weight, and power metrics and near diffraction limited beam quality. MDA will maintain partnerships with OUSD(R&E), Industry, and National Laboratories to focus on directed energy capabilities.

Specific and/or unique planned accomplishments to each FY are as follows:

FY 2020 Plans:

Continue to develop scalable, efficient, and compact high-energy laser components for integration into high power systems
- Maintain partnerships with Industry and National Laboratories to focus on laser scaling.
- Perform component and sub-assembly testing, including pump diode integration design and test
- Finish detailed engineering drawing for components
- Verify Diode Pumped Alkali Laser (DPAL) power maturation, while maintaining beam quality demonstrated in the prior year
- Conduct DPAL preliminary design review (PDR)
- Verify Fiber Combined Laser (FCL) power maturation, while maintaining beam quality demonstrated in the prior year
- Conduct FCL PDR
- Conduct FCL laboratory demonstration

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Perform Beam Control component development and Lethality testing ***FY 2021 Plans:*** - No funding is requested in FY 2021 for this effort. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects a reduction and reallocation of funding to higher priority Department investments.			
Accomplishments/Planned Programs Subtotals	224.771	116.266	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Demonstrator Development - Beam Control and Lethality Demonstration	C/CPFF	TBD : TBD	0.000	0.000		41.884	Jun 2020	0.000		-		0.000	0.000	41.884	0.000
Directed Energy Demonstrator Development - Industry Laser Scaling	C/CPFF	Boeing : CA	0.000	0.000		15.800	Jan 2020	0.000		-		0.000	0.000	15.800	0.000
Directed Energy Demonstrator Development - LPLD Preliminary Design A	C/CPFF	Lockheed Martin : CA	24.138	16.356	Nov 2018	0.000		0.000		-		0.000	0.000	40.494	0.000
Directed Energy Demonstrator Development - LPLD Preliminary Design B	C/CPFF	General Atomics : CA	23.728	13.113	Nov 2018	0.000		0.000		-		0.000	0.000	36.841	0.000
Directed Energy Demonstrator Development - LPLD Preliminary Design C	C/CPFF	Boeing : CA	23.261	13.100	Nov 2018	0.000		0.000		-		0.000	0.000	36.361	0.000
Directed Energy Demonstrator Development - LPLD System Critical Design A (CPU)	C/CPFF	Lockheed Martin : CA	0.000	26.000	Feb 2019	0.000		0.000		-		0.000	0.000	26.000	0.000
Directed Energy Demonstrator Development - LPLD System Critical Design B (CPU)	C/CPFF	General Atomics : CA	0.000	26.000	Feb 2019	0.000		0.000		-		0.000	0.000	26.000	0.000
Directed Energy Demonstrator Development - LPLD	C/CPFF	Boeing : CA	0.000	26.000	Feb 2019	0.000		0.000		-		0.000	0.000	26.000	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Critical Design C (CPU)															
Directed Energy Demonstrator Development - Laser Lethality Demonstration	C/CPFF	General Atomics, AFRL, Redstone Testing Center, White Sands Missile Range : CA, AL, NM	3.089	1.089	Dec 2018	0.000		0.000		-		0.000	0.000	4.178	0.000
Directed Energy Demonstrator Development - Laser Scaling	C/Various	MIT LL, LLNL : MA, CA	0.000	85.000	Feb 2019	50.000	Feb 2020	0.000		-		0.000	0.000	135.000	0.000
Directed Energy Demonstrator Development - Performance Analysis	MIPR	MIT LL, Aviation and Missile Research Development and Engineering Center (AMRDEC),Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC) : MA, AL	2.204	3.163	Dec 2018	1.978	Jan 2020	0.000		-		0.000	0.000	7.345	0.000
Directed Energy Demonstrator Development - Technology Transfer/Component Development	MIPR	MIT LL, LLNL, AF : MA, CA, NM	10.302	5.907	Feb 2019	3.457	Feb 2020	0.000		-		0.000	0.000	19.666	0.000
		Subtotal	86.722	215.728		113.119		0.000		-		0.000	0.000	415.569	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Demonstrator Development - Advisory and Assistance Services	C/CPFF	MDA Multi : AL, NM	0.000	7.413	Oct 2018	0.000		0.000		-		0.000	0.000	7.413	0.000
Directed Energy Demonstrator Development - Engineering and Technical Services	MIPR	Aviation and Missile Research Development and Engineering Center (AMRDEC), Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC) : AL	2.221	0.000		0.000		0.000		-		0.000	0.000	2.221	0.000
Directed Energy Demonstrator Development - FFRDC	MIPR	Aerospace : AL, NM	1.450	0.000		1.664	Nov 2019	0.000		-		0.000	0.000	3.114	0.000
Directed Energy Demonstrator Development - Facility Support	Various	377th ABW, Phoenix : NM	0.150	0.118	Dec 2018	0.141	Nov 2019	0.000		-		0.000	0.000	0.409	0.000
Directed Energy Demonstrator Development - Facility Sustainment	C/CPFF	TBD : AL, NM	0.000	0.548	May 2019	0.000		0.000		-		0.000	0.000	0.548	0.000
Directed Energy Demonstrator Development - Information Technology	C/CPFF	Northrop Grumman, Jacobs Technology : CO	1.031	0.964	Nov 2018	0.957	Nov 2019	0.000		-		0.000	0.000	2.952	0.000
Directed Energy Demonstrator Development - Travel	Allot	MDA Multi : AL, NM	0.000	0.000		0.385	Oct 2019	0.000		-		0.000	0.000	0.385	0.000
		Subtotal	4.852	9.043		3.147		0.000		-		0.000	0.000	17.042	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	91.574	224.771		116.266		0.000		-		0.000	0.000	432.611	N/A

Remarks

Decrease from FY 2020 to FY 2021 reflects a realignment of DoD priorities.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Laser Scaling Development - Fiber Combined Laser (FCL)	✧	✧	✧	✧	✧	✧	✧	✧																				
Laser Scaling Development - Diode Pumped Alkali Laser (DPAL)	✧	✧	✧	✧	✧	✧	✧	✧																				
Industry Laser Scaling Critical Design Review				▲																								
Laser Scaling DPAL Beam Quality Measurement				▲																								
Industry Laser Scaling Technology Design Review - Phase I						△																						
Laser Scaling FCL Beam Quality and Power Demonstration							△																					
Laser Scaling DPAL Preliminary Design Review								△																				
Industry Laser Scaling Technology Design Review - Phase II								△																				

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD98 / *Directed Energy Demonstrator Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Laser Scaling Development - Fiber Combined Laser (FCL)	1	2019	4	2020
Laser Scaling Development - Diode Pumped Alkali Laser (DPAL)	1	2019	4	2020
Industry Laser Scaling Critical Design Review	4	2019	4	2019
Laser Scaling DPAL Beam Quality Measurement	4	2019	4	2019
Industry Laser Scaling Technology Design Review - Phase I	2	2020	2	2020
Laser Scaling FCL Beam Quality and Power Demonstration	3	2020	3	2020
Laser Scaling DPAL Preliminary Design Review	4	2020	4	2020
Industry Laser Scaling Technology Design Review - Phase II	4	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD99: *Discrimination Sensor Demonstrator Development*	108.733	74.710	132.187	64.237	-	64.237	69.845	93.065	56.599	52.528	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of passive Electro Optical/Infrared (EO/IR) missile tracking tests and demonstrations; objectives met in FY 2020.

A. Mission Description and Budget Item Justification

Areas of concentration include tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms. Discrimination Sensor Demonstrator Development (DSDD) demonstrates precision track of advanced threats at extended ranges, simple scene discrimination, and then complex scene discrimination through ground, flight, and space demonstrations.

Develops and tests high-precision advanced sensors that improve incoming threat identification, acquisition, tracking, and discrimination; specifically addressing U.S. Strategic Command's Prioritized Capabilities List requirements. DSDD activities and software maturation enhances the MDS capability to discriminate lethal objects in a threat cluster, and track and hand over the threat object with Aegis Launch on Remote and Engage on Remote precision. The increased kinematics envelope of the SM-3 Block IIA, when combined with Engage on Remote capability, will expand battlespace and increase the number of threats engaged.

This effort includes the development of next-generation General Atomics' advanced sensor systems to include tracking lasers, specialized detectors, unique processors and the corollary ground, airborne and space subsystems. These advanced sensors operate at strategic ranges required to augment MDS radar, improve MDS discrimination capability and provide precision track of large raids. They have the potential for tracking multiple targets simultaneously, substantially reducing the number of sensor assets required for large raids. The program leverages technology demonstrated from the ground and in the air to develop Massachusetts Institute of Technology/Lincoln Laboratory's (MIT/LL) compact ruggedized advanced sensor technology. This effort includes cost-effective focal plane arrays and advanced sensor components to inform future MDS layer decisions for persistent tracking and discrimination. MIT/LL will develop and test sensors to advance technology and assess system performance from the ground and on host platforms.

The Project includes sensor integration to test in operationally relevant environments and demonstrations. Platforms equipped with a sensor could provide the MDA a viable quick reaction capability to augment MDS radar. MDA is exploring options to partner with the Services and develop concepts for cost effective integration of sensor, radio frequency, and radar technologies into limited fielding prototypes, which may inform follow-on development decisions.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Discrimination Sensor Demonstrator Development	74.710	132.187	49.239
Articles:	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Description: Discrimination Sensor Demonstrator Development (DSDD) project develops an advanced sensor system (tracking laser, advanced detector, infrared sensor, and precision tracking and discrimination algorithms) for participation in MDS tests under operationally relevant conditions and at operationally relevant ranges. The sensors upgrade will provide capability for tracking and discrimination of lethal objects. In addition, it provides passive stereo tracking and discrimination algorithms for the same. The sensors provide capability for tracking and discrimination of missile representative objects. Specific and/or unique planned accomplishments for each FY are as follows: ***FY 2020 Plans:*** - Continue airborne advanced sensor design maturation to incorporate advanced threat and discrimination -- Begin test design for active flight tests -- Begin ground test for next generation advanced sensor - Integrate FY 2019 ground test results into follow-on technology transfer for next generation advanced sensor - Develop Technology Design Review criteria for a compact ruggedized advanced sensor for future space application - Award compact ruggedized advanced sensor contract - Continue passive EO/IR missile tracking tests and demonstrations to complete data gathering for model baselining ***FY 2021 Plans:*** - Integrate advanced sensor into an aircraft mounted pod in alignment with Combatant Command requirements - Integrate ruggedized advanced sensor into an aircraft mounted pod in alignment with Combatant Command requirements - Conduct CONUS advanced sensor active ground and flight tests with new beam director - Continue fabrication and testing of ruggedized advanced sensor subsystems - Conduct CONUS ruggedized advanced sensor active ground and flight tests ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completed passive EO/IR missile tracking tests and demonstrations; objectives met in FY 2020. Additionally, change from FY 2020 to FY 2021 separates program operation activities into distinct program accomplishments to provide greater visibility.			
Title: Program Operations	0.000	0.000	14.998
Articles:	-	-	-
Description: Program Operations provides strategic planning, program integration, acquisition, contracting, engineering, financial management, internal reviews and audits, and program assessments for the Technology Maturation Initiatives Program. Recurring activities include:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide technical and business management support activities to deliver critical program status and decision quality data - Ensure program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process - Conduct internal program reviews to measure program progress - Continue a mission assurance and engineering program to include quality, configuration management, manufacturing, systems engineering, and safety in all phases of the system life cycle - Provide Quality Safety and Mission Assurance operations to ensure compliance with Agency requirements for design, test, manufacturing, quality, safety and reliability to ensure high quality products are delivered to the Warfighter ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** See recurring activities above. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 separates program operation activities into distinct program accomplishments to provide greater visibility.			
Accomplishments/Planned Programs Subtotals	74.710	132.187	64.237

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost

Remarks

D. Acquisition Strategy

The acquisition strategy for DSDD consists of a contract(s) to industry via the Advanced Technology Innovation Broad Agency Announcement and competitive procurements and agreements with Federally Funded Research and Development Centers to develop and demonstrate an advanced sensor system in realistic test environments. MDA will leverage agency partner subject matter experts and use government model based assessments for better acquisition decisions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Advanced Sensor - FFRDC	MIPR	Aerospace : CA	0.000	0.000		0.000		1.529	Nov 2020	-		1.529	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Advanced Sensor Flight Demonstrator	Various	General Atomics, MIT/LL, TBD : C, MA, TBD	33.679	19.975	Jan 2019	51.447	Nov 2019	26.628	Nov 2020	-		26.628	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Advanced Sensor Ground Test	MIPR	MIT LL, Aerospace : MA, CA	20.783	11.700	Oct 2018	2.000	Nov 2019	0.000		-		0.000	0.000	34.483	0.000
Discrimination Sensor Demonstrator Development - Advanced Sensor Performance Analysis Aegis Engage on Remote Hardware in the Loop (HWIL)	MIPR	MIT LL, Aviation and Missile Research, Development, Engineering Center (AMRDEC), and Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC) : MA, AL	10.235	5.779	Dec 2018	5.900	Dec 2019	4.980	Dec 2020	-		4.980	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - Compact Ruggedized Advanced Sensor	Various	MIT LL, Industry (TBD) : MA, TBD	0.000	11.595	May 2019	14.715	Jan 2020	16.102	Nov 2020	-		16.102	Continuing	Continuing	Continuing
Discrimination Sensor Demonstrator Development - EO/IR Flight Tests	C/CPFF	General Atomics : CA	20.423	15.889	Sep 2019	44.100	Nov 2019	0.000		-		0.000	0.000	80.412	0.000
		Subtotal	85.120	64.938		118.162		49.239		-		49.239	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Discrimination Sensor Demonstrator Development - Advisory and Assistance Services	C/CPFF	Various : NM, AL	5.494	0.000		3.049	Nov 2019	0.000		-		0.000	0.000	8.543	0.000
Discrimination Sensor Demonstrator Development - Civilian Salaries and Travel	Allot	MDA Multi : AL, NM	7.804	4.698	Oct 2018	6.283	Oct 2019	0.000		-		0.000	0.000	18.785	0.000
Discrimination Sensor Demonstrator Development - Engineering and Technical Services	MIPR	Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Combat Capabilities Development Command - Aviation and Missile Center (CCDC-AMC), Aerospace Aerospace : AL, CA	2.269	1.847	Dec 2018	0.844	Oct 2019	0.000		-		0.000	0.000	4.960	0.000
Discrimination Sensor Demonstrator Development - Facility Support	MIPR	377th ABW : NM	0.311	0.000		0.470	Oct 2019	0.000		-		0.000	0.000	0.781	0.000
Discrimination Sensor Demonstrator Development - Information	C/CPAF	Northrop Grumman, Jacobs Technology : CO	7.735	3.227	Oct 2018	3.379	Oct 2019	0.000		-		0.000	0.000	14.341	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Management and Technology															
Program Operations - Advisory and Assistance Services	C/CPFF	Various : NM, AL	0.000	0.000		0.000		5.793	Nov 2020	-		5.793	Continuing	Continuing	Continuing
Program Operations - Civilian Salaries	Allot	MDA Multi : NM, AL	0.000	0.000		0.000		5.493	Nov 2020	-		5.493	Continuing	Continuing	Continuing
Program Operations - Facility Support	MIPR	377th ABW : NM	0.000	0.000		0.000		0.310	Oct 2020	-		0.310	Continuing	Continuing	Continuing
Program Operations - Information Management and Technology	C/CPAF	Northrop Grumman, Jacobs Technology : CO	0.000	0.000		0.000		3.402	Oct 2020	-		3.402	Continuing	Continuing	Continuing
		Subtotal	23.613	9.772		14.025		14.998		-		14.998	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	108.733	74.710		132.187		64.237		-		64.237	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Passive Flight Test	✧	✧	✧	✧	✧	✧	✧	✧																				
Advanced Sensor Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Passive Flight Test Contract Extension				▲																								
Passive Flight Software Maturation						△																						
Compact Ruggedized Advanced Sensor Development							✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Advanced Sensor Discrimination Development															✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD99 / *Discrimination Sensor Demonstrator Development*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Passive Flight Test	1	2019	4	2020
Advanced Sensor Development	1	2019	4	2026
Passive Flight Test Contract Extension	4	2019	4	2019
Passive Flight Software Maturation	2	2020	2	2020
Compact Ruggedized Advanced Sensor Development	3	2020	4	2026
Advanced Sensor Discrimination Development	3	2022	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT99: *Technology Maturation Initiatives Test*	11.892	0.502	6.324	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	18.718
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of passive Electro-Optical Infrared (EO/IR) missile tracking tests and demonstrations; objectives met in FY 2020. Beginning FY 2021, the advanced sensor is removed from Integrated Master Test Plan (IMTP) participation. Component and sub-system level test participation will continue and is funded in the MD99 Discrimination Sensor Demonstrator Development budget project.

A. Mission Description and Budget Item Justification

The TMI test project funds the management and execution of TMI system participation in MDS level tests, hardware-in-the-loop testing, and performance analysis costs for flight test data. This includes test asset shipment to test ranges, labor, travel, range support, C2BMC test support specific to TMI. No funding is requested for this project in FY 2021.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Technology Maturation Initiatives Test	0.502	6.324	0.000
Articles:	-	-	-

Description: The TMI Test project tests the systems developed under the DEDD and DSDD projects under realistic conditions in conjunction with on-going MDS testing and through dedicated live fire tests to inform continued testing, full development and limited fielding decisions. This effort also demonstrates potential sensors, systems, and architectures to integrate the MDS for left through right of launch.

Specific and/or unique planned accomplishments to each FY are as follows:

FY 2020 Plans:
- Conduct system level hardware-in-the-loop testing in conjunction with Enterprise Sensor Laboratory and Experimental Laboratory for MDS level tests
- Shipping, labor, travel, and range support for MDS level tests

FY 2021 Plans:
- No funding is requested in FY 2021 for the Technology Maturation Initiatives Test budget project.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Decrease from FY 2020 to FY 2021 reflects the completion of passive EO/IR missile tracking tests and demonstrations, and removes advanced sensor participation from the IMTP.			
Accomplishments/Planned Programs Subtotals	0.502	6.324	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Maturation Initiatives Test - Command Control Battle Management and Communications/Aegis	Various	Northrop Grumman, Lockheed Martin, Space and Naval Warfare Center, National Air and Space Intelligence Center, Naval Surface Warfare Center Dahlgren Division : CO, CA, OH, VA	4.574	0.494	Jan 2019	1.324	Oct 2019	0.000		-		0.000	0.000	6.392	0.000
Technology Maturation Initiatives Test - Range Facility Test Prep	MIPR	Pacific Missile Range Facility, Edwards AFB : HI, CA	0.429	0.008	Jan 2019	0.600	Oct 2019	0.000		-		0.000	0.000	1.037	0.000

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Maturation Initiatives Test - Reagan Test Site Prep	MIPR	Reagan Test Site : Kwajalein Atoll	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Technology Maturation Initiatives Test - Transportation Costs	MIPR	US Air Force : CA	6.889	0.000		4.400	Oct 2019	0.000		-		0.000	0.000	11.289	0.000
		Subtotal	11.892	0.502		6.324		0.000		-		0.000	0.000	18.718	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.892	0.502		6.324		0.000		-		0.000	0.000	18.718	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	▲																											
FTI-03 (OTA, OT Intercept Flight Test)	▲																											
GT-228	▲																											
FTG-11 (OT) (GM, OT Intercept Flight Test)		▲																										
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)							△																					
FEX-01 (OTHER, DT Tracking Exercise FT)					✧	✧	✧	✧																				
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)							△																					

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MT99 / *Technology Maturation Initiatives Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-45 (AEGIS 5.1, DT Intercept Flight Test)	1	2019	1	2019
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
GT-228	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTM-31 E1 (AEGIS SBT, DT/OT Intercept Flight Test)	3	2020	3	2020
FEX-01 (OTHER, DT Tracking Exercise FT)	1	2020	4	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC98: *Cyber Operations*	0.633	5.430	0.475	0.475	-	0.475	0.464	0.470	0.479	0.489	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Cyber Operations sustains the Missile Defense Agency DoD Risk Management Framework (RMF) and Controls Validation Testing activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones (POAM) for all Technology Maturation Initiative (TMI) mission systems. It maintains Certification and Accreditation data repository, capturing DoD Information Assurance Certification and Accreditation Program documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority accreditation decisions) and Plans of Action and Milestones on all MDA information systems.

This project monitors and tracks cybersecurity mitigations detailed in information technology security POAM. Activities include preparation of Certification and Accreditation documentation and accreditation recommendations to MDA Senior Information Assurance Officer /Certification Authority and Designated Approving Authority. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	5.430	0.475	0.475
Articles:	-	-	-
Description: The Cyber Operations project sustains MDA DoD RMF certification and Controls Validation Testing activities for the TMI PE. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Conduct cyber security and information assurance engineering and architecture planning for TMI information technology systems - Plan and test the information assurance controls for MDS TMI systems - Develop TMI DoD RMF certification and accreditation packages - Conduct controls validation testing for TMI mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Conduct annual information assurance reviews on the TMI enclaves to assess compliance in implementing and maintaining Information Assurance controls ***FY 2021 Plans:*** - Conduct cyber security and information assurance engineering and architecture planning for TMI information technology systems ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	5.430	0.475	0.475

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603178C: *Weapons Technology*	13.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for Cyber Operations, consists of using MDA civilian employees and the existing competitively awarded contractor support services.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Cyber Development and Engineering	C/CPFF	Davidson Technologies, JHU, Raytheon : AL, MD, MA	0.000	5.000	Jan 2019	0.000		0.000		-		0.000	0.000	5.000	0.000
Network / System Certification and Accreditation (C&A) - Cybersecurity Management and Computer Network Defense	C/CPFF	TEAMS : AL, NM	0.000	0.270	Jan 2019	0.300	Oct 2019	0.315	Nov 2020	-		0.315	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network / System Certification and Accreditation (C and A) - Agency Operations – Civilian Salaries and Travel	Allot	Missile Defense Agency : NM	0.302	0.160	Oct 2018	0.175	Oct 2019	0.160	Oct 2020	-		0.160	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Network / System Certification and Accreditation (C and A) - CDS Implementation	C/CPFF	Northrop Grumman : CO	0.331	0.000		0.000		0.000		-		0.000	0.000	0.331	0.000
		Subtotal	0.633	5.430		0.475		0.475		-		0.475	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.633	5.430		0.475		0.475		-		0.475	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Cyber Security Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Cybersecurity Contract Award - 2	▲																											
Cybersecurity Contract Award - 1	▲																											
Cybersecurity Contract Award - 3		▲																										
Controls Validation Certification 1			▲																									
Controls Validation Certification FY 2022															△													
Controls Validation Certification FY 2025																											△	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MC98 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Security Support	1	2019	4	2025
Cybersecurity Contract Award - 2	1	2019	1	2019
Cybersecurity Contract Award - 1	1	2019	1	2019
Cybersecurity Contract Award - 3	2	2019	2	2019
Controls Validation Certification 1	3	2019	3	2019
Controls Validation Certification FY 2022	3	2022	3	2022
Controls Validation Certification FY 2025	3	2025	3	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	15.188	6.661	9.268	2.677	-	2.677	2.905	3.919	3.078	3.059	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	6.661	9.268	2.677
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	6.661	9.268	2.677

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various : AL, CO, CA, VA	0.000	0.000		9.129	Nov 2019	1.262	Nov 2020	-		1.262	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	MIPR	Various : Multi: AL, VA	0.124	0.101	Jul 2019	0.139	Jul 2020	0.000		-		0.000	0.000	0.364	0.000
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK, AL, CO, CA, HI, MD, VA	0.000	0.000		0.000		1.200	Nov 2020	-		1.200	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AK, AL, CA, CO, VA	15.064	6.560	Jun 2019	0.000		0.000		-		0.000	0.000	21.624	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	C/FFP	Various : Multi: AK, AL, CA, CO, VA	0.000	0.000		0.000		0.215	Nov 2020	-		0.215	Continuing	Continuing	Continuing
		Subtotal	15.188	6.661		9.268		2.677		-		2.677	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.188	6.661		9.268		2.677		-		2.677	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604115C / *Technology Maturation Initiatives*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	63.032	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
MD29: *Hypersonic Defense*	63.032	127.222	383.506	196.749	-	196.749	103.254	106.617	109.577	111.878	Continuing	Continuing
MD40: *Program Wide Support*	-	5.390	6.698	10.083	-	10.083	4.267	4.467	5.910	6.455	0.000	43.270

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects FY 2020 Congressional increases.

The funding request for FY 2021 includes Joint Emergent Operational Need (JEON) PC-0015 requirements.

A. Mission Description and Budget Item Justification

This program element supports a focused program that includes executing the systems engineering process, kill chain technology identification and maturation, providing analysis and assessment of target of opportunity events, and executing near term sensor and command and control capability upgrades to address defense from hypersonic threats, which pose a significant threat.

The Hypersonic Defense effort will develop and demonstrate advanced technologies for future capabilities to counter hypersonic threats. The Missile Defense Agency (MDA) continues to assess architecture alternatives and provide recommendations for future Missile Defense System configurations to keep pace with evolving threats. MDA will leverage and upgrade existing systems, pursue hypersonic threat defeat weapon system capabilities, and develop technologies that augment future Hypersonic Defense architectures. These integrated sets of enhancements will provide incremental capabilities measured by progress and knowledge points in the following areas:

- Systems engineering (architecture analysis, technology prioritization, requirements development, integration planning, test planning & assessment, and lethality)
- Modification of existing Ballistic Missile Defense System (BMDS) Command, Control, Battle Management and Communications (C2BMC) element for hypersonic threats
- Hypersonic Defense Weapon Systems and Component Technology Development to enable a broad set of solutions including kinetic and non-kinetic means for future implementation

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	130.944	157.425	142.391	-	142.391
Current President's Budget	132.612	390.204	206.832	-	206.832
Total Adjustments	1.668	232.779	64.441	-	64.441
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	232.779			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.747	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	4.415	0.000	64.441	-	64.441

Change Summary Explanation

The FY 2020 increase reflects a Congressional add to accelerate Hypersonic Defense programs. This increase provides additional high risk component development and testing for the Glide Phase Defeat Weapon System, as well as additional Engineering Enablers, the leverage and upgrade of existing systems and partner flight test participation.

The FY 2021 increase provides for development of Glide Phase Defeat technologies to inform a future weapon system architecture, and provides advancing development and analysis needed to integrate Aegis BMD Weapon System capabilities with a glide phase defeat weapon to address hypersonic threats.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD29: *Hypersonic Defense*	63.032	127.222	383.506	196.749	-	196.749	103.254	106.617	109.577	111.878	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional increase.

A. Mission Description and Budget Item Justification

The Hypersonic Defense effort will develop and demonstrate advanced technologies for future capabilities to counter hypersonic threats.

The Missile Defense Agency (MDA) will conduct systems engineering activities and technology maturation to develop Missile Defense System architectures for future capabilities to defeat advanced threats. Efforts include kill chain and component allocations for requirements development, performance analysis, integration planning, and ground/flight test planning & assessment for near term and far term architectures.

MDA will continue operationalization and integration of the initial hypersonic tracking capability developed under U.S. Indo-Pacific Command (USINDOPACOM) Joint Emergent Operational Need (JEON) PC-0015 into the C2BMC program of record, Spiral 8.2-5. MDA plans to leverage the lessons learned and analysis from this capability development for the design and development of additional sensors for potential advanced threat applications. In addition, MDA will begin integrating these sensors into C2BMC and continue to enhance advanced threat ground processing to leverage data from these new sensors.

To address the weapon technology required to defeat the hypersonic threat, MDA will focus on the maturation of hypersonic defense component advancements, and the development of weapon concepts through competitive development efforts with industry. MDA will assess those concepts and identify technology component risk reduction efforts for cost, risk, and performance, and refine requirements to inform future development efforts. The Agency will also enhance analysis tools to assess concept designs and provide input to the requirements process.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Hypersonic Defense	127.222	0.000	0.000
Articles:	-	-	-
Description: This effort includes the systems engineering, technology development, and near-term component capability development activities required to evolve the BMDS to address hypersonic threats, to include architecture analysis, capability roadmap development, and requirements development. It also includes an assessment of existing and new capabilities, identification, development of new technology and capabilities needed across the kill chain in support of architecture alternatives, and the ability to address advanced threats.			
FY 2020 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Enacted FY 2020 position is reflected in the breakout of Hypersonic Defense activities to individual Accomplishment sections within this budget project for greater visibility.			
Title: Disruptive Technologies for Future Architecture	0.000	35.543	13.252
Articles:	-	-	-
Description: Provides identification, development of new technology and capabilities needed across the kill chain in support of Hypersonic Defense architecture alternatives, and the ability to address advanced threats. ***FY 2020 Plans:*** - Identify, develop, and demonstrate advanced technologies across the hypersonic defense full kill chain in the key areas of: -- Large field of view, digital focal plane array -- High speed processing & algorithm development -- High data rate, low latency processing and communications - Develop forward looking seeker technology -- Develop propulsion technology to increase maneuverability and energy management -- Accelerate on-chip processing and multi-mode sensor/seeker technologies -- Deliver an integrated single-axis atomic gyroscope-accelerometer capability to navigate under severe acceleration, shock, and vibration -- Mature software algorithms for the kill vehicle -- Mature modeling and simulation architecture through advanced concept development -- Continue development of advanced concepts to counter the evolving threats ***FY 2021 Plans:*** - Provide development of Weapon and Sensor System Component Technologies: -- Initial Digital Focal Plane Array deliveries under the Hypersonic and Ballistic Tracking Space Sensor -- Advanced technology efforts to increase Digital Focal Plane Arrays dynamic range for improved sensitivity across a broader range of threats -- Develop low-cost/light weight Focal Plane Array sensor supporting electronics and cooling for Hypersonic and Ballistic Tracking Space Sensor -- Develop propulsion technology to increase maneuverability and energy management			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Develop advanced concepts to counter the evolving threats ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Beginning in FY 2020, content per accomplishment has been broken out into further detail for greater visibility. Decrease from FY 2020 to FY 2021 reflects reprioritization of funds in FY 2021 to the Regional Glide Phase Defeat Weapon Systems Accomplishment.			
Title: Engineering Enablers	0.000	68.672	44.901
Articles:	-	-	-
Description: Provides systems engineering activities required to evolve the BMDS to address hypersonic threats, to include architecture analysis, capability roadmap development, and requirements development. ***FY 2020 Plans:*** - Execute the Hypersonic Defense program systems engineering process for integrating hypersonic defense capabilities into a layered missile defense system. - Lead Hypersonic Defense program; synchronizing element execution. - Complete analysis and assessments of target of opportunity events. - Perform architectural analysis to define initial Hypersonic Defense missile defense architectures, functional and performance needs using digital engineering techniques and tools. - Develop plans for capability integration; identify and resolve cross element integration technical and scheduling issues. - Update Hypersonic Defense architecture roadmap. - Conduct engineering to examine new track filter algorithms to support hypersonic threat behavior - Develop and provide threat products to support the development of hypersonic defense capabilities - Conduct engineering and modeling and simulation analysis to determine acceptable sensor and window characteristics for hypersonic velocity and temperatures: Window behaviors, boresight error and compensation, atmospheric effects, window mounting, window cover release, and dependence on flight conditions - Perform initial laboratory and wind-tunnel experiments on window behavior and plan experiments - Conduct engineering and modeling and simulation analysis to determine feasibility for different flight controls in endo-atmospheric conductions to achieve sufficient agility and lethality for interceptor - Update hypersonic defense Core Truth Models (CTM) and hardware-in-the-loop (HWIL) models to support testing - Conduct hypersonic defense lethality testing - Perform hypersonic defense gaps analysis ***FY 2021 Plans:*** - Conduct foundational Systems Engineering activities required to develop Hypersonic Defense, including concept definition, requirements and interfaces, system design, integration, test planning, and use of digital engineering tools and practices			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Provide key products for development and maintenance of the technical baseline -- Assess current BMDS capabilities against hypersonic threats and analyze future HD solutions to counter the evolving threat -- Develop and integrate modeling and simulation tools to validate HD requirements and assess HD performance -- Support HD reviews to coordinate the technical and program baselines to ensure development of a successful capability -- Continue to mature modeling and simulation architecture - Perform engineering analysis, develop requirements, and define interfaces for sensor-to-weapon fire control using C2BMC to lay the path for connectivity, battle management, and sensor tasking to a weapon system such as Aegis - Develop modeling and simulation for glide phase weapon lethality and conduct lethality testing ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Beginning in FY 2020, content formerly planned in the Hypersonic Defense accomplishment has been broken out into further detail for greater visibility. Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional plus up.			
Title: Leverage and Upgrade Existing Systems	0.000	86.627	21.212
Articles:	-	-	-
Description: This effort includes the assessment of and upgrades to existing BMD capabilities to address hypersonic threats. ***FY 2020 Plans:*** - Command and Control, Battle Management, Communication (C2BMC) Upgrades: -- Conduct Enterprise Sensor Laboratory (ESL)/C2BMC Hypersonic Defense capability development -- Perform C2BMC Hypersonic Defense integration -- Develop sensor cueing - Ground Sensor Upgrades: For AN/TPY-2 update and develop: -- Hypersonic threat profiles (database updates) -- Impact point prediction updates (threat/non-threat calls) -- Track filter techniques -- Interfaces -- Other (higher classification) - Upgrades and accelerations due to FY 2020 increased funding marks: -- Develop C2BMC expanded capabilities to support hypersonic defense, situational awareness, sensor management, advanced threat typing/custody and engagement coordination. System updates address additional processing, latency improvements and updated reporting -- For AN/TPY-2, update and develop Models & Simulation (M&S), M&S Ground Test support, and Battle Manager Interfaces ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Complete USINDOPACOM JEON response for real time detection warning, tracking, and reporting of Hypersonic Glide Vehicles (HGV) via C2BMC for BMDS situational awareness - Evaluate and support internal synchronization, technology insertion, and program requirements generation and validation - Continue to upgrade C2BMC and sensor cueing to provide C2BMC reporting of HGV tracks to BMDS weapon systems via Link 16 - Evaluate and support internal synchronization, technology insertion, and program requirements generation and validation ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Beginning in FY 2020, content formerly planned in the Hypersonic Defense accomplishment has been broken out into further detail for greater visibility. Decrease from FY 2020 to FY 2021 reflects the FY 2020 Congressional plus up.			
Title: Glide Phase Defeat Weapon System	0.000	88.585	117.384
Articles:	-	-	-
Description: This effort includes the near-term Regional Glide Phase Weapon System (RGPWS) capability maturation with the industry activities required to evolve the BMDS to address hypersonic threats. It also includes the assessment of and upgrades to existing Aegis BMD Weapon System capabilities for a Regional Glide Phase Weapon to address hypersonic threats. ***FY 2020 Plans:*** - Complete concept definition and refine design concepts for the Regional Glide Phase Weapon System. The weapon system designs, concepts and component technologies aid the Agency in establishing the foundation for glide phase weapons. - Conduct hypersonic technology risk reduction activities for the Glide Phase Weapon System - Begin Aegis Weapon System analysis to determine preliminary design modifications to support Glide Phase Weapon Control and Integration, to include physical and software required modifications - Initiate modeling changes needed to incorporate Glide Phase Weapon Control and Integration ***FY 2021 Plans:*** - Conduct RGPWS technical risk reduction activities and concept development/definition - Integrate technology for future demonstration of a RGPWS and collect data to inform future product development efforts - Refine contractor concept definition efforts, focusing on assessments of high risk areas to determine the feasibility of each concept's unique design characteristics - Conduct technical reviews of the RGPWS designs - Continue Aegis Weapon System analysis to determine preliminary physical and software design modifications - Continue modeling changes needed to incorporate Glide Phase Weapon Control and Integration - Begin analysis based on initial modeling to identify system design gaps and integration challenges needed to incorporate Glide Phase Weapon Control changes in the Aegis Weapon System			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Conduct reviews and activities for improving defense against hypersonic threats with the Aegis platform ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Beginning in FY 2020, content formerly planned in the Hypersonic Defense accomplishment has been broken out into further detail for greater visibility. Increase from FY 2020 to FY 2021 provides for development of Glide Phase Defeat technologies to inform a future weapon system architecture, and provides advancing development and analysis needed to integrate Aegis BMD Weapon System capabilities with a glide phase defeat weapon to address hypersonic threats.			
Title: Partnered Flight Test Participation	0.000	104.079	0.000
Articles:	-	-	-
Description: MDA's participation in Partner Flight Test events is critical for data collection across a diverse hypersonic threat set from multiple types of launch platforms. Participation in these test events supports the development and fielding of MDA's Hypersonic Defense capabilities to protect the United States, its allies, and deployed forces in all phases of flight. ***FY 2020 Plans:*** - Fully funds partner flight test participation and associated engineering test data analysis - Collect sensor data to support model validation, threat validation and development of hypersonic defense capabilities - Coordinate with partner flight test teams to ensure test collection resources and assets are integrated in a safe manner ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Beginning in FY 2020, content formerly planned in the Hypersonic Defense accomplishment has been broken out into further detail for greater visibility. Decrease from FY 2020 to FY 2021 reflects completion of MDA participation in Partnered Flight Test events.			
Accomplishments/Planned Programs Subtotals	127.222	383.506	196.749

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603176C: *Advanced Concepts and Performance Assessment*	12.720	46.201	14.910	-	14.910	15.178	16.205	16.879	17.300	Continuing	Continuing
• 0603180C: *Advanced Research*	42.100	27.674	18.687	-	18.687	18.883	18.975	19.720	20.222	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 1206895C: *Ballistic Missile Defense System Space Programs*	96.146	140.565	32.068	-	32.068	28.591	41.201	39.090	39.630	Continuing	Continuing

Remarks

D. Acquisition Strategy

To optimize Missile Defense System performance, MDA leverages the nation's engineering centers of excellence at government agencies, Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry. The executing agents use varying contracting strategies in a flexible manner to maximize their contribution to the Missile Defense System. MDA acquires products and services by competitive means to the extent that is possible, practical and uses the Advanced Technology Broad Area Announcement process to award concept definition contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Defense - BMDS C2BMC Upgrades	C/Various	Various : AL	13.375	20.270	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades - AN/TPY-2	SS/CPFF	Raytheon : MA	1.896	14.578	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - BMDS Sensor Upgrades - LRDR	C/FFP	Lockheed Martin : NJ	1.822	10.185	Feb 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Component Technology for Sensors and Weapons	MIPR	Various : AL	10.949	9.551	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - Advanced Threat Tracking and Analysis / Low Latency Processing	MIPR	Various : AL, CA	7.368	5.648	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Sensor Technology - Sensor Concept and Development	MIPR	Various : AL	6.714	14.808	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering	Allot	MDA : AL, VA	3.914	1.530	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering -- CSS	C/CPFF	TEAMS : AL, VA	3.250	3.438	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering -- FFRDC/UARC	MIPR	Various : VA, AL	2.000	5.257	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Systems Engineering -- Industry	C/CPAF	Boeing : AL	2.500	1.039	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Hypersonic Defense - Technology Development Program Operations	Allot	MDA : AL, VA	4.466	7.395	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Defense - Weapon Concept Definition & Risk Reduction	C/Various	Various : AL	4.778	33.523	Feb 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Disruptive Technologies for Future Architecture - Hypersonic Defense - Component Technology for Sensors and Weapons	MIPR	Various : AL	0.000	0.000		13.852	Nov 2019	5.460	Dec 2020	-		5.460	Continuing	Continuing	Continuing
Disruptive Technologies for Future Architecture - Hypersonic Defense - Sensor Technology - Advanced Threat Tracking and Analysis / Low Latency Processing	MIPR	Various : AL, CA	0.000	0.000		6.623	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Disruptive Technologies for Future Architecture - Hypersonic Defense - Sensor Technology / Sensor Concept and Development	MIPR	Various : AL	0.000	0.000		15.068	Nov 2019	7.792	Dec 2020	-		7.792	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense - Systems Engineering	Allot	MDA : AL, VA	0.000	0.000		3.000	Nov 2019	7.909	Nov 2020	-		7.909	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense - Systems Engineering - Lethality and Analysis	Various	Various : Various	0.000	0.000		8.600	Feb 2020	5.000	Nov 2020	-		5.000	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense - Systems Engineering - M&S	C/CPAF	Northrop Grumman : AL	0.000	0.000		6.600	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense -	Various	Various : Various	0.000	0.000		10.600	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering - Threat Engineering															
Engineering Enablers - Hypersonic Defense - Systems Engineering -- CSS	C/CPFF	TEAMS : AL, VA	0.000	0.000		11.308	Nov 2019	9.283	Nov 2020	-		9.283	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense - Systems Engineering -- FFRDC/UARC	MIPR	Various : AL, VA	0.000	0.000		24.000	Nov 2019	21.680	Jan 2021	-		21.680	Continuing	Continuing	Continuing
Engineering Enablers - Hypersonic Defense - Systems Engineering -- Industry	C/CPAF	Boeing : AL	0.000	0.000		4.564	Nov 2019	1.029	Nov 2020	-		1.029	Continuing	Continuing	Continuing
Leverage and Upgrade Existing Systems - Hypersonic Defense - BMDS C2BMC	Various	Various : Various	0.000	0.000		25.313	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Leverage and Upgrade Existing Systems - Hypersonic Defense - BMDS C2BMC Upgrades (Prime)	C/CPIF	Lockheed Martin : AL	0.000	0.000		0.000		2.000	Nov 2020	-		2.000	Continuing	Continuing	Continuing
Leverage and Upgrade Existing Systems - Hypersonic Defense - BMDS C2BMC Upgrades for HD	C/CPAF	Northrop Grumman : CO	0.000	0.000		14.942	Jan 2020	19.212	Nov 2020	-		19.212	Continuing	Continuing	Continuing
Leverage and Upgrade Existing Systems - Hypersonic Defense - BMDS Sensor Upgrades	C/FFP	Lockheed Martin : NJ	0.000	0.000		6.948	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Leverage and Upgrade Existing Systems - Hypersonic Defense -	SS/CPFF	Raytheon : MA	0.000	0.000		39.424	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BMDS Sensor Upgrades - AN/TPY-2															
Glide Phase Defeat Weapon System - Hypersonic Defense - Technology Development Program Operations	Allot	MDA : AL, VA	0.000	0.000		6.759	Nov 2019	4.230	Nov 2020	-		4.230	Continuing	Continuing	Continuing
Glide Phase Defeat Weapon System - Hypersonic Defense - Weapon Concept Definition and Risk Reduction	C/Various	Various : AL	0.000	0.000		81.826	Feb 2020	113.154	May 2021	-		113.154	Continuing	Continuing	Continuing
		Subtotal	63.032	127.222		279.427		196.749		-		196.749	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Partnered Flight Test Participation - Partner Flight Test Participation	MIPR	Space and Missile Defense Command/ US Maritime Administration/ Pacific Missile Range Facility/ Ronald Reagan Test Site/ L3/JHU/APL/ MDIOC/ Lockheed Martin/AMRDEC/ NSWC/NAWC : AL/ CA/CO/DC/HI/TN/TX	0.000	0.000		104.079	Jan 2020	0.000		-		0.000	0.000	104.079	0.000
		Subtotal	0.000	0.000		104.079		0.000		-		0.000	0.000	104.079	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	63.032	127.222		383.506		196.749		-		196.749	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
C2BMC System Requirements Review / Preliminary Design Review	▲																											
Hypersonic Defense Sensor and Weapons Component Technology Development Contract Award		▲																										
AoA Completion				▲																								
Weapon Systems Concept Definition Contract Award #2				▲																								
AN/TPY-2 Capability Development	✧	✧	✧	✧	✧	✧	✧	✧																				
LRDR Capability Development	✧	✧	✧	✧	✧	✧	✧	✧																				
Weapon Systems Concept Definition & Risk Reduction (Phases 1 and 2)	✧	✧	✧	✧	✧	✧	✧	✧																				
Hypersonic Threat Sensor Technology Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧												
C2BMC Capability Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Hypersonic Defense Sensor & Weapons Component Technology Capability Development	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Hypersonic Defense Sensor and Weapons Component Technology Performance Testing			✧	✧	✧	✧	✧	✧	✧	✧	✧	✧																
AN/TPY-2 System Requirements Review				▲																								
Weapons Technology Risk Reduction Contract(s) Award							✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD29 / *Hypersonic Defense*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
C2BMC System Requirements Review / Preliminary Design Review	1	2019	1	2019
Hypersonic Defense Sensor and Weapons Component Technology Development Contract Award	2	2019	2	2019
AoA Completion	4	2019	4	2019
Weapon Systems Concept Definition Contract Award #2	4	2019	4	2019
AN/TPY-2 Capability Development	1	2019	4	2020
LRDR Capability Development	1	2019	4	2020
Weapon Systems Concept Definition & Risk Reduction (Phases 1 and 2)	1	2019	4	2020
Hypersonic Threat Sensor Technology Development	1	2019	4	2022
C2BMC Capability Development	1	2019	4	2025
Hypersonic Defense Sensor & Weapons Component Technology Capability Development	1	2019	4	2025
Hypersonic Defense Sensor and Weapons Component Technology Performance Testing	3	2019	4	2021
AN/TPY-2 System Requirements Review	4	2019	4	2019
Weapons Technology Risk Reduction Contract(s) Award	3	2020	3	2026

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	-	5.390	6.698	10.083	-	10.083	4.267	4.467	5.910	6.455	0.000	43.270
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	5.390	6.698	10.083
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	5.390	6.698	10.083

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi, AL, CA, CO, VA	0.000	0.082	Aug 2019	0.100	Aug 2020	1.979	Nov 2020	-		1.979	0.000	2.161	0.000
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various : Multi: AK/ AL/CA/CO/HI/MD/ VA/NJ/NY/OCONUS	0.000	0.000		0.000		0.265	Nov 2020	-		0.265	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/Various	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	5.308	Aug 2019	0.000		0.000		-		0.000	0.000	5.308	0.000
Program Wide Support - Agency Operations, Sustainment and GPC	C/FFP	Various : Multi: AK, AL, CA, HI, NY, NM, VA	0.000	0.000		0.000		3.469	Nov 2020	-		3.469	Continuing	Continuing	Continuing
Program Wide Support - Facilities Maintenance	MIPR	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		6.598	Nov 2019	0.000		-		0.000	0.000	6.598	0.000
Program Wide Support - Facilities and Maintenance SRM	MIPR	Various : Multi: AK, AL, CA, CO, HI, VA	0.000	0.000		0.000		4.370	Dec 2020	-		4.370	Continuing	Continuing	Continuing
		Subtotal	0.000	5.390		6.698		10.083		-		10.083	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	5.390		6.698		10.083		-		10.083	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604181C / *Hypersonic Defense*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	70.735	181.667	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	252.402
MD40: *Program-Wide Support*	-	0.000	6.813	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.813

Program MDAP/MAIS Code: 362

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019/outyears: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

The FY 2021 funding request was reduced by $195.883 million during DWR to postpone HDR-Hawaii. Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

A. Mission Description and Budget Item Justification

The HDR-H Program Element (PE) 0604672C is comprised of a persistent discrimination sensor for the Missile Defense System (MDS).

Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	62.221	274.714	210.614	-	210.614
Current President's Budget	70.735	188.480	0.000	-	0.000
Total Adjustments	8.514	-86.234	-210.614	-	-210.614
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-86.234			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.485	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	9.999	0.000	-210.614	-	-210.614

Change Summary Explanation

Increase in FY 2019 reflects prime contract award and negotiated contract funding requirement in FY 2019.

Decrease in FY 2020 reflects enacted Congressional adjustment due to funding acceleration early to need; and radar foundation and thermal control system acquisition change from RDT&E to MILCON funding.

Decrease in FY 2021 is due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD41: *Homeland Defense Radar - Hawaii (HDR-H)*	-	70.735	181.667	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	252.402
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019/outyears: PE 0604672C Homeland Defense Radar Hawaii, Project MD41

Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

A. Mission Description and Budget Item Justification

Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Homeland Defense Radar - Hawaii (HDR-H)	70.735	181.667	0.000
Articles:	-	-	-
Description: Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.			
Specific and/or unique accomplishments to each FY are as follows:			
FY 2020 Plans: -Complete contract close out and document lessons learned			
FY 2021 Plans: -No funding is requested in FY 2021			
FY 2020 to FY 2021 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.			
Accomplishments/Planned Programs Subtotals	70.735	181.667	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing
• 32199903: *MILCON PLANNING and DESIGN*	0.000	12.872	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.872

Remarks

D. Acquisition Strategy

An acquisition strategy was approved in December 2017 for the procurement of a single Homeland Defense Radar (HDR) for Hawaii. In May of 2018, this acquisition strategy was updated to include the procurement of up to three Homeland Defense Radars. A competitively awarded multiple-award indefinite delivery, indefinite quantity (IDIQ) contract was awarded in July 2018 to three contractors. The first IDIQ delivery order was competitively awarded on December 18, 2018 for the development, construction, integration and testing, and delivery of one HDR to be sited in Hawaii. The HDR-H delivery order contract includes fixed price and cost-reimbursable line items that properly balance acquisition costs and risks. Performance and cost incentives were included to motivate contractor performance. The HDR-H delivery order contract includes the requirement for the radar prime to deliver a full technical data package (TDP) that will enable the Government to effectively and

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

affordably sustain the system. Due to a shift in Department of Defense priorities, the Department has postponed pursuing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. In light of the postponement of the program, the MDA is evaluating contract termination and other open commitments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Homeland Defense Radar - Hawaii (HDR-H) - Civilians/Travel	Allot	MDA : Various	0.000	0.972	Nov 2018	3.729	Oct 2019	0.000		-		0.000	0.000	4.701	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	0.057	Mar 2019	3.250	Mar 2020	0.000		-		0.000	0.000	3.307	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Contractor Support Services	C/CPFF	MDA Various : AL	0.000	2.389	Nov 2018	3.810	Oct 2019	0.000		-		0.000	0.000	6.199	0.000
Homeland Defense Radar - Hawaii (HDR-H) - FFRDC/UARC	MIPR	GTRI, JHU/APL, MITRE : GA, VA, AL	0.000	2.031	Nov 2018	1.172	Oct 2019	0.000		-		0.000	0.000	3.203	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Lead Service Cell	C/CPFF	MDA Various : AL, CO	0.000	0.308	Nov 2018	0.000		0.000		-		0.000	0.000	0.308	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Prime Contractor	C/FPIF	Lockheed Martin : NJ	0.000	61.151	Dec 2018	151.787	Jan 2020	0.000		-		0.000	0.000	212.938	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Radar Material	MIPR	Air Force : GA	0.000	0.175	Jun 2019	0.000		0.000		-		0.000	0.000	0.175	0.000
Homeland Defense Radar - Hawaii (HDR-H) - Site Activation & Studies	MIPR	Various : AL, HI	0.000	3.652	Mar 2019	17.919	Mar 2020	0.000		-		0.000	0.000	21.571	0.000
		Subtotal	0.000	70.735		181.667		0.000		-		0.000	0.000	252.402	N/A

Remarks

Due to a shift in Department of Defense priorities, the Department is postponing the development and fielding of a Homeland Defense Radar - Hawaii beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	70.735		181.667		0.000		-		0.000	0.000	252.402	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Homeland Defense Radar - Hawaii (HDR-H)	✧	✧	✧	✧	✧	✧	✧	✧																				
System Requirements Review (SRR)			✦																									

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD41 / *Homeland Defense Radar - Hawaii (HDR-H)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Homeland Defense Radar - Hawaii (HDR-H)	1	2019	4	2020
System Requirements Review (SRR)	3	2019	3	2019

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	0.000	6.813	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	6.813
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 20 Program Wide Support (PWS) is allocated to the Homeland Defense Radar-Hawaii PE. PWS is allocated on a pro-rata basis across multiple Agency program elements (PEs) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	0.000	6.813	0.000
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.000	6.813	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations and Support Services	C/Various	Various : Multi: AL, CA, CO, VA	0.000	0.000		6.813	Dec 2019	0.000		-		0.000	0.000	6.813	0.000
		Subtotal	0.000	0.000		6.813		0.000		-		0.000	0.000	6.813	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		6.813		0.000		-		0.000	0.000	6.813	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program Wide Support					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604672C / *Homeland Defense Radar-Hawaii*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program Wide Support	1	2020	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
MD51: *Pacific Radar (PAC Radar)*	-	14.453	5.156	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.609
MD40: *Program Wide Support*	-	0.000	1.555	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.555

Program MDAP/MAIS Code: 362

Note

Homeland Defense Radar - Hawaii (HDR-H) funding was appropriated/budgeted as follows:
FY 2017: PE 0603884C BMDS Sensors, Project MD41
FY 2018: PE 0604673C Pacific Discriminating Radar, Project MD41
FY 2019: PE 0604672C Homeland Defense Radar Hawaii, Project MD41.

Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

The FY 2021 funding request was reduced by $4.0 million during DWR to defer Pacific Radar Fielding.

A. Mission Description and Budget Item Justification

The Pacific Discriminating Radar Program Element is comprised of the PAC Radar program, a persistent discrimination sensor for the Missile Defense System (MDS).

Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	15.926	6.711	59.800	-	59.800
Current President's Budget	14.453	6.711	0.000	-	0.000
Total Adjustments	-1.473	0.000	-59.800	-	-59.800
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.380	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-1.093	0.000	-59.800	-	-59.800

Change Summary Explanation

Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD51: *Pacific Radar (PAC Radar)*	-	14.453	5.156	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	19.609
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.

A. Mission Description and Budget Item Justification

The mission of the PAC Radar program office is to define, develop, acquire, field, and sustain the radar as an element of the MDS. It will provide persistent tracking, midcourse discrimination, and hit assessment to support the defense of the Homeland against long-range missile threats and defense against regional threats in the USINDOPACOM area of responsibility.

Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Pacific Radar (PAC Radar)	14.453	5.156	0.000
Articles:	-	-	-
Description: Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete program close out ***FY 2021 Plans:*** - No funding requested ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021. Decrease from FY 2020 to FY 2021 reflects this change.			
Accomplishments/Planned Programs Subtotals	14.453	5.156	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing
• 31299903: *MILCON PLANNING and DESIGN*	6.184	35.472	0.000	-	0.000	0.000	0.000	0.000	0.040	0.000	41.696

Remarks

D. Acquisition Strategy

The PAC Radar acquisition strategy was approved in December 2017. The PAC Radar procurement was planned as part of the Multiple-Award Indefinite Delivery Indefinite Quantity (MAIDIQ) contract that would include the full/open competitive award of the Delivery Order for the PAC Radar no later than FY 2023. Due to a shift in Department of Defense priorities, the Department is no longer pursuing the development and fielding of a Pacific Discriminating Radar beginning in FY 2021.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pacific Radar (PAC Radar) - Civilian/Travel	Allot	MDA : Various	0.000	0.474	Nov 2018	1.225	Oct 2019	0.000		-		0.000	0.000	1.699	0.000
Pacific Radar (PAC Radar) - Communications Integration	SS/CPIF	Lockheed Martin : AL	0.000	5.618	Mar 2019	2.984	Oct 2019	0.000		-		0.000	0.000	8.602	0.000
Pacific Radar (PAC Radar) - Contractor Support Services	Various	Various : Various	0.000	2.921	Nov 2018	0.947	Oct 2019	0.000		-		0.000	0.000	3.868	0.000
Pacific Radar (PAC Radar) - FFRDC/UARC	MIPR	GTRI, JHU, MIT, MITRE : AL, GA, MA, VA	0.000	4.455	Nov 2018	0.000		0.000		-		0.000	0.000	4.455	0.000
Pacific Radar (PAC Radar) - Site Activation & Studies	C/CPFF	Various : Various	0.000	0.985	Feb 2019	0.000		0.000		-		0.000	0.000	0.985	0.000
		Subtotal	0.000	14.453		5.156		0.000		-		0.000	0.000	19.609	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	14.453		5.156		0.000		-		0.000	0.000	19.609	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Pacific Radar	✧	✧	✧	✧	✧	✧	✧	✧																				

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD51 / *Pacific Radar (PAC Radar)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Pacific Radar	1	2019	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	-	0.000	1.555	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.555
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2020, Program Wide Support (PWS) was proportionately reallocated to the Pacific Discriminating Radar program element. PWS is allocated on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	0.000	1.555	0.000
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.000	1.555	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	0.000	0.000		1.555	Dec 2019	0.000		-		0.000	0.000	1.555	0.000
		Subtotal	0.000	0.000		1.555		0.000		-		0.000	0.000	1.555	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		1.555		0.000		-		0.000	0.000	1.555	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604673C / *Pacific Discriminating Radar*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2020	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	734.077	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing
MD96: *Long Range Discrim Radar (LRDR)*	694.500	164.759	131.446	131.804	-	131.804	114.073	86.668	57.168	39.450	Continuing	Continuing
MD40: *Program Wide Support*	39.577	7.946	4.977	5.452	-	5.452	4.714	3.631	3.083	2.276	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The mission of the Long Range Discrimination Radar (LRDR) program is to design, develop, integrate, deliver, field, and sustain the LRDR as an element of the Missile Defense System (MDS) Increment 6b Homeland Defense (HLD) Capability. This capability is representative of LRDR Configuration 1. Initial fielding of the LRDR is planned for 2020 leading to a Technical Capability Declaration (TCD) in FY 2021 and an Operational Capability Declaration (OCD) in FY 2022. Configuration 2 represents MDS Increment 6c/7 which includes software upgrades to LRDR to further improve discrimination techniques and capability, expand capability to a broader spectrum of threats, increase support to Space Situational Awareness and Space Object Identification, and implement cost reduction initiatives to reduce life cycle operating costs. Technical Capability Declaration for Configuration 2 is planned for FY 2024. The LRDR is comprised of a LRDR Equipment Shelter (LES), housing two radar array faces, a Mission Control Facility (MCF) which supports radar operations, and supporting facilities and infrastructure. The Secretary of the Air Force approved Clear Air Force Station, Alaska as the LRDR site. The Air Force Space Command (AFSPC) is the designated Lead Major Command (MAJCOM).

The LRDR operates in the S-band frequency, features scalable and open systems architecture to mitigate evolving threats, and integrates into the MDS through the Command and Control, Battle Management, and Communications (C2BMC) system. This Program Element includes MDS threat discrimination improvements to enhance MDS effectiveness against the evolving threat. The result will be a MDS architecture more capable of discriminating and intercepting re-entry vehicles with a higher degree of confidence to improve Warfighter shot doctrine, and conserve Ground-Based Defense (GMD) interceptor inventory. LRDR also supports additional mission areas including Space Situational Awareness.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	166.543	136.423	122.877	-	122.877
Current President's Budget	172.705	136.423	137.256	-	137.256
Total Adjustments	6.162	0.000	14.379	-	14.379
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-3.738	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	9.900	0.000	14.379	-	14.379

Change Summary Explanation

Increase in FY 2019 provides Prime Contract funding for unanticipated cost growth following award of the subcontract for the site and construction activities.

Increase in FY 2021 reflects the development initiation of Active Sensor Bias monitoring.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD96: *Long Range Discrim Radar (LRDR)*	694.500	164.759	131.446	131.804	-	131.804	114.073	86.668	57.168	39.450	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

This project includes the development and initial fielding of a Long Range Discrimination Radar (LRDR) by 2020 (Configuration 1) leading to an Operational Capability Declaration in FY 2022 and an improved persistent midcourse MDS discrimination capability in the Pacific sensor architecture. The LRDR will also increase the defensive capacity of the Ground-Based Midcourse Defense (GMD) interceptor inventory and address evolving threats. MDA's request includes funding for the design and development of the LRDR, delivery of spares for initial fielding, system engineering, software development, software Independent Verification and Validation (IV&V), hardware manufacturing, qualification testing, developmental testing support, Modeling and Simulation (M&S), and acquisition sustainment. M&S includes development of LRDR digital simulations and their integration into the MDS, M&S architecture, and Verification, Validation, and Accreditation (VV&A) of LRDR models. The United States Air Force (USAF) will leverage the LRDR inherent capabilities to augment ancillary missions including Space Object Identification and Space Situational Awareness.

This project also includes Configuration 2 software upgrades. Configuration 2 represents MDS Increment 6c/7 which includes software upgrades to LRDR to further improve discrimination techniques and capability, expand capability to a broader spectrum of threats, increase support to Space Situational Awareness and Space Object Identification, and implement cost reduction initiatives to reduce life cycle operating costs. Technical Capability Declaration for Configuration 2 is planned for FY 2024.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Long Range Discrimination Radar (LRDR)	164.759	131.446	131.804
Articles:	-	-	-
Description: The LRDR program includes requirement development activities associated with systems engineering, software development, discrimination improvements, design reviews, testing, and M&S efforts for radar development. Efforts include LRDR site activation and preparation of site infrastructure for construction activities. The program will develop and integrate C2BMC systems for LRDR functionality. The program will develop, maintain, and deliver radar software Build 1 and establish the Independent Verification and Validation (IV&V) lab for testing of operational software. The program includes purchase, manufacture, integration and test of radar materials. This program will also establish the operational baseline, initiate radar			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
operations and communication, and initiate sustainment operations. The program also includes logistics management, reliability, availability, maintainability (RAM) efforts, data management, and operations support for the LRDR program office. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** Radar Assembly and Integration -- Complete shipment and installation of Arrays on-site at Clear Air Force Station (CAFS), AK -- Complete Mission Control Facility (MCF) / LRDR Equipment Shelter (LES) site integration with MILCON and C2BMC -- Continue execution of the Transition & Transfer (T2) checklist items -- Complete Space Missile Defense Command Warfighter training of C2BMC for LRDR functionality -- Complete Logistics Business Case Analysis and Depot Maintenance Planning -- Continue Independent Validation & Verification (IV&V) of tactical software on Hardware-in-the-Loop equipment -- Continue C2BMC pairwise testing and cyber security testing ***FY 2021 Plans:*** -- Complete the capability delivery of Configuration 1 -- Complete the Government acceptance of radar (DD250) -- Initiate the Missile Defense Operations Centers (MDOCs) for LRDR -- Initiate support to ground and flight test programs -- Complete cyber testing and achieve Authority to Operate -- Complete Technical Capability Declaration -- Initiate post-fielding sustainment of Configuration 1 system -- Initiate Configuration 2 software development -- Complete System Requirements Review (SRR) for Configuration 2 -- Initiate development of Active Sensor Bias monitoring ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	164.759	131.446	131.804

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604873C: *Long Range Discrimination Radar MILCON*	174.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	174.000
• 0604879C: *Ballistic Missile Defense Sensor Test*	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing
• 31299903: *MILCON PLANNING and DESIGN*	6.184	35.472	0.000	-	0.000	0.000	0.000	0.000	0.040	0.000	41.696

Remarks

D. Acquisition Strategy

The LRDR acquisition strategy, which was approved on January 7, 2015, incorporates robust acquisition practices to ensure delivery of a best value solution that meets mission performance requirements and reduces lifecycle costs. MDA awarded a fixed-price incentive contract to Lockheed Martin Corporation of Moorestown, New Jersey, on October 21, 2015 to design, develop, manufacture, integrate & test, and field the LRDR prime mission equipment. The prime contract included other fixed-price and cost-reimbursable line items and options in order to properly balance acquisition costs and risks. Performance and cost incentives were included to motivate contractor performance. The radar prime contractor will deliver a full technical data package, which will enable the government to effectively and affordably sustain the system. MDA will synchronize the radar development contract efforts with a simultaneous MILCON effort, which will be executed through the US Army Corps of Engineers. The LRDR is expected to complete development and initial fielding in 2020 for MDS integration and testing of Configuration 1 and in 2024 for Configuration 2.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Long Range Discrimination Radar (LRDR) - BMEWS Remediation and Removal	MIPR	USACE : AL, AK	25.110	0.000		0.000		0.000		-		0.000	0.000	25.110	0.000
Long Range Discrimination Radar (LRDR) - Civilians/ Travel	Allot	MDA : AL	0.000	2.413	Oct 2018	3.203	Oct 2019	2.675	Oct 2020	-		2.675	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Communications Integration	SS/CPIF	Lockheed Martin : AL, NJ	23.719	4.000	May 2019	6.418	May 2020	1.417	May 2021	-		1.417	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Contract Support Services	Various	Various : Various	0.000	5.257	Oct 2018	4.197	Oct 2019	4.776	Oct 2020	-		4.776	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - FFRDC/ UARC/OGA	MIPR	GTRI, JHU/APL, MITRE, MIT/LL : AL, GA, IL, MA, VA	0.000	3.385	Oct 2018	3.274	Oct 2019	3.700	Oct 2020	-		3.700	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Hybrid Program Office	MIPR	US Air Force : Various	0.000	0.000		2.947	Oct 2019	0.000		-		0.000	0.000	2.947	0.000
Long Range Discrimination Radar (LRDR) - IV&V	MIPR	AMRDEC : Huntsville, AL	8.629	2.864	Nov 2018	3.400	Nov 2019	4.653	Nov 2020	-		4.653	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Prime Contractor -Configuration 1	C/FPIF	Lockheed Martin : NJ	553.789	123.888	Nov 2018	86.920	Nov 2019	44.287	Nov 2020	-		44.287	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Prime Contractor -Configuration 2	SS/CPIF	Lockheed Martin : NJ	0.000	0.000		0.000		31.032	Jan 2021	-		31.032	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Program Office - No longer funded in this cost category	Various	MDA, JHU/APL, GSA AL, MA, IL : AL, MA, IL	10.616	0.000		0.000		0.000		-		0.000	0.000	10.616	0.000
Long Range Discrimination Radar (LRDR) - Radar	MIPR	USAF : AK	0.000	0.000		0.000		20.796	Nov 2020	-		20.796	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operations, Sustainment, and Fuel															
Long Range Discrimination Radar (LRDR) - Site Activation & Studies	MIPR	USACE : AL, AK	72.637	22.952	Feb 2019	17.058	Feb 2020	14.891	Feb 2021	-		14.891	Continuing	Continuing	Continuing
Long Range Discrimination Radar (LRDR) - Transition & Transfer	C/TBD	MDA : AL	0.000	0.000		4.029	Jan 2020	3.577	Jan 2021	-		3.577	Continuing	Continuing	Continuing
		Subtotal	694.500	164.759		131.446		131.804		-		131.804	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	694.500	164.759		131.446		131.804		-		131.804	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Build 1.1 Software Delivery	▲																											
Long Range Discrimination Radar Capability	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Initial Fielding									△																			
System Requirements Review for Configuration 2									△																			
Technical Capability Declaration (TCD) Configuration 1											△																	
FTX-26 (OT) (SN, OT Target Only Flight Test)											△																	
Operational Capability Declaration (OCD)														△														
Technical Capability Declaration (TCD) Configuration 2																					△							

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD96 / *Long Range Discrim Radar (LRDR)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Build 1.1 Software Delivery	1	2019	1	2019
Long Range Discrimination Radar Capability	1	2019	4	2025
Initial Fielding	1	2021	1	2021
System Requirements Review for Configuration 2	1	2021	1	2021
Technical Capability Declaration (TCD) Configuration 1	3	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
Operational Capability Declaration (OCD)	2	2022	2	2022
Technical Capability Declaration (TCD) Configuration 2	1	2024	1	2024

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	39.577	7.946	4.977	5.452	-	5.452	4.714	3.631	3.083	2.276	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency program elements (PEs) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	7.946	4.977	5.452
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	7.946	4.977	5.452

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance SRM (MIPR)	MIPR	Various : Multi: AL, VA, Aust, Japan	20.000	4.395	Mar 2019	0.000		0.000		-		0.000	0.000	24.395	0.000
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, CA, CO, VA	0.460	0.090	Jul 2019	0.075	Jul 2020	0.000		-		0.000	0.000	0.625	0.000
Program Wide Support - Agency Operations Sustainment and GPC	C/FFP	Various : Multi: AL, CA, CO, VA etc.	0.735	1.592	Mar 2019	0.000		0.000		-		0.000	0.000	2.327	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	13.256	1.869	Jun 2019	4.902	Jul 2020	5.452	Apr 2021	-		5.452	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	5.126	0.000		0.000		0.000		-		0.000	0.000	5.126	0.000
		Subtotal	39.577	7.946		4.977		5.452		-		5.452	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	39.577	7.946		4.977		5.452		-		5.452	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604873C / *Long Range Discrimination Radar (LRDR)*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,370.535	407.858	515.000	664.138	-	664.138	921.349	1,339.439	856.712	1,258.000	Continuing	Continuing
MD97: *Improved HD Interceptors*	1,330.086	385.978	36.581	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,752.645
MD80: *Next Generation Interceptor Development (NGI)*	-	0.000	465.000	637.759	-	637.759	884.785	1,285.581	841.322	1,258.000	Continuing	Continuing
MD40: *Program Wide Support*	40.449	21.880	13.419	26.379	-	26.379	36.564	53.858	15.390	0.000	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The increase from FY 2020 to FY 2021 provides a ramp-up for two contractors through Preliminary Design Review (PDR) to develop the Next Generation Interceptor (NGI).

FY 2020 - FY 2025 funding was realigned and adjusted from MD97 Improved HD Interceptors to a new project MD80 to reflect the NGI program.

A. Mission Description and Budget Item Justification

The Improved Homeland Defense Interceptor Program Element will deliver a NGI for Homeland Defense. The NGI acquisition covers the development, integration and testing of an All Up Round (AUR) boost vehicle/ kill vehicle system capable of surviving both the natural and hostile environments while countering the allocated threats. The NGI will provide the Warfighter a cost-effective solution that is lethal across the specified threat space and extensible to address future and evolving threats. The Government will issue a Request for Proposal in FY 2020 for a NGI acquisition, which covers the development, integration and testing of an AUR boost vehicle/ kill vehicle system.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	421.820	412.363	326.922	-	326.922
Current President's Budget	407.858	515.000	664.138	-	664.138
Total Adjustments	-13.962	102.637	337.216	-	337.216
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-362.363			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	465.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-9.547	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*

• Other Adjustment	-4.415	0.000	337.216	-	337.216

Change Summary Explanation

FY2019 does not include the enacted rescissions of $267 million for Redesigned Kill Vehicle (RKV) termination.

Decrease in FY 2019 reflects SBIR/STTR reduction, BTR of $4.4 million and rescission of $267 million for Redesigned Kill Vehicle (RKV) termination.

Net Increase in FY 2020 reflects the enacted Congressional decrease of $362 million for RKV termination. $140 million was transferred to the Midcourse Defense PE 0603882C for a more robust CE-1 reliability and Service Life Extension Program (SLEP) until the NGI deliveries begin in 2028. $465 million was realigned to support NGI Competitive Development for two Contractors, provides risk reduction and for the funding for NGI program operation efforts.

The increase in FY 2021 provides a ramp-up for two contractors through PDR to develop the NGI.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD97: *Improved HD Interceptors*	1,330.086	385.978	36.581	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1,752.645
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2020 to FY 2021 reflects the termination of the RKV program and realignment/adjustment of funding from MD97 to MD80. FY 2020 - FY 2025 funding was realigned and adjusted from MD97 Improved HD Interceptors to MD80 NGI.

A. Mission Description and Budget Item Justification

The improved Homeland Defense interceptor includes a RKV and the AUR engineering necessary to integrate the RKV with new and existing booster configurations. The RKV improves interceptor reliability, reduces unit cost, improves maintainability in the field, and improves performance against emerging threats. The AUR engineering enables RKV integration with new and existing boost vehicles for flight testing and operational fielding.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Improved Homeland Defense (HLD) Interceptor Development	376.336	34.442	0.000
Articles:	-	-	-

Description: HD development objectives include: redesigning the Ground-Based Defense (GMD) kill vehicle (KV), implementing tactical booster modifications, and conducting AUR system engineering. The RKV will be built with a modular, open architecture and designed with common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base. The design for growth allows future upgradability. The AUR development approach integrates the RKV with the boost vehicle. The goal of all of these efforts is to develop and field an integrated set of capabilities to improve the reliability, survivability, lethality, and discrimination to defeat future threats.

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
-RKV termination activities

FY 2021 Plans:
None; RKV terminated August 2019.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
The decrease from FY 2020 to FY 2021 reflects the termination of the RKV program and realignment/adjustment of funding from MD97 to MD80.			
Title: Program Operations	9.642	2.139	0.000
Articles:	-	-	-
Description: Program Operations provides for integrated program management of the Improved Homeland Defense Interceptor efforts. This effort includes: Technical and business management support, financial management, cost and schedule performance analysis, cost estimation and analysis, configuration management, and integration activities to ensure the program meets cost, schedule, and performance goals; GMD RKV program compliance with internal and external direction, policies, and regulations to deliver critical capability via a consistent and disciplined process; Mission Assurance and Manufacturing Engineering Program to include quality, configuration management, manufacturing, engineering, and safety in all phases of the system life cycle, throughout the supply chain and at all levels of assembly emphasizing high yield rates which minimize test and rework costs; technical and testing oversight, verification of hardware and software development, quality / safety / mission assurance, integrated logistics support, and government manpower and infrastructure to develop, test, and sustain the RKV. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -RKV termination activities ***FY 2021 Plans:*** None; RKV terminated August 2019. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects the termination of the RKV program and realignment/adjustment of funding from MD97 to MD80.			
Accomplishments/Planned Programs Subtotals	385.978	36.581	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD08: *GMD Procurement*	405.464	285.471	0.000	-	0.000	0.000	10.225	2.130	36.400	Continuing	Continuing
• 0208866C: MD08: *Midcourse Defense O&M*	139.204	153.218	158.054	-	158.054	175.511	179.368	219.013	169.852	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	72.634	98.139	67.071	-	67.071	63.240	61.200	79.139	33.282	Continuing	Continuing

Remarks

D. Acquisition Strategy

MDA executed an acquisition strategy to develop an integrated RKV with a Cross-Industry team design solution. This concept included production sources from industry and provided a consolidated product that included the collective knowledge of and leveraged capabilities from the industry leaders in kill vehicle design and development. The industry teaming method incorporated the most viable technical approach from each contractor and allowed for combination of resources to shorten the learning curve and reduce the time needed to develop and begin initial production. This strategy allowed for industry to provide the best value and best design solution for the MDA while setting the conditions for future competition of production. The development phase was followed by initial production and then a competitive full rate production phase. The competitive production phase encompassed the purchase, production, and the integration of the proven components demonstrated in the development phase and provided competitive benefits to the Government. This strategy allowed industry to provide the best value and best design solution for MDA while setting the conditions for future competition of production. The Government, as the design authority, retained responsibility for the execution of the program cost, schedule, and the technical performance of the RKV to meet requirements levied on the contractor. The Government implemented a rigorous systems engineering process to ensure that the design and development efforts met requirements. This acquisition strategy was documented in the RKV Acquisition Plan signed by the Defense Acquisition Executive in October 2015.

In January of 2018, the MDA Director signed an Acquisition Strategy Decision Memorandum (ASDM) changing the acquisition strategy to execute the Missile Defeat and Defense Enhancement scope. The Development and Sustainment Contract (DSC) would continue with the Boeing Company to 1Q FY 2024 to build the 20 GBI's and 20 Silos with supporting test, engineering, software, and performance based logistics scope. This additional capability would provide 64 interceptors as well as maintain operation and support capabilities and support ground and flight tests. The Justification and Approval for this action was signed by the MDA Director on 2 January 2018.

In August 2019 the RKV program was terminated.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Improved Homeland Defense (HLD) Interceptor Development - GBI Consolidated Integration Facility Improvements	C/CPIF	Boeing : AL/AK/AZ	0.000	9.279	Nov 2018	0.000		0.000		-		0.000	0.000	9.279	0.000
Improved Homeland Defense (HLD) Interceptor Development - OGA/ FFRDC Booster Avionics Risk Reduction	MIPR	Draper : AL/CA	1.644	0.000		0.000		0.000		-		0.000	0.000	1.644	0.000
Improved Homeland Defense (HLD) Interceptor Development - PRIME AUR System Engineering and Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	49.840	0.000		0.000		0.000		-		0.000	0.000	49.840	0.000
Improved Homeland Defense (HLD) Interceptor Development - PRIME RKV Development	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	1,134.952	343.955	Oct 2018	34.382	Nov 2019	0.000		-		0.000	0.000	1,513.289	0.000
Improved Homeland Defense (HLD) Interceptor Development - Post-Intercept Assessment	C/CPIF	Boeing AL/AK/AZ : CA/CO/TX/VA	0.000	0.000		0.000		0.000		-		0.000	0.000	0.000	0.000
Improved Homeland Defense (HLD) Interceptor Development - Prior year no longer funded in the FYDP	Various	Various : Various	21.114	0.000		0.000		0.000		-		0.000	0.000	21.114	0.000
Improved Homeland Defense (HLD) Interceptor Development - RKV Development Lab and System Support	MIPR	AMRDEC : Redstone Arsenal, AL	76.827	23.102	Oct 2018	0.060	Nov 2019	0.000		-		0.000	0.000	99.989	0.000
		Subtotal	1,284.377	376.336		34.442		0.000		-		0.000	0.000	1,695.155	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Termination of the RKV program in August 2019 results in no cost to complete/total cost/target value of contract for MD97.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Contract Support Services	C/CPFF	Various AL/AK/ : CA/ CO/VA	26.590	5.830	Oct 2018	1.562	Oct 2019	0.000		-		0.000	0.000	33.982	0.000
Program Operations - FFRDC Support	MIPR	MIT : LL AL	3.132	0.000		0.000		0.000		-		0.000	0.000	3.132	0.000
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	8.066	2.352	Oct 2018	0.577	Oct 2019	0.000		-		0.000	0.000	10.995	0.000
Program Operations - Other Government Agencies	MIPR	Various AL/VA : FL/ CO	6.718	1.460	Oct 2018	0.000		0.000		-		0.000	0.000	8.178	0.000
Program Operations - Prior year no longer funded in the FYDP	Various	Various : Various	0.552	0.000		0.000		0.000		-		0.000	0.000	0.552	0.000
Program Operations - Travel	MIPR	MDA : AL/VA	0.651	0.000		0.000		0.000		-		0.000	0.000	0.651	0.000
		Subtotal	45.709	9.642		2.139		0.000		-		0.000	0.000	57.490	N/A

Remarks

Termination of the RKV program in August 2019 results in no cost to complete/total cost/target value of contract for MD97.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,330.086	385.978		36.581		0.000		-		0.000	0.000	1,752.645	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Redesigned Kill Vehicle	✦	✦	✦	✦																								
Improved Homeland Defense (HD) Interceptor Development	✦	✦	✦	✦																								

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD97 / *Improved HD Interceptors*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Redesigned Kill Vehicle	1	2019	4	2019
Improved Homeland Defense (HD) Interceptor Development	1	2019	4	2019

Note

RKV terminated August 2019. Next Generation Interceptor development was realigned to MD80.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD80: *Next Generation Interceptor Development (NGI)*	-	0.000	465.000	637.759	-	637.759	884.785	1,285.581	841.322	1,258.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2020 to FY 2021 provides two contractors through PDR to develop the NGI.

FY 2020 - FY 2025 funding was realigned and adjusted from MD97 Improved HD Interceptors to MD80 in support of the NGI.

A. Mission Description and Budget Item Justification

The Improved Homeland Defense Interceptor Program Element will deliver an NGI for Homeland Defense. The NGI acquisition covers the development, integration and testing of an AUR boost vehicle/ kill vehicle system capable of surviving both the natural and hostile environments while countering the allocated threats. The NGI will provide the Warfighter a cost-effective solution that is lethal across the specified threat space and extensible to address future and evolving threats. The Government will issue a Request for Proposal in FY 2020 for a NGI acquisition, which covers the development, integration and testing of an AUR boost vehicle/ kill vehicle system. The Government will utilize two contractors through PDR to develop the NGI.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Next Generation Interceptor Development (NGI)	0.000	303.583	628.991
Articles:	-	-	-

Description: The Improved Homeland Defense Interceptor Program Element will deliver a NGI for Homeland Defense. The NGI has improved survivability against natural and hostile environments and increases performance capability against 2030 threats compared to the currently fielded GBIs.

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:

-Initiate the design, development, and test of NGI payload and the boost vehicle utilizing two prime contractors to provide the Warfighter a cost-effective solution that is lethal across the specified threat space and extensible to address future and evolving threats

-Initiate System Requirements Review to establish the functional baseline for the NGI design

FY 2021 Plans:

-Design, develop, and test the NGI payload and boost vehicle utilizing two prime contractors

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Complete System Requirements Review to establish the functional baseline for the NGI design -Initiate activities to support achieving Knowledge Point #1 exit criteria, successful completion of the Preliminary Design Review. These activities include: --Complete interceptor, boost vehicle and kill vehicle level SRRs --Initiate purchase of NGI parts and initiate testing to gain early confidence in NGI design --Initiate Parts, Materials, and Processes Board Requirements (PMPCB) approval for all parts --Initiate battlespace and threat containment requirement analysis ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 provides a ramp-up for two contractors through PDR to develop the NGI. Funding is realigned/adjusted from MD97 to MD80.			
Title: Program Operations	0.000	6.417	8.768
Articles:	-	-	-
Description: Program Operations provides for integrated program management of the Improved HD Interceptor efforts including: -Technical and business management support, financial management, cost and schedule performance analysis, cost estimation and analysis, configuration management, and integration activities to ensure the program meets cost, schedule, and performance goals -GMD NGI program compliance with internal and external direction, policies, and regulations to deliver critical capability via a consistent and disciplined process -Mission Assurance and Manufacturing Engineering processes to include quality, configuration management, manufacturing, engineering, and safety in all phases of the system life cycle, throughout the supply chain and at all levels of assembly emphasizing high yield rates which minimize test and rework costs -Technical and testing oversight, verification of hardware and software development, quality / safety / mission assurance, integrated logistics support, and government manpower and infrastructure to develop, test, and sustain the NGI Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Funding is realigned/adjusted from MD97 to MD80.			
Title: Risk Reduction	0.000	155.000	0.000
Articles:	-	-	-
Description: Risk Reduction for maintaining and enhancing existing homeland defense capabilities against near- and mid-term threats prior to the fielding of NGI. ***FY 2020 Plans:*** - Execute Risk Reduction funding for maintaining and enhancing existing homeland defense capabilities against near- and mid-term threats prior to the fielding of NGI. ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21 reflects completion of risk reduction activities funded via congressional add.			
Accomplishments/Planned Programs Subtotals	0.000	465.000	637.759

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD08: *BMD Midcourse Defense O&M*	139.204	153.218	160.713	-	160.713	164.416	168.170	194.747	179.506	Continuing	Continuing
• 0208866C: MD08: *GMD Procurement*	520.464	285.471	0.000	-	0.000	0.000	10.225	2.130	36.400	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0604874C: *Improved Homeland Defense Interceptors*	407.858	515.000	664.138	-	664.138	921.349	1,339.439	856.712	1,258.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0604887C: *Ballistic Missile Defense Midcourse Defense Segment Test*	72.634	98.139	67.071	-	67.071	63.240	61.200	79.139	33.282	Continuing	Continuing

Remarks

D. Acquisition Strategy

Acquisition strategy includes a competitive source selection to develop and test an all up round interceptor to meet Warfighter requirements and defeat the 2030 threat. MDA has established multiple knowledge points to evaluate component and system performance during development. MDA will request production decisions following a successful intercept flight test. The Government will utilize two contractors through Preliminary Design Review (PDR) to develop the NGI.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next Generation Interceptor Development (NGI) - NGI Development	TBD	Competitive Contract Award : TBD	0.000	0.000		302.043	Nov 2019	627.359	Nov 2020	-		627.359	Continuing	Continuing	Continuing
Next Generation Interceptor Development (NGI) - NGI Development Lab & System Support	MIPR	Various : Various	0.000	0.000		1.540	Nov 2019	1.632	Nov 2020	-		1.632	Continuing	Continuing	Continuing
Risk Reduction - Risk Reduction	TBD	Competitive Contract Award : TBD	0.000	0.000		155.000	Apr 2020	0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		458.583		628.991		-		628.991	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Contract Support Services	C/CPFF	Various : AL/AK/ CA/ CO/VA	0.000	0.000		4.687	Oct 2019	6.374	Oct 2020	-		6.374	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA : AL/VA	0.000	0.000		1.730	Oct 2019	2.394	Oct 2020	-		2.394	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		6.417		8.768		-		8.768	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		465.000		637.759		-		637.759	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Next Generation Interceptor					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD80 / *Next Generation Interceptor Development (NGI)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Next Generation Interceptor	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	40.449	21.880	13.419	26.379	-	26.379	36.564	53.858	15.390	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	21.880	13.419	26.379
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	21.880	13.419	26.379

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various Multi : AL, VA	8.871	14.724	Nov 2018	5.218	Nov 2019	2.492	Nov 2020	-		2.492	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	Various Multi : AL, VA	0.424	0.331	Nov 2018	0.201	Nov 2019	1.500	Nov 2020	-		1.500	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services	MIPR	Various Multi : AL, VA	10.513	4.573	Mar 2019	0.000		4.450	Nov 2020	-		4.450	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various Multi : AL, VA	20.641	2.252	Dec 2018	8.000	Dec 2019	17.937	Dec 2020	-		17.937	Continuing	Continuing	Continuing
		Subtotal	40.449	21.880		13.419		26.379		-		26.379	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	40.449	21.880		13.419		26.379		-		26.379	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧																				

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604874C / *Improved Homeland Defense Interceptors*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	221.328	57.972	25.137	7.768	-	7.768	72.388	74.306	60.179	19.877	Continuing	Continuing
MT07: *THAAD Test*	210.993	54.845	24.417	7.459	-	7.459	69.515	71.318	57.099	18.793	Continuing	Continuing
MD40: *Program Wide Support*	10.335	3.127	0.720	0.309	-	0.309	2.873	2.988	3.080	1.084	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP).

Similar to FY 2019 and FY 2020, Terminal High Altitude Area Defense (THAAD) will participate in FY 2021 flight tests associated with the U.S. Indo-Pacific Command (USINDOPACOM) Joint Emergent Operational Need (JEON) effort. USINDOPACOM JEON FY 2021 flight tests are funded in Program Element 0603914C BMD Test.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Terminal Defense Segment Test provides the Terminal High Altitude Area Defense (THAAD) program's participation in Ballistic Missile Defense System (BMDS) Flight Tests and Ground Tests in accordance with the IMTP. THAAD Test coordinates with Operational Test Agencies, conducts pretest planning, coordination and analysis, conducts flight test operations, performs post-flight test reporting, and performs data distribution and storage.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	61.017	25.137	32.124	-	32.124
Current President's Budget	57.972	25.137	7.768	-	7.768
Total Adjustments	-3.045	0.000	-24.356	-	-24.356
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.805	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-1.240	0.000	-24.356	-	-24.356

Change Summary Explanation

Decrease in FY 2021 is in accordance with the BMDS IMTP.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT07: *THAAD Test*	210.993	54.845	24.417	7.459	-	7.459	69.515	71.318	57.099	18.793	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP).

A. Mission Description and Budget Item Justification

Terminal High Altitude Area Defense (THAAD) Test conducts Ballistic Missile Defense System (BMDS) Flight Tests and Ground Tests with other BMDS elements (such as Army Navy / Transportable Radar Surveillance (AN/TPY-2), BMDS Command, Control, Battle Management, and Communication (C2BMC), Phased Array Tracking Intercept of Target (PATRIOT), and Aegis) in accordance with the IMTP. THAAD Test coordinates with Operational Test Agencies, conducts all pre and post flight test, ground test, cyber security enhancements, and wargames and exercises requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Flight Test Execution	34.509	7.081	0.000
Articles:	-	-	-
Description: Performs all requirements to support flight test execution such as mission planning, pre-flight integration testing, conduct of readiness reviews, test asset transportation, flight test execution and data collection, post flight test reporting and data distribution in accordance with the IMTP. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** N/A. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP.			
Title: Ground Test Execution	7.819	5.717	0.000
Articles:	-	-	-
Description: Ground Test Execution includes:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- THAAD participation in MDA Ground Test operational scenario events to ensure THAAD's ability to conduct coordinated engagements with Aegis and PATRIOT operating with C2BMC and AN/TPY-2. - Pre-mission planning, pre- and post-mission analyses, reporting, and execution to support BMDS Ground and Flight Test campaigns. - Provide ground test of element hardware and software prior to hardware-in-the-loop (HWIL) testing and enable a continuous capacity based Sprint vs. lengthy individual Ground Test (GT) campaign environment, enabling a more efficient process for ground testing and reducing test cycle time. - Continued performance assessments to evaluate system performance and interoperability within the integrated BMDS. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Continue THAAD participation in variable ground test operational scenario events GT-07, GT-08, and GT-20. ***FY 2021 Plans:*** N/A. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP.			
Title: Resources	3.608	2.954	0.000
Articles:	-	-	-
Description: Resources includes: - On-site range support for THAAD maintenance, repair, and pre-mission analysis to ensure THAAD test asset readiness. - Data management, facilities operations, and post-test reporting in support of BMDS tests to ensure data collection and readiness for mission execution. - Performance Assessments to evaluate system performance and interoperability within the integrated BMDS. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP.			
Title: Wargames and Exercises	0.461	0.459	0.000
Articles:	-	-	-
Description: Wargames and Exercises support the Combatant Commands (CCMDs) with model and simulations and subject matter expertise during exercise events. Continue to assist in developing/refining Tactics, Techniques, and Procedures and Pre-Planned Responses to incorporate in future events. Demonstrate THAAD capability to the warfighter community in the Integrated and Missile Defense (IAMD) environment. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** N/A. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the IMTP.			
Title: Test Program Operations	8.448	8.206	7.459
Articles:	-	-	-
Description: Program Operations provides strategic planning, program integration, acquisition, engineering, financial management, internal reviews and audits, and program assessments for THAAD Test Activities. Specific and/or unique planned accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- N/A.			
Accomplishments/Planned Programs Subtotals	54.845	24.417	7.459

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD07: *THAAD Procurement*	1,014.068	425.863	348.433	-	348.433	341.446	328.736	374.844	425.603	Continuing	Continuing
• 0208866C:MD07: *THAAD OM*	87.560	99.819	99.626	-	99.626	106.849	112.696	115.435	120.094	Continuing	Continuing
• 0603881C: *Ballistic Missile Defense Terminal Defense Segment*	383.369	306.761	412.627	-	412.627	340.071	302.279	204.986	227.970	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing

Remarks

D. Acquisition Strategy

THAAD awards Indefinite Delivery Indefinite Quantity (IDIQ) Task Orders on the Advanced Capability Development (ACD) contract for the continuation of THAAD development and test as described and approved in the MDA Integrated Master Test Plan. The discrete task orders allow management and tracking of IMTP-related work.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Program Operations - Program Operations	Various	Missile Defense Agency (MDA) : Ft. Belvoir, VA/ Huntsville, AL	0.000	8.448	Nov 2018	8.206	Nov 2019	7.459	Nov 2020	-		7.459	Continuing	Continuing	Continuing
		Subtotal	0.000	8.448		8.206		7.459		-		7.459	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - Execution, Support and Planning	MIPR	MDA / AMRDEC / KLC / RTS : AL / CO / AK / HI / Wake Island / Kwajalein	106.402	11.609	Nov 2018	3.541	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - Planning, Analysis, and Execution	SS/IDIQ	Lockheed Martin : Sunnyvale, CA / Huntsville, AL	53.263	22.900	Nov 2018	3.540	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - BMDS Ground Test Support	MIPR	US Army AMRDEC : Huntsville, AL	19.429	7.819	Dec 2018	5.717	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Resources - All Prior Years	Various	Various : Various	5.961	0.000		0.000		0.000		-		0.000	0.000	5.961	0.000
Resources - Test and Range Infrastructure	MIPR	US Army AMRDEC / White Sands Missile Range / Lincoln Labs : Huntsville, AL / White Sands, NM / MA	24.868	3.608	Dec 2018	2.954	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Wargames and Exercises - Wargames and Exercises	MIPR	MDA / Space and Missile Defense Command : Huntsville, AL	1.070	0.461	Nov 2018	0.459	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	210.993	46.397		16.211		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	210.993	54.845		24.417		7.459		-		7.459	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	MT07 / *THAAD Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTT-23 (TH, DT Intercept Flight Test)				▲																								
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)				✦																								
GTI-07c (N/I) (BMDS Ground Test)					✦																							
FTX-39 (LTPO, DT Target Only Flight Test)					▲																							
FTP-27 E1 (LTPO, DT/OT Flight Test)						△																						
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)						✧																						
FTP-27 E2 (LTPO, DT/OT Flight Test)						△																						
GTI-08 (N/P) (BMDS Ground Test)								✧																				
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)									△																			
FTT-21 (TH, DT Intercept Flight Test)										△																		
GTI-ASI (22)															✧													
FTT-25 (TH Intercept Flight Test)															△													
FTT-24 (TH, DT Intercept Flight Test)																			△									
FTX-28 E1-E3 (TH, DT Target Only Flight Test)																				△								
GTI-ASI (24) (BMDS Ground Test)																						✧						
FTT-22 (TH Intercept Flight Test)																							△					

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MT07 / *THAAD Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
GTI-19 Sprint 2 (JEON) (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTX-39 (LTPO, DT Target Only Flight Test)	1	2020	1	2020
FTP-27 E1 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GTI-20 Sprint 2 (JEON) (BMDS Ground Test)	2	2020	2	2020
FTP-27 E2 (LTPO, DT/OT Flight Test)	2	2020	2	2020
GTI-08 (N/P) (BMDS Ground Test)	4	2020	4	2020
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
GTI-ASI (22)	3	2022	3	2022
FTT-25 (TH Intercept Flight Test)	3	2022	3	2022
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
FTX-28 E1-E3 (TH, DT Target Only Flight Test)	4	2023	4	2023
GTI-ASI (24) (BMDS Ground Test)	2	2024	2	2024
FTT-22 (TH Intercept Flight Test)	3	2024	3	2024

Note

FY 2021 USINDOPACOM JEON tests are funded in PE 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	10.335	3.127	0.720	0.309	-	0.309	2.873	2.988	3.080	1.084	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency Program Elements (PE) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	3.127	0.720	0.309
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	3.127	0.720	0.309

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, VA, Aust, Japan	0.024	0.049	Jul 2019	0.011	Jul 2020	0.010	Jul 2021	-		0.010	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Various	Various : VA	4.174	0.000		0.000		0.000		-		0.000	0.000	4.174	0.000
Program Wide Support - Agency Operations and Support International and Materiel and Readiness	MIPR	Various : Multi: AL, VA, Aust, Japan	0.000	0.000		0.360	Jul 2020	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	5.563	3.078	Apr 2019	0.349	Jun 2020	0.299	May 2021	-		0.299	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	0.574	0.000		0.000		0.000		-		0.000	0.000	0.574	0.000
		Subtotal	10.335	3.127		0.720		0.309		-		0.309	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.335	3.127		0.720		0.309		-		0.309	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604876C / *Ballistic Missile Defense Terminal Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	426.278	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing
MC13: *Network _System Certification and Accreditation - C&A*	-	0.000	0.000	0.634	-	0.634	0.645	0.662	0.673	0.697	0.000	3.311
MT09: *AEGIS BMD Test*	410.813	88.937	163.861	163.458	-	163.458	183.490	155.883	169.999	205.161	Continuing	Continuing
MD40: *Program Wide Support*	15.465	3.223	5.961	6.788	-	6.788	7.609	6.558	9.205	11.877	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) 21.1.

A. Mission Description and Budget Item Justification

The Aegis Ballistic Missile Defense (BMD) mission is to deliver an enduring, operationally effective, and supportable BMD capability to defend the nation, deployed forces, friends, and allies and to increase this capability by delivering evolutionary improvements as part of Ballistic Missile Defense System (BMDS) upgrades. The Aegis BMD element of the BMDS capitalizes upon and evolves from the existing U.S. Navy Aegis Weapons System (AWS) and Standard Missile (SM) infrastructures. Aegis BMD provides a forward-deployable, mobile capability to detect and track Ballistic Missiles of all ranges and the ability to destroy Short-Range Ballistic Missiles (SRBMs), Medium-Range Ballistic Missiles (MRBMs), and Intermediate-Range Ballistic Missiles (IRBMs) in the midcourse phase of flight in addition to shorter range missiles in the terminal phase of flight. Aegis BMD also provides a Long Range Surveillance and Track (LRS&T) capability to the BMDS. Upgrades to both the Aegis BMD Weapon System and the SM-3 configuration enable Aegis BMD to provide effective and supportable defensive capability against longer range more sophisticated threats and an enduring Aegis Ashore defensive capability.

- Working with all U.S. Armed Services that participate in the BMDS level Operational Test Agency (OTA) Team, with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.
- As part of the MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the BMDS configuration, actual environmental conditions, and target dynamics observed in flight to anchor Modeling and Simulation (M&S) results.
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	92.160	169.822	76.270	-	76.270
Current President's Budget	92.160	169.822	170.880	-	170.880
Total Adjustments	0.000	0.000	94.610	-	94.610
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	94.610	-	94.610

Change Summary Explanation

Decrease in FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) 21.1.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MC13 / *Network _System Certification and Accreditation - C&A*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC13: *Network _System Certification and Accreditation - C&A*	-	0.000	0.000	0.634	-	0.634	0.645	0.662	0.673	0.697	0.000	3.311
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

New accomplishment in FY 2021 provides Aegis Ground Test participation for Cyber Testing Runs-for-Record.

A. Mission Description and Budget Item Justification

Cyber testing is for Aegis Ground Test participation in Cyber Testing Runs-for-Record. The IMTP 21.1 re-plan modified the GT schedule to reflect updated cyber philosophy to characterize BMDS Cyber resilience and inform decisions on improving BMDS Cybersecurity.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	0.000	0.000	0.634
Articles:	-	-	-
Description: Aegis Ground Test participation for Cyber Testing Runs-for-Record (RFR). ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** - Support BMDS cybersecurity objectives to determine risks to BMDS components, networks, and systems. Assess and characterize mission risks posed by threat exploitation. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides the new Cyber budget project in FY21 for Aegis Ground Test participation in Cyber Testing Runs-for-Record in new accomplishment to ensure continued transparency.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	0.634

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MC13 / *Network _System Certification and Accreditation - C&A*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MC13 / *Network _System Certification and Accreditation - C&A*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Aegis BMD Network / Systems Certifications and Accreditation (	MIPR	Various : VA, CA, NJ, MD	0.000	0.000		0.000		0.634	Dec 2020	-		0.634	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.000		0.634		-		0.634	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		0.000		0.634		-		0.634	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MC13 / *Network _System Certification and Accreditation - C&A*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC13 Cyber Operations					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MC13 / *Network _System Certification and Accreditation - C&A*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC13 Cyber Operations	1	2020	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT09: *AEGIS BMD Test*	410.813	88.937	163.861	163.458	-	163.458	183.490	155.883	169.999	205.161	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

The FY 2020 Aegis BMD Test Program concentrates on critical IMTP flight tests that support the U.S. Navy and European Phased Adaptive Approach (EPAA), Weapon System Certification, and Missile Production Decision requirements. Aegis BMD will concentrate on Aegis Baseline (BL) 9.C2 (BMD 5.x) and Standard Missile SM-3 Block IIA operational testing.

The FY 2021 Aegis BMD Test Program concentrates on critical IMTP flight tests that support the BMDS incremental development strategy and the U.S. Navy, European Phased Adaptive Approach (EPAA).

- Working with the U.S. Navy Integrated Warfare System (IWS) Services' Operational Test Agencies (OTA), with the support of the Director of Operational Test and Evaluation (DOT&E), MDA has developed a test program to improve missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable.
- As part of MDA's rigorous test program, System Pre-Flight predictions provide confidence in test execution by predicting element performance and exercising element interfaces. System Post-Flight Reconstruction replicates the Ballistic Missile Defense System configuration and actual environmental conditions and target dynamics observed in flight to anchor M&S results.
- The IMTP is event-oriented and extends until the collection of all identified data is completed ensuring adequate test investments.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Aegis BMD Flight Test Execution	35.841	106.315	106.447
Articles:	-	-	-
Description: Aegis BMD Flight Test Program performs comprehensive testing of Aegis BMD components and their interoperability with the BMDS using accredited Modeling & Simulation (M&S) that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. All flight testing is reflected in the R-4 schedule and the IMTP. Recurring Accomplishments include: -Prepare for and conduct BMDS Flight Test events as reflected in the IMTP and the R-4 schedule. -Collect Aegis BMD data for Modeling and Simulation anchoring used in comprehensive flight testing.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Conduct Aegis BMD specific analysis during pre- and post-mission analysis phases to confirm pre-mission predictions of mission success and validate post-test results. -Conduct test milestone reviews to ensure readiness for test execution and accomplishment of test objectives. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Complete test event data collection, conduct post-test analysis supporting assessments and fielding decisions for BMDS Testing - Prepare for and execute Flight Tests scheduled in the IMTP ***FY 2021 Plans:*** SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Aegis BMD Ground Test Execution	18.878	18.504	26.442
Articles:	-	-	-
Description: Aegis BMD Ground Test Program performs comprehensive testing of Aegis BMD Components and their interoperability with the BMDS using accredited M&S that provides the evidence required for the MDA and Combatant Commanders to transition the capability to the Operational Capacity Baseline. More specifically, ground testing is used to collect data for Aegis BMD characterization and assessment, flight test risk reduction, and exploration of scenarios where flight testing is either impracticable or impossible. Recurring Accomplishments include: -Participate in BMD System Ground Tests to include pre-mission analysis, mission execution, and post-mission analysis. -Conduct planning to ensure BMD Test Bed San Diego (BTS) capabilities support Aegis BMD testing, exercises, flight tests, and demonstration requirements. This includes upgrades to the ground testing labs to ensure compliance with operational and test baselines. -Continue testing of U.S. Navy C4I systems and Aegis BMD baselines to ensure BMDS interoperability. -Continue to participate in System Level Ground Testing as an element of the layered BMDS to collect data for Aegis BMD characterization and assessment and exploration of scenarios where flight testing is either impracticable or impossible. -Continue operation support of Hardware in the loop (HWIL) M&S for Element ground testing. -Aegis BMD HWIL lab participation align to the IMTP Ground Test schedule and implementation of Future Ground Test Concept of Operations (CONOPS) pathfinders. Specific and/or unique accomplishments to each FY are as follows:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: - Prepare and execute Ground Test (GT) support activities specific to IMTP v 21.0. - Conduct ground and flight testing to improve the missile defense capabilities and ensure the capabilities transferred to the warfighter are effective. ***FY 2021 Plans:*** - Prepare and execute Ground Test (GT) support activities specific to IMTP v 21.0. - Conduct ground and flight testing to improve the missile defense capabilities and ensure the capabilities transferred to the warfighter are effective. - Provide HWIL lab participation aligned to IMTP Ground Test schedule. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides Aegis BMD HWIL lab participation aligned to the IMTP Ground Test schedule.			
Title: Aegis BMD Test Resources	17.432	17.287	14.194
Articles:	-	-	-
Description: This effort provides resources to conduct ground and flight testing to improve confidence in missile defense capabilities under development and ensure the capabilities transferred to the warfighter are operationally effective, suitable, and survivable. Recurring Accomplishments include: - Provide Core Test and Evaluation support for Aegis BMD test and evaluation missions and laboratories, field activities, range support activities, analysis activities, and shipboard and land-based test site test teams. - Provide Test & Evaluation (T&E) infrastructure support for Aegis BMD Test Missions as reflected in the IMTP to collect truth data for post-event analysis. - Exercise tactical communications during testing to ensure interoperability with the BMDS and Combatant Command (CCMD) systems. - Continue core test planning for Aegis BMD test missions to include assessment of target requirements, and preparation of the range to ensure all missions are executable and apply to the technical program objectives. - Develop and execute risk-reduction activities to minimize or mitigate shipboard and missile test and programs risks. - Develop and execute data collection plans and supporting instrumentation requirements. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** SEE ABOVE. ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY20 to FY21 reflects the reduction of test resources in alignment with IMTP changes.			
Title: Engineering & Analysis	9.218	13.686	9.116
Articles:	-	-	-
Description: The Engineering and Analysis effort provides essential BMDS ground and flight test event planning, execution, and evaluation activities for each test event. Recurring Accomplishments: - Design test architecture, define test objectives and evaluation criteria, define target requirements, and generate ground and flight test scenarios appropriate to the data collection requirements to assess BMDS performance and anchor M&S. - Coordinate with BMDS Operational Test Agency (OTA) to address, coordinate, and disposition test issues to achieve closure through recommended action plans. - Deliver HWIL M&S integration test cases. - Conduct M&S HWIL integration benchmarking, and integrate the BMDS HWIL M&S framework with MDA and non-MDA Elements into the test event BMDS architecture. - Integrate, test, and deliver end-to-end BMDS simulations supporting ground test missions. - Analyze System-level interoperability. - Conduct modeling and technical analysis for Combatant Command wargames and exercises. - Utilize M&S for pre-test assessment, post-test review, and M&S updates. - Provide test configuration management; risk assessments; and anomaly/deficiency review, assessment and closure. - Analyze test results to identify verification and validation data collection shortfalls and reassign objectives to future test events as required. - Document BMDS test observations for system-level test anomalies and coordinate the resulting BMDS Discrepancy Reports within the Failure Reporting, Analysis, and Corrective Action System (FRACAS) - Provide the Quick Look Brief, Mission Data Review (MDR), and Executive MDR. - Provide long-range BMDS IMTP planning and integration strategies related to overarching BMDS analysis product integration. - Upgrade test analysis tools in concert with the BMDS evolution (e.g., Modular Analysis and Reporting Suite [MARS]) to enhance analysis capability and efficiency. - Populate the MARS database with data from the most recently completed tests to support as-built analysis and capability assessments. - Provide engineering analysis process software, to include System Coordination and Observation Reporting Environment (SCORE), Software Change Analysis Review Environment (SCARE), File Manager (FileMan), and ManPower Loading (MPL). Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Conduct system pre-mission testing and analyses for FTO-03. ***FY 2021 Plans:*** SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) 21.1.			
Title: Test Program Operations	7.568	8.069	7.259
Articles:	-	-	-
Description: This activity funds the Government and contractor workforce that manage the overall Aegis Ballistic Missile Defense (BMD) program and enables the program to develop, build, and test standard missiles and the associated Aegis Weapon Systems. This project includes all operations support for the Aegis program office related to Engineering and Testing. ***FY 2020 Plans:*** -SEE ABOVE ***FY 2021 Plans:*** -SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	88.937	163.861	163.458

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0604880C: *Land Based SM-3 (LBSM3)*	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - 20117142323680	MIPR	NSWC/DD : Dahlgren VA	0.000	0.000		2.179	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - 20117142323689	SS/CPAF	Lockheed Martin : Moorestown NJ	0.000	0.000		7.752	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD 5.x Development - MD09 - Various	MIPR	Various : MA, MD, VA, NJ	0.000	0.000		1.005	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution	MIPR	Various - DT : HI,VA,CA,MA,NC	0.000	3.747	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - ARMY- SMDC	MIPR	Army : SMDC	3.056	0.000		0.000		0.000		-		0.000	0.000	3.056	0.000
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - DOT MARAD	MIPR	DOT : MARAD	5.084	8.109	Jan 2019	0.000		5.000	Oct 2020	-		5.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - Flight Test Execution - MT09 - SECOTEC	SS/CPFF	SECOTEC : Huntsville AL	2.166	0.721	Jan 2019	0.000		0.300	Dec 2020	-		0.300	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 - CPF	MIPR	COMPACTFLT : HI	0.330	1.300	Dec 2018	4.703	Dec 2019	1.800	Dec 2020	-		1.800	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD	SS/CPFF	Corvid : NC	4.008	0.560	Dec 2018	2.058	Dec 2019	0.150	Dec 2020	-		0.150	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - MT09 - Corvid															
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09 -JHU/APL	SS/CPFF	JHU/APL : Columbia MD	13.731	5.875	Dec 2018	6.200	Dec 2019	22.500	Dec 2020	-		22.500	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09- Corona	MIPR	NSWC Corona : CA	10.129	3.583	Dec 2018	5.173	Dec 2019	7.100	Dec 2020	-		7.100	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-DMEA	MIPR	DMEA : McClellan, CA	0.000	0.253	Dec 2018	1.566	Dec 2019	0.700	Dec 2020	-		0.700	0.000	2.519	0.000
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-L3 Communications	C/CPFF	L3 Communications : Waco, TX	3.846	1.340	Dec 2018	2.803	Dec 2019	2.300	Dec 2020	-		2.300	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/AD	MIPR	NAWC/AD-PHX Air : Pax River, MD	5.631	2.219	Dec 2018	2.273	Dec 2019	1.800	Dec 2020	-		1.800	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	9.968	0.627	Dec 2018	5.463	Dec 2019	1.500	Dec 2020	-		1.500	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NRL	MIPR	Naval Research Lab : Washington, DC	0.135	0.120	Dec 2018	0.890	Dec 2019	0.200	Dec 2020	-		0.200	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-NSWC DD	MIPR	NSWC Dahlgren : Dahlgren, VA	5.556	0.670	Dec 2018	7.073	Dec 2019	15.000	Dec 2020	-		15.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD	MIPR	NSWC Carderock : Potomac, MD	1.652	0.820	Dec 2018	7.670	Dec 2019	0.650	Dec 2020	-		0.650	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Flight Test Execution - MT09-NSWCCR															
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	9.407	4.170	Dec 2018	8.300	Dec 2019	5.000	Dec 2020	-		5.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-PMRF	MIPR	PMRF Barking Sands : Kauai, HI	20.500	0.270	Dec 2018	15.642	Dec 2019	5.500	Dec 2020	-		5.500	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-SSCPAC	MIPR	SPAWAR : San Diego, CA	3.476	0.930	Dec 2018	5.406	Dec 2019	2.000	Dec 2020	-		2.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Various	MIPR	Various : HI, VA, CA, MA, NC, NJ, AZ	73.933	0.177	Dec 2018	7.886	Dec 2019	5.497	Dec 2020	-		5.497	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Aegis BMD Flight Test Execution - MT09-Xontech	C/CPFF	Northrop Grumman System Corp : Huntsville, AL	1.155	0.350	Dec 2018	1.656	Dec 2019	0.450	Dec 2020	-		0.450	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Flight Test Execution	SS/CPFF	Lockheed Martin : NJ	14.779	0.000		0.000		24.000	Dec 2020	-		24.000	0.000	38.779	0.000
Aegis BMD Flight Test Execution - Flight Test Execution - RMS	SS/CPFF	Raytheon : AZ	9.494	0.000		0.000		5.000	Dec 2020	-		5.000	0.000	14.494	0.000
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - Block IIA Flight Test Support - Various	MIPR	Various : CA, VA, MD	0.000	0.000		1.100	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Standard	SS/CPIF	Raytheon : Tucson AZ	0.000	0.000		8.017	Apr 2020	0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support															
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support - DD	MIPR	NSWC DD : Dahlgren VA	0.000	0.000		0.500	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Flight Test Execution - Standard Missile - 3 (SM-3) Block IIA Development - MT09 - SM-3 BLK IIA Flight Test Support APL	MIPR	JHU/APL : Laurel MD	0.000	0.000		1.000	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - NSWCDD	MIPR	NSWC Dahlgren : Dahlgren VA	0.353	1.601	Dec 2018	0.000		2.100	Dec 2020	-		2.100	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 -Navy	MIPR	PEO : IWS	0.146	0.156	Dec 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - CORONA	MIPR	NSWC Corona : CA	2.795	0.784	Dec 2018	1.982	Dec 2019	0.602	Dec 2020	-		0.602	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - JHU/APL MDA	SS/CPFF	JHU/APL : MDA	3.200	3.355	Dec 2018	2.480	Dec 2019	4.200	Dec 2020	-		4.200	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD	SS/CPFF	Lockheed Martin : Moorestown, NJ	24.044	5.501	Dec 2018	3.731	Dec 2019	8.900	Dec 2020	-		8.900	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Test Execution - MT09 - LM															
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - PHD	MIPR	NSWC PHD : Pt. Hueneme, CA	2.200	1.952	Dec 2018	3.156	Dec 2019	3.500	Dec 2020	-		3.500	Continuing	Continuing	Continuing
Aegis BMD Ground Test Execution - Aegis BMD Ground Test Execution - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	17.212	5.529	Dec 2018	7.155	Dec 2019	7.140	Dec 2020	-		7.140	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - DT - Various	MIPR	Various : HI, VA, CA, MA, MD	0.587	0.000		0.000		0.000		-		0.000	0.000	0.587	0.000
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - APL	SS/CPFF	JHU/APL : Columbia MD	31.284	2.157	Dec 2018	2.500	Dec 2019	2.500	Dec 2020	-		2.500	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - Aegis	MIPR	Aegis BMD : VA	2.371	0.000		0.000		0.000		-		0.000	0.000	2.371	0.000
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - CORONA	MIPR	NSWC Corona : CA	16.209	4.224	Dec 2018	4.000	Dec 2019	4.300	Dec 2020	-		4.300	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NAWC/PM	MIPR	NAWC/PM : Pt. Mugu, CA	2.875	0.670	Dec 2018	0.850	Dec 2019	0.850	Dec 2020	-		0.850	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - NSWCDD	MIPR	NSWC Dahlgren : Dahlgren, VA	13.412	1.660	Dec 2018	2.500	Dec 2019	0.940	Dec 2020	-		0.940	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD	MIPR	NSWC PHD : Pt. Hueneme, CA	19.415	5.455	Dec 2018	4.865	Dec 2019	4.870	Dec 2020	-		4.870	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 0604878C / *Aegis BMD Test*	Project (Number/Name) MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Resources - MT09 - PHD															
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - PMRF	MIPR	PMRF Barking Sands : Kauai, HI	2.875	0.100	Dec 2018	0.430	Dec 2019	0.150	Dec 2020	-		0.150	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - SSCPAC	MIPR	SPAWAR : San Diego, CA	8.032	1.000	Dec 2018	1.089	Dec 2019	0.149	Dec 2020	-		0.149	Continuing	Continuing	Continuing
Aegis BMD Test Resources - Aegis BMD Test Resources - MT09 - Various	MIPR	Various : HI, VA, CA, MA, MD	16.388	2.166	Dec 2018	1.053	Dec 2019	0.435	Dec 2020	-		0.435	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis	TBD	Teledyne Brown Engineering : Huntsville ,AL	0.000	0.000		4.500	Nov 2019	1.050	Nov 2020	-		1.050	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - Engineering Support	C/CPAF	Northrop Grumman : AL, CO	6.383	1.818	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - FFRDC/UARC	MIPR	Various : AL, CO, VA	14.819	2.210	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - Industry	C/CPAF	Boeing : AL	3.696	0.000		0.000		0.000		-		0.000	0.000	3.696	0.000
Engineering & Analysis - Engineering & Analysis - Engineering & Analysis - OGA	MIPR	AMRDEC : AL	22.059	4.236	Nov 2018	2.065	Nov 2019	1.831	Nov 2020	-		1.831	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis - NME	C/CPAF	Northrop Grumman-JRDC : CO, AL	0.500	0.000		5.387	Nov 2019	4.492	Nov 2020	-		4.492	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Engineering & Analysis - Engineering & Analysis NME Support	MIPR	SPAWAR : CA	1.922	0.954	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Engineering & Analysis - Engineering & Analysis- Various	Various	Various : Huntsville, AL	0.000	0.000		1.734	Nov 2019	1.743	Nov 2020	-		1.743	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - Civ Salary	Allot	MDA : Dahlgren, VA	0.000	1.602	Jan 2019	2.343	Nov 2019	1.683	Dec 2020	-		1.683	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - MDA Travel	Allot	MDA : Dahlgren, VA	0.000	0.776	Jan 2019	0.475	Nov 2019	0.766	Dec 2020	-		0.766	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - MIDAESS	C/CPFF	Various : Dahlgren, VA	0.000	4.454	Jan 2019	4.570	Nov 2019	3.419	Dec 2020	-		3.419	Continuing	Continuing	Continuing
Test Program Operations - Program Operations - MT09 - NAVSEA Civ Sal	MIPR	NAVSEA : Washington DC	0.000	0.736	Jan 2019	0.681	Nov 2019	1.391	Dec 2020	-		1.391	Continuing	Continuing	Continuing
		Subtotal	410.813	88.937		163.861		163.458		-		163.458	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	410.813	88.937		163.861		163.458		-		163.458	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0604878C / *Aegis BMD Test*	MT09 / *AEGIS BMD Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTM-45	✦																											
FTI-03	✦																											
GTI-18 Sprint 3	✦	✦																										
FTG-11		✦																										
FTX-34 (AEGIS AA, DT Tracking Exercise Flight Test)		▲																										
GTI-19 Sprint 1			✦																									
GTD-07b			✦																									
GTI-19 Sprint 2			✦																									
FS-19			✦																									
GTI-07c (N/I) (BMDS Ground Test)					✦																							
FTM-44 SMPT					✧																							
GTI-20 Sprint 1(E/C) (BMDS Ground Test)						✧																						
FTM-44						✧																						
GTD-07b (AA) (BMDS Ground Test)							✧																					
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)										✧																		
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)										✧																		
GTD-08a (N/I) (BMDS Ground Test)										✧	✧																	
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)											✧																	
FS-21											✧																	
GTI-ISR (21) (BMDS Ground Test)												✧																
GTD-09 (E/C) (BMDS Ground Test)												✧																
FTM-46 (Blk IIA decision)													△															
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)													✧															
GTI-ASI (22)															✧													

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0604878C / *Aegis BMD Test*	MT09 / *AEGIS BMD Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)				✧			
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)				△			
Pacific Dragon-22 (Interoperability Japan)				△			
GTD-08b (N/I) (BMDS Ground Test)				✧			
FTM-37					✧		
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)					△		
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)					✧ ✧		
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)					✧ ✧		
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)					△		
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)					✧ ✧		
GTD-11 (N/I) (BMDS Ground Test)					✧		
GTI-ISR (23) (BMDS Ground Test)					✧		
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)					△		
FTX-38					✧		
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)					✧		
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)					△		
GTI-ASI (24) (BMDS Ground Test)					✧		
GTD-10 (E/C) (BMDS Ground Test)					✧		
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests					△		
FTM-30					✧		
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)					✧		
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)					✧		
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)					✧		
GTI-ISR (25) (BMDS Ground Test)					✧ ✧		

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)							✧
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)							△
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)							△
FTM-35 (Aegis BL9 FOT&E)							
GTD-12 (E/C) (BMDS Ground Test)							
GTI-ASI (26) (BMDS Ground Test)							
FTO-05 (OTA, OT Intercept Flight Test)							

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-45	1	2019	1	2019
FTI-03	1	2019	1	2019
GTI-18 Sprint 3	1	2019	2	2019
FTG-11	2	2019	2	2019
FTX-34 (AEGIS AA, DT Tracking Exercise Flight Test)	2	2019	2	2019
GTI-19 Sprint 1	3	2019	3	2019
GTD-07b	3	2019	3	2019
GTI-19 Sprint 2	3	2019	3	2019
FS-19	3	2019	3	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTM-44 SMPT	1	2020	1	2020
GTI-20 Sprint 1(E/C) (BMDS Ground Test)	2	2020	2	2020
FTM-44	2	2020	2	2020
GTD-07b (AA) (BMDS Ground Test)	3	2020	3	2020
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	2	2021	2	2021
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)	2	2021	2	2021
GTD-08a (N/I) (BMDS Ground Test)	2	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
FS-21	3	2021	3	2021
GTI-ISR (21) (BMDS Ground Test)	4	2021	4	2021
GTD-09 (E/C) (BMDS Ground Test)	4	2021	4	2021
FTM-46 (Blk IIA decision)	1	2022	1	2022
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)	1	2022	1	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTI-ASI (22)	3	2022	3	2022
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)	3	2022	3	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
Pacific Dragon-22 (Interoperability Japan)	4	2022	4	2022
GTD-08b (N/I) (BMDS Ground Test)	4	2022	4	2022
FTM-37	1	2023	1	2023
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	1	2023	1	2023
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	2	2023	3	2023
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	2	2023	3	2023
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	3	2023	3	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023
GTI-ISR (23) (BMDS Ground Test)	4	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
FTX-38	1	2024	1	2024
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	2	2024	2	2024
FTM-40 (AEGIS BL 10 (BMD 6.0) Test)	2	2024	2	2024
GTI-ASI (24) (BMDS Ground Test)	2	2024	2	2024
GTD-10 (E/C) (BMDS Ground Test)	3	2024	3	2024
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests	3	2024	3	2024
FTM-30	3	2024	3	2024
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)	4	2024	4	2024
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	1	2025	1	2025
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)	2	2025	2	2025
GTI-ISR (25) (BMDS Ground Test)	2	2025	3	2025
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	3	2025	3	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MT09 / *AEGIS BMD Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)	4	2025	4	2025
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2025	4	2025
FTM-35 (Aegis BL9 FOT&E)	1	2026	1	2026
GTD-12 (E/C) (BMDS Ground Test)	1	2026	1	2026
GTI-ASI (26) (BMDS Ground Test)	3	2026	3	2026
FTO-05 (OTA, OT Intercept Flight Test)	4	2026	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	15.465	3.223	5.961	6.788	-	6.788	7.609	6.558	9.205	11.877	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	3.223	5.961	6.788
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	3.223	5.961	6.788

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, VA	0.645	0.049	Jul 2019	0.089	Jul 2020	0.150	Jul 2021	-		0.150	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations User Services	C/CPAF	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.324	Dec 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Civilian Salaries, Travel, Training	Allot	Various : MDA Multi: AL, CO, CA, VA,	8.261	2.500	Oct 2018	0.000		0.000		-		0.000	0.000	10.761	0.000
Program Wide Support - Agency Operations and Support Other Agency Services (FFP)	C/FFP	Various : Multi: AL, CA, CO, VA	6.504	0.674	Apr 2019	5.548	Apr 2020	6.035	Apr 2021	-		6.035	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPR)	MIPR	Various : Multi: AL, CA, CO, VA	0.055	0.000		0.000		0.603	Oct 2020	-		0.603	Continuing	Continuing	Continuing
		Subtotal	15.465	3.223		5.961		6.788		-		6.788	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	15.465	3.223		5.961		6.788		-		6.788	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604878C / *Aegis BMD Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	301.791	71.905	105.530	76.456	-	76.456	99.138	131.191	122.983	124.398	Continuing	Continuing
MT11: *BMDS Radars Test*	289.934	67.093	101.053	73.419	-	73.419	95.204	125.916	116.689	117.612	Continuing	Continuing
MD40: *Program Wide Support*	11.857	4.812	4.477	3.037	-	3.037	3.934	5.275	6.294	6.786	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2020 to FY 2021 reflects Sensors' participation in Missile Defense System (MDS) ground and flight test in accordance with Integrated Master Test Plan (IMTP) 21.1.

A. Mission Description and Budget Item Justification

MDA Sensors executes a robust test program that includes flight and ground tests to support both strategic and regional MDS capabilities against medium- and long-range threats. The Sensors elements of the Missile Defense System (MDS) Integrated Master Test Plan (IMTP) are intended to demonstrate the integrated missile defense capabilities under development to ensure the capabilities delivered to the Warfighter are operationally effective, suitable, and survivable. The Sensors Test Program Element specifically includes the planning, execution, and analysis of flight and ground tests, including the associated infrastructure.

The Sensors Test program provides data required for the Technical Capability Declaration for European Phased Adaptive Approach (EPAA) Phase III Robust Intermediate Range Ballistic Missile (IRBM) Defense, Enhanced Homeland Defense, and Mid-term Discrimination Improvements.

The Sensors Test program supports Long Range Discrimination Radar (LRDR) integration into the MDS, mid and far-term Discrimination Improvements, and Operational Test and Evaluation of the theater/regional and strategic MDS architecture.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	77.405	105.530	114.698	-	114.698
Current President's Budget	71.905	105.530	76.456	-	76.456
Total Adjustments	-5.500	0.000	-38.242	-	-38.242
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-5.500	0.000	-38.242	-	-38.242

Change Summary Explanation

Decrease in FY 2021 reflects flight and ground tests and sensor participation in accordance with IMTP 21.1.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT11: *BMDS Radars Test*	289.934	67.093	101.053	73.419	-	73.419	95.204	125.916	116.689	117.612	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 provides Sensor participation in Missile Defense System (MDS) ground and flight tests in accordance with the Integrated Master Test Plan (IMTP) 21.1.

A. Mission Description and Budget Item Justification

This project provides activities for planning, analysis, and execution of BMDS flight test events, including pre- and post-test ground testing such as Digital and Hardware-in-the-Loop (HWIL) System Pre-Mission Tests (SPMTs) and System Post-Flight Reconstruction (SPFR). Sensors Test provides planning, analysis, and execution in accordance with the Ground Test Concept of Operations (CONOPS) supporting the Ground Test level of effort concept for BMDS system level ground tests identified in the IMTP. Test infrastructure funding provides for HWIL labs and program management required to operate and maintain a flight and ground test capability.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Test Resources	17.465	27.851	65.543
Articles:	-	-	-

Description: Test Resources efforts include configuration and maintenance of Sensors HWILs for use in ground test execution (MDS and element developmental testing) and in MDS flight test execution pre-mission testing, and technical oversight to all MDS system level activities with Sensors participation. It also includes conducting the detailed test event planning and design, integration, and execution for all MDS flight and ground test campaigns. Test Resources provides support for evolving Objective Simulation Framework (OSF) (software upgrades) integration into the MDS HWIL ground test execution and flight test execution. Beginning in FY 2021, it also provides a Level of Effort (LOE) support to MDS Ground Tests in accordance with the MDS Integrated Master Test Plan (IMTP) and the new Ground Test Concept of Operations (CONOPS).

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:
- SEE ABOVE

FY 2021 Plans:
- SEE ABOVE

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Increase from FY 2020 to FY 2021 provides for the transfer of the Ground Test Execution accomplishment to the Test Resources accomplishment in FY 2021. It also provides for Sensors participation in MDS flight and ground tests in accordance with the IMTP 21.1.			
Title: Flight Test Execution	23.163	41.392	7.876
Articles:	-	-	-
Description: Flight Test Execution includes test planning, pre-flight analysis, transportation of radars, test execution, and post-flight analysis for Sensors' participation in MDS flight tests in accordance with the MDS IMTP. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects Sensors participation in BMDS flight tests in accordance with the IMTP 21.1.			
Title: Ground Test Execution	26.465	31.810	0.000
Articles:	-	-	-
Description: Ground Test Execution includes event planning, asset integration, execution and post-mission analysis for Sensors' participation in MDS ground tests in accordance with the MDS IMTP. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - Plan and execute Sensors' participation in MDS Ground Tests in accordance with IMTP and the new Ground Test Concept of Operations (CONOPS) ***FY 2021 Plans:*** -N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Decrease from FY 2020 to FY 2021 reflects the transfer of the Ground Test Execution accomplishment to the Test Resources accomplishment in FY 2021.			
Accomplishments/Planned Programs Subtotals	67.093	101.053	73.419

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603898C: *Ballistic Missile Defense Joint Warfighter Support*	48.401	51.532	49.560	-	49.560	51.735	51.059	53.133	54.023	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603907C: *Sea Based X-Band Radar (SBX)*	125.900	128.156	118.318	-	118.318	135.931	131.510	145.582	169.980	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0604672C: *Homeland Defense Radar-Hawaii*	70.735	188.480	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	259.215
• 0604673C: *Pacific Discriminating Radar*	14.453	6.711	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	21.164
• 0604873C: *Long Range Discrimination Radar (LRDR)*	172.705	136.423	137.256	-	137.256	118.787	90.299	60.251	41.726	Continuing	Continuing

Remarks

D. Acquisition Strategy

Test & Evaluation projects use multiple existing development and MDS test contracts depending on the system(s) involved in the testing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Resources - AN/TPY-2, SBX, UEWR & CD OSF Integration & Infrastructure, Sys Test Lab	C/CPAF	Raytheon : MA	53.097	12.792	Dec 2018	10.112	Nov 2019	39.021	Nov 2020	-		39.021	Continuing	Continuing	Continuing
Test Resources - Civilians/Travel	Allot	MDA : AL/VA	0.000	0.000		5.086	Oct 2019	5.640	Oct 2020	-		5.640	Continuing	Continuing	Continuing
Test Resources - Contract Support Services	Various	Various : Various	0.000	0.000		3.083	Oct 2019	3.616	Oct 2020	-		3.616	Continuing	Continuing	Continuing
Test Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, Inc. : AL	0.825	0.000		0.000		0.000		-		0.000	0.000	0.825	0.000
Test Resources - Cybersecurity - BGTC and SBIRS	C/IDIQ	Northrop Grumman Space & Mission System : CO	1.600	0.000		0.000		0.000		-		0.000	0.000	1.600	0.000
Test Resources - Cybersecurity - Tactical Communication Environment Segment (TCES)	MIPR	SPAWAR : CA	0.190	0.000		0.000		0.000		-		0.000	0.000	0.190	0.000
Test Resources - General Infrastructure and OGA Support	Various	Various : AL, NM	0.000	3.293	Oct 2018	0.000		4.471	Nov 2020	-		4.471	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Resources - LRDR OSF Integration & Infrastructure, Sys Test Lab	SS/FFP	Lockheed Martin : NJ	0.000	1.380	Jan 2019	9.570	Jan 2020	12.795	Nov 2020	-		12.795	Continuing	Continuing	Continuing
Test Resources - UEWR SSF Integration & Infrastructure, Sys Test Lab	C/FPIF	deciBel : AL	14.655	0.000		0.000		0.000		-		0.000	0.000	14.655	0.000
Flight Test Execution - AN/TPY-2, SBX UEWR &CD MDS Level Testing	C/CPAF	Raytheon : MA	109.340	15.230	Mar 2019	40.142	Mar 2020	3.157	Nov 2020	-		3.157	Continuing	Continuing	Continuing
Flight Test Execution - FT Security, Site Activation & Deployments MDS Level Testing	Various	Various : AI, CO, HI, Wake Island	31.508	1.963	Oct 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - LRDR MDS Level Testing	SS/TBD	Lockheed Martin : NJ	0.032	0.000		0.200	Jun 2020	4.204	Nov 2020	-		4.204	Continuing	Continuing	Continuing
Flight Test Execution - OGA Sensor Research & Development	MIPR	Secretary of the Air Force : NCR	0.000	4.500	Aug 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Flight Test Execution - System-Level Post Flight Reconstruction (SPFR)	MIPR	CCDC AVMC : AL	0.000	1.470	Nov 2018	1.050	Jun 2020	0.515	Jun 2021	-		0.515	Continuing	Continuing	Continuing
Flight Test Execution - UEWR/CD MDS Level Testing	C/FPIF	deciBel : AL	1.152	0.000		0.000		0.000		-		0.000	0.000	1.152	0.000
Ground Test Execution - AN/TPY-2, SBX, UEWR/CD MDS Level Testing	C/CPAF	Raytheon : MA	77.535	26.465	Feb 2019	31.810	Feb 2020	0.000		-		0.000	0.000	135.810	0.000
		Subtotal	289.934	67.093		101.053		73.419		-		73.419	Continuing	Continuing	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	289.934	67.093		101.053		73.419		-		73.419	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0604879C / *Ballistic Missile Defense Sensor Test*	MT11 / *BMDS Radars Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
FTI-03 (OTA, OT Intercept Flight Test)	▲																											
FTG-11 (OT) (GM, OT Intercept Flight Test)		▲																										
FTT-23 (TH, DT Intercept Flight Test)				▲																								
GTI-07c (N/I) (BMDS Ground Test)					✦																							
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)							△																					
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)								△																				
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)									△																			
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)										✧																		
FTT-21 (TH, DT Intercept Flight Test)										△																		
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)										✧																		
GTD-08a (N/I) (BMDS Ground Test)										✧	✧																	
FTX-26 (OT) (SN, OT Target Only Flight Test)											△																	
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)											○																	
GTI-ISR (21) (BMDS Ground Test)												✧																
GTD-09 (E/C) (BMDS Ground Test)												○																
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)													✧															
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)														○														
FTT-25 (TH Intercept Flight Test)														△														
GTI-ASI (22)														✧														
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)														✧														
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)															△													
GTD-08b (N/I) (BMDS Ground Test)															✧													
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)																△												
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)																○												

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 0604879C / *Ballistic Missile Defense Sensor Test*	MT11 / *BMDS Radars Test*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)																	✧	✧										
FTT-24 (TH, DT Intercept Flight Test)																		△										
GTD-10 (E/C) (BMDS Ground Test)																		○										
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)																		✧	✧									
FTX-28 E1-E3 (TH, DT Target Only Flight Test)																			△									
GTD-11 (N/I) (BMDS Ground Test)																			✧									
GTI-ISR (23) (BMDS Ground Test)																			✧									
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)																			△									
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)																				○								
GTI-ASI (24) (BMDS Ground Test)																					✧							
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests																						△						
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)																						○						
FTT-22 (TH Intercept Flight Test)																						△						
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)																							✧					
FTO-04 (GM, OT Intercept Flight Test)																								△				
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)																									✧			
GTI-ISR (25) (BMDS Ground Test)																									✧	✧		
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)																												△
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)																												△
FTM-35 (Aegis BL9 FOT&E)																												
GTD-12 (E/C) (BMDS Ground Test)																												
GTI-ASI (26) (BMDS Ground Test)																												
FTO-05 (OTA, OT Intercept Flight Test)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTI-03 (OTA, OT Intercept Flight Test)	1	2019	1	2019
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
FTT-23 (TH, DT Intercept Flight Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
TH CTV-01 (LTPO, DT Interceptor Only Flight Test)	1	2021	1	2021
GTI-09 Sprint 1 (E/C) (BMDS Ground Test)	2	2021	2	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
GTI-21 Sprint 1 (JEON) TH 4.0 (BMDS Ground Test)	2	2021	2	2021
GTD-08a (N/I) (BMDS Ground Test)	2	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
GTI-09 Sprint 2 (E/C) (BMDS Ground Test)	3	2021	3	2021
GTI-ISR (21) (BMDS Ground Test)	4	2021	4	2021
GTD-09 (E/C) (BMDS Ground Test)	4	2021	4	2021
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)	1	2022	1	2022
GTI-10 Sprint 1 (E/C) (BMDS Ground Test)	3	2022	3	2022
FTT-25 (TH Intercept Flight Test)	3	2022	3	2022
GTI-ASI (22)	3	2022	3	2022
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)	3	2022	3	2022
FTX-40 (AEGIS 5.1, DT Tracking Exercise Flight Test)	4	2022	4	2022
GTD-08b (N/I) (BMDS Ground Test)	4	2022	4	2022

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTX-23 (AEGIS 5.1, DT Target Only Flight Test)	1	2023	1	2023
GTI-10 Sprint 2 (E/C) (BMDS Ground Test)	1	2023	1	2023
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	2	2023	3	2023
FTT-24 (TH, DT Intercept Flight Test)	3	2023	3	2023
GTD-10 (E/C) (BMDS Ground Test)	3	2023	3	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023
FTX-28 E1-E3 (TH, DT Target Only Flight Test)	4	2023	4	2023
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023
GTI-ISR (23) (BMDS Ground Test)	4	2023	4	2023
FTM-43 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2023	4	2023
GTI-12 Sprint 1 (E/C) (BMDS Ground Test)	1	2024	1	2024
GTI-ASI (24) (BMDS Ground Test)	2	2024	2	2024
FTM-41 (AEGIS BL 10 (BMD 6.0) Tests	3	2024	3	2024
GTI-12 Sprint 2 (E/C) (BMDS Ground Test)	3	2024	3	2024
FTT-22 (TH Intercept Flight Test)	3	2024	3	2024
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)	4	2024	4	2024
FTO-04 (GM, OT Intercept Flight Test)	1	2025	1	2025
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)	2	2025	2	2025
GTI-ISR (25) (BMDS Ground Test)	2	2025	3	2025
FTM-39 (AEGIS 5.1, OT Intercept Flight Test)	4	2025	4	2025
FTM-42 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2025	4	2025
FTM-35 (Aegis BL9 FOT&E)	1	2026	1	2026
GTD-12 (E/C) (BMDS Ground Test)	1	2026	1	2026
GTI-ASI (26) (BMDS Ground Test)	3	2026	3	2026
FTO-05 (OTA, OT Intercept Flight Test)	4	2026	4	2026

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MT11 / *BMDS Radars Test*

Note

FY 2020 United States Indo-Pacific Command (USINDOPACOM) Joint Emerging Operational Needs (JEON) tests are funded in Program Element (PE) 0603914C BMD Test.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	11.857	4.812	4.477	3.037	-	3.037	3.934	5.275	6.294	6.786	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	4.812	4.477	3.037
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	4.812	4.477	3.037

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various : Multi: AL, VA	0.242	1.950	Jul 2019	0.067	Jul 2020	0.092	Jul 2021	-		0.092	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	MIPR	Various : Multi: AL, VA	11.615	2.862	Feb 2019	4.410	Jul 2020	2.945	Jul 2021	-		2.945	Continuing	Continuing	Continuing
		Subtotal	11.857	4.812		4.477		3.037		-		3.037	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.857	4.812		4.477		3.037		-		3.037	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604879C / *Ballistic Missile Defense Sensor Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	1,162.851	25.200	38.352	56.628	-	56.628	43.742	29.073	31.507	27.908	Continuing	Continuing
MD68: *AEGIS Ashore*	1,120.168	20.840	33.741	51.764	-	51.764	41.043	26.652	28.638	25.129	Continuing	Continuing
MC68: *Cyber Operations*	2.724	2.901	2.980	2.615	-	2.615	0.963	1.252	1.257	1.257	Continuing	Continuing
MD40: *Program-Wide Support*	39.959	1.459	1.631	2.249	-	2.249	1.736	1.169	1.612	1.522	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

Increase from FY 2020 to FY 2021 provides additional hardware modernization upgrades at the Aegis Ashore Missile Defense Test Complex (AAMDTC), site activation requirements due to Poland construction delays, and initiates development of High-Altitude Electromagnetic Pulse (HEMP) Combat System hardening at the operational site in Romania.

A. Mission Description and Budget Item Justification

This program supports development of the Land-Based Standard Missile-3 (LBSM3) capability, Aegis Ashore. On 17 September 2009, the President announced an overarching plan to provide regional missile defense to U.S. deployed forces, allies, and partners in Europe called the European Phased Adaptive Approach (EPAA). The EPAA policy specifically defines a timeline to deploy a mix of afloat and land-based Ballistic Missile Defense (BMD) capabilities. Aegis Ashore represents one of these land-based capabilities. The U.S. can also build on current efforts to pursue Phased Adaptive Approaches (PAAs) in the Asia Pacific and the Middle East regions. The PAA tailors U.S. BMD capabilities to specific theater needs enhancing integrated regional missile defenses to protect defended assets against medium, intermediate, and ultimately intercontinental range ballistic missiles.

Aegis Ashore is a key component of EPAA Phases II (Romania) and III (Poland) and provides Aegis BMD capability against short to intermediate-range ballistic missiles in an ashore configuration. Aegis Ashore provides sophisticated engagement strategies and can adapt to threat updates while also being deployed/redeployed worldwide where needed to provide persistent coverage for the Geographic Combatant Commanders. Aegis Ashore re-hosts the required BMD components of a U.S. Navy Destroyer, including: SPY-1 Radio Direction and Ranging (Radar); Vertical Launch System (VLS), Computing Infrastructure; Command Control; Communications; Computers and Intelligence (C4I) Systems; and Operator Consoles.

This program element will continue to modernize, develop, and test Aegis Ashore capability improvements at the Aegis Ashore Missile Defense Test Complex (AAMDTC) in Hawaii for implementation at operational sites.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	27.692	38.352	36.348	-	36.348
Current President's Budget	25.200	38.352	56.628	-	56.628
Total Adjustments	-2.492	0.000	20.280	-	20.280
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.628	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-1.864	0.000	20.280	-	20.280

Change Summary Explanation

Increase in FY 2021 provides additional hardware modernization upgrades at the Aegis Ashore Missile Defense Test Complex (AAMDTC), site activation requirements due to Poland construction delays, and initiates development of High-Altitude Electromagnetic Pulse (HEMP) Combat System hardening at the operational site in Romania

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD68: *AEGIS Ashore*	1,120.168	20.840	33.741	51.764	-	51.764	41.043	26.652	28.638	25.129	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Increase from FY 2020 to FY 2021 provides additional hardware modernization upgrades at the Aegis Ashore Missile Defense Test Complex (AAMDTC), site activation requirements due to Poland construction delays, and initiates development of High-Altitude Electromagnetic Pulse (HEMP) Combat System hardening at the operational site in Romania.

A. Mission Description and Budget Item Justification

Deployed sites, referred to as Aegis Ashore Missile Defense Systems (AAMDS), will be modified to support future computer programs and missile variants in step with the U.S. Navy's Destroyer Modernization Plan. MDA is responsible for maintaining and modernizing the test center at the Pacific Missile Range Facility (PMRF), while the U.S. Navy is responsible for maintaining and modernizing all deployed Aegis Ashore sites. The initial AAMDS deployed to Romania in 2015 employing Aegis BMD 5.0 CU (Capabilities Upgrade) and SM-3 Block IB. A second AAMDS will deploy to Poland and is scheduled to become operational in FY 2022. These sites provide an Aegis Ashore exo-atmospheric defense against short to intermediate-range ballistic missile threats in the later stages of flight. If the threat dictates, additional systems can be purchased and deployed globally.

Research and Development efforts include design of modifications to adapt the Aegis Weapon System for land-based use, modernization in pace with the U.S. Navy's Destroyer Modernization Plan, development and testing of Aegis Ashore capability improvements at the AAMDTC in Hawaii, and modifications, as required, to enhance co-existence with Broadband Wireless Access systems in the European theater.

In support of EPAA Phase III, Aegis Ashore integrates the Aegis BMD 5.1 and Standard Missile (SM-3) Block IIA capabilities into the Aegis Ashore sites. MDA will provide all upgrades to BMD capability, BMD specific mission equipment, and integration with existing Ballistic Missile Defense System (BMDS) nodes for all Aegis Ashore sites.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Aegis Weapon System Development	16.010	19.869	27.889
Articles:	-	-	-
Description: Maintain and modernize the AAMDTC at the PMRF in Hawaii. Develop and test Aegis Ashore capability improvements prior to implementation at operational sites, and support SPY-1 Radar and Broadband Wireless Access (BWA) coexistence efforts at Aegis Ashore sites. Recurring Accomplishments: - Determine the minimum hardware refresh of element components and spares that are projected to be removed from the production to ensure the test capability at AAMDTC remains current with the U.S Navy's Destroyer Modernization efforts			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Provide system engineering, technical, and logistics support for the AAMDS facility and tactical elements to ensure appropriate system adaptation, readiness, availability, and effectiveness - Modernize the AAMDTC Weapons System, C4I, VLS, and other equipment to align with the U.S. Navy's Destroyer Modernization Plan and ensure the test site configuration is ready to support BMDS testing - Maintain Aegis Ashore Technical Data Package with modernization implementation to include drawings and installation plans for U.S. Navy use in implementation at operational sites Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Install hardware at AAMDTC to increase processing capabilities, network capacities, and update storage space -Provide Facilities, Sustainment, Restoration, and Modernization (FSRM) to initiate critical repairs and maintenance of infrastructure at AAMDTC ***FY 2021 Plans:*** - Procure hardware modernization upgrades at AAMDTC to align with the U.S. Navy's Destroyer Modernization Plan - Initiate development of High-Altitude Electromagnetic Pulse (HEMP) Combat System hardening of operational site in Romania - Enhance AAMDTC capabilities as test asset with protected space required to enable special testing initiatives required for Special Access Programs ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 provides hardware modernization upgrades at AAMDTC and initiates development of HEMP Hardening in Romania			
Title: Site Activation	4.830	13.872	23.875
Articles:	-	-	-
Description: Provide site design, unexploded ordnance clearing; spectrum analysis studies; security; temporary facilities; utilities; administrative communications equipment and services; infrastructure modifications; generator and commercial power; leased vehicles; material handling equipment; generator fuel; supplies, barriers; guard shacks; temporary lighting; transportation of materials and equipment; translators; and emerging requirements as site activation progresses and until sites are transferred to the Navy. Recurring Accomplishments include: - Provide temporary site activation facilities, base operations support, utilities, administrative communications, on-site material handling equipment services, and equipment installation - Fuel for facility commissioning activities, backup generators, and on-site vehicle support - Technical support to facilitate processing facility change proposals and construction modifications			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Post-award technical services (structural, mechanical, and electrical) to ensure quality standards and construction schedule is met - Provide High-Altitude Electromagnetic Pulse (HEMP) validation and verification testing of the Aegis Ashore facilities ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** - Increase from FY 2020 to FY 2021 provides additional site activation requirements due to Poland construction delays.			
Accomplishments/Planned Programs Subtotals	20.840	33.741	51.764

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C MD09: *Aegis BMD O&M*	77.756	75.237	85.830	-	85.830	77.612	81.977	84.899	85.610	Continuing	Continuing
• 0208866C MD09: *Aegis BMD Procurement*	706.366	697.768	620.096	-	620.096	498.016	541.099	890.056	815.708	Continuing	Continuing
• 0208866C MD73: *Aegis Ashore Phase III Procurement*	15.000	25.659	12.000	-	12.000	1.520	3.896	2.403	0.981	Continuing	Continuing
• 0208866C MD90: *Aegis BMD Hardware and Software*	91.181	124.986	104.372	-	104.372	109.374	103.328	126.109	124.604	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0604878C: *Aegis BMD Test*	92.160	169.822	170.880	-	170.880	191.744	163.103	179.877	217.735	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Aegis Ashore Engineering Agent (AAEA) is responsible for the design, development, integration and test of the Aegis Weapons System capability into a reconstitutable deckhouse. The AAEA will also support Aegis Ashore deployment to Romania.

The Facilities and Deployments (FD) program office is utilizing Naval Facilities Engineering Command (NAVFAC) and U. S. Corps of Engineers Europe District (Core of Engineers North Atlantic Union) CENAU to award and administer contracts for base operating support, commercial power, temporary site activation facilities, and integrated electronic security systems for Romania and Poland sites.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aegis Weapon System Development - AWS Development-NAVFAC	MIPR	NAVFAC : HI	3.338	1.881	Nov 2018	2.600	Nov 2019	3.408	Nov 2020	-		3.408	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NAVSEA-MD68	MIPR	NAVSEA-LM/BAE, SPAWAR, NSWC CD : San Diego, CA; Baltimore, MD; Minneapolis, MN	8.886	2.984	Nov 2018	3.150	Nov 2019	5.990	Mar 2021	-		5.990	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC DD-MD68	MIPR	NSWC Dahlgren : Dahlgren, VA	46.830	1.905	Nov 2018	1.214	Nov 2019	1.591	Nov 2020	-		1.591	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-NSWC PHD-MD68	MIPR	NSWC PHD, NSWC, DOI, Aegis Techrep : CA, NJ, ID, MD, IN	40.582	2.449	Nov 2018	2.125	Nov 2019	2.785	Nov 2020	-		2.785	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-PMRF - MD68	MIPR	PMRF : Hawaii	15.356	1.448	Nov 2018	1.238	Nov 2019	1.609	Nov 2020	-		1.609	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SPAWAR-MD68	MIPR	SSC PAC : San Diego,CA	48.977	0.047	Nov 2018	2.000	Nov 2019	2.621	Nov 2020	-		2.621	Continuing	Continuing	Continuing
Aegis Weapon System Development - AWS Development-SSC PAC Pearl Harbor	MIPR	SSC PAC Pearl Harbor : HI	0.000	2.246	Nov 2018	2.090	Nov 2019	2.739	Nov 2020	-		2.739	Continuing	Continuing	Continuing
Aegis Weapon System Development - Aegis Weapon System Development - MD68-	SS/CPIF	MDA Lockheed Martin : Moorestown, NJ	30.194	3.050	Jan 2019	5.452	Nov 2019	7.146	Nov 2020	-		7.146	Continuing	Continuing	Continuing
Aegis Weapon System Development - Aegis Weapon System Development- AWS	Various	Various : AL, VA, CA, APO, HI, NJ	837.719	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development- Various MD68: No longer funding in the FYDP															
Aegis Weapon System Development - Aegis Weapon System Development- MD68	MIPR	MDA : Arlington	1.076	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - DTRA support to construction in Romania and Poland	MIPR	DTRA : Ft. Belvoir, VA	1.550	2.750	Nov 2018	0.426	Nov 2019	0.551	Nov 2020	-		0.551	Continuing	Continuing	Continuing
Site Activation - Poland Admin Communication	MIPR	Northrop Grumman : Poland	1.768	0.437	Nov 2018	0.423	Nov 2019	0.467	Nov 2020	-		0.467	Continuing	Continuing	Continuing
Site Activation - Poland Base Operating Support	MIPR	NAVFAC : Poland	5.955	1.007	Nov 2018	7.763	Nov 2019	8.464	Nov 2020	-		8.464	Continuing	Continuing	Continuing
Site Activation - Poland Commerical and Temporary Utilities	MIPR	NAVFAC : Poland	0.545	0.000		2.223	Nov 2019	2.378	Nov 2020	-		2.378	Continuing	Continuing	Continuing
Site Activation - Poland Fuel	MIPR	DLA : Fort Belvoir, Virginia	0.089	0.000		0.247	Nov 2019	0.263	Nov 2020	-		0.263	Continuing	Continuing	Continuing
Site Activation - Romainia/ Poland Security Guards / Escorts	C/FFP	Chenega Infinity : Chantilly, VA	0.829	0.000		0.252	Nov 2019	9.081	Nov 2020	-		9.081	Continuing	Continuing	Continuing
Site Activation - Site Activation – Transportation of Aegis Weapon System	MIPR	SDDC : Scotts AFB, IL	5.881	0.012	Nov 2018	0.012	Nov 2019	0.013	Nov 2020	-		0.013	Continuing	Continuing	Continuing
Site Activation - Site Activation- IESS Support	MIPR	USAF LCMC Wright Patterson AFB : OH	0.145	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - Site Activation- Poland Admin Communications	MIPR	DISA : Scott AFB, IL	0.160	0.009	Nov 2018	0.125	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - Site Activation- Prior year no longer funded in the FYDP	Various	Various : Various	64.185	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Site Activation - Site Activation- Site Activation	MIPR	NAVFAC : Naples Italy	1.324	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Poland Navy Leases/ Material Hnadling Services															
Site Activation - USACE in-house support in Poland	MIPR	CEHNC : Huntsville, AL	1.839	0.000		1.899	Nov 2019	1.568	Nov 2020	-		1.568	Continuing	Continuing	Continuing
Site Activation - USACE support in Poland	MIPR	CENAU : Poland	2.940	0.615	Nov 2018	0.502	Nov 2019	1.090	Nov 2020	-		1.090	Continuing	Continuing	Continuing
		Subtotal	1,120.168	20.840		33.741		51.764		-		51.764	Continuing	Continuing	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,120.168	20.840		33.741		51.764		-		51.764	Continuing	Continuing	N/A

Remarks

Funding in the All Prior Years column represents a summary of Prior Years Total Costs for inactive contracts and MIPRs on the R-3.
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
AAMDTC Upgrades	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Integrated Master Test Plan (IMTP)	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧
Poland Beneficial Occupancy Date (BOD)										✧																		
Facility Support for NAVEUR Exercise											✧																	
EPAA Phase III Technical Capability Declaration (TCD)													✧															
Poland Construction Complete													✧															

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD68 / *AEGIS Ashore*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
AAMDTC Upgrades	1	2019	4	2025
Integrated Master Test Plan (IMTP)	1	2019	4	2025
Poland Beneficial Occupancy Date (BOD)	2	2021	2	2021
Facility Support for NAVEUR Exercise	3	2021	3	2021
EPAA Phase III Technical Capability Declaration (TCD)	1	2022	1	2022
Poland Construction Complete	1	2022	1	2022

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC68: *Cyber Operations*	2.724	2.901	2.980	2.615	-	2.615	0.963	1.252	1.257	1.257	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Sustain Missile Defense Agency (MDA) DoD Information Assurance Certification and Accreditation Program (DIACAP) and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager (PM/IAM) Plans of Action and Milestones (POA&Ms) for MDA Aegis Ballistic Missile Defense (BMD) mission systems. It maintains the Certification and Accreditation (C&A) data repository, capturing the DIACAP documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) on all MDA Information Systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	2.901	2.980	2.615
Articles:	-	-	-

Description: Monitor and track cybersecurity mitigation detailed in Information Technology Security Guidance. Activities include preparation of C&A documentation and accreditation recommendations to the MDA Senior Information Assurance Officer (SIAO)/ Certification Authority (CA) and DAA. Independent Verification and Validation (IV&V) team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the Project are necessary to comply with the Federal Information Security Management Act (FISMA).

Recurring Accomplishments:

- Provide Cybersecurity engineering and architecture requirements planning for Aegis BMD systems
- Coordinate the development and implementation of Aegis BMD Risk Management Framework (RMF) accreditation packages
- Conduct regular Controls Validation Testing (CVT) of Aegis BMD systems and provide a Risk Assessment Report (RAR) to mitigate cybersecurity deficiencies
- Conduct annual cybersecurity reviews on the Aegis BMD systems to assess compliance in implementing and maintaining RMF controls
- Implement HW/SW to conduct continuous daily monitoring
- Conduct monthly reviews of systems in eMass
- Provide daily management of eMass

Specific and/or unique accomplishments to each FY are as follows:

FY 2020 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.901	2.980	2.615

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Program Management Office utilizes the U.S. Navy Centers of Excellence to administer contracts for cyber operations, assessments, and mitigations.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Cyber Operations	MIPR	PMRF : HI	0.000	0.000		0.252	Nov 2019	0.332	Nov 2020	-		0.332	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Lockheed Martin	C/CPFF	Lockheed Martin : Moorestown, NJ	0.000	0.048	Aug 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - NAVSEA	MIPR	NAVSEA : Washington, DC	0.000	1.843	Mar 2019	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - NSWC Corona	MIPR	NSWC Corona : CA	0.000	0.250	Nov 2018	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - NSWC Philadelphia	MIPR	Pennsylvania, PA : NSWC Philadephia	0.942	0.465	Nov 2018	0.133	Nov 2019	0.173	Nov 2020	-		0.173	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - SPAWAR	MIPR	SPAWAR : CA	1.782	0.295	Nov 2018	2.595	Nov 2019	2.110	Nov 2020	-		2.110	Continuing	Continuing	Continuing
		Subtotal	2.724	2.901		2.980		2.615		-		2.615	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	2.724	2.901		2.980		2.615		-		2.615	Continuing	Continuing	N/A

Remarks
Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MC68 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	39.959	1.459	1.631	2.249	-	2.249	1.736	1.169	1.612	1.522	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	1.459	1.631	2.249
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	1.459	1.631	2.249

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Various	Various: Multi : AL, CA, CO, VA	2.119	0.076	Jul 2019	0.024	Jul 2020	0.067	Jul 2021	-		0.067	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CA, CO, VA	21.912	1.383	Mar 2019	1.607	Jul 2020	2.182	Jul 2021	-		2.182	9.005	36.089	0.000
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	15.928	0.000		0.000		0.000		-		0.000	0.000	15.928	0.000
		Subtotal	39.959	1.459		1.631		2.249		-		2.249	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	39.959	1.459		1.631		2.249		-		2.249	Continuing	Continuing	N/A

Remarks
Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604880C / *Land Based SM-3 (LBSM3)*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	279.453	72.634	98.139	67.071	-	67.071	63.240	61.200	79.139	33.282	Continuing	Continuing
MT08: *Midcourse Test*	270.370	69.004	95.231	64.407	-	64.407	60.730	58.739	75.089	31.467	Continuing	Continuing
MD40: *Program Wide Support*	9.083	3.630	2.908	2.664	-	2.664	2.510	2.461	4.050	1.815	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2020 to FY 2021 is in accordance with the Integrated Master Test Plan (IMTP) Version 21.1.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of Ground Based Midcourse Defense (GMD) functionality to demonstrate Enhanced Homeland Defense capabilities against long-range threats. The GMD components are tested in an integrated environment with Ballistic Missile Defense System (BMDS) sensors; Command and Control, Battle Management, and Communications (C2BMC); Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

Primary programs include Resources, Flight Test Execution, Ground Test Execution and Program Operations for which detailed descriptions and accomplishments are provided in section B.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	72.634	98.139	91.955	-	91.955
Current President's Budget	72.634	98.139	67.071	-	67.071
Total Adjustments	0.000	0.000	-24.884	-	-24.884
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-24.884	-	-24.884

Change Summary Explanation

Decrease in FY 2021 is in accordance with the IMTP Version 21.1.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MT08: *Midcourse Test*	270.370	69.004	95.231	64.407	-	64.407	60.730	58.739	75.089	31.467	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2020 to FY 2021 is in accordance with the IMTP Version 21.1.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense Midcourse Defense Segment Test provides flight and ground testing of GMD functionality to demonstrate capabilities against long-range threats. The GMD components are tested in an integrated environment with BMDS sensors; C2BMC; Warfighters; and national collection assets to assess the ability to defend the United States and its territories against ballistic missile attack.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Resources	17.146	24.963	23.869
Articles:	-	-	-

Description: Provides day-to-day operations of the flight and ground test programs to include engineering support for ground test planning, execution, and post-event reconstruction.

Recurring work:
-Provides test infrastructure and coordination of flight test range support from Vandenberg Air Force Base (VAFB), California, for all range activities, engineering, operators and Ground Based Interceptor (GBI) transportation
-Provides command and control and situational awareness for the GMD flight and ground test events at the MDA Integration and Operations Center (MDIOC) in Colorado Springs, Colorado and the Readiness and Control Facility (R&C) in Ft. Greely, Alaska
-Provides test communication plans, test communication control, satellite communication bandwidth, test network certification and accreditation for GMD flight and ground tests to integrate the range in VAFB, California, MDIOC in Colorado Springs, Colorado, Ft. Greely, Alaska and Pacific Missile Range Facility (PMRF) in Hawaii
-Provides engineering, operations and maintenance of the integrated system test labs in Huntsville, Alabama, to conduct BMDS flight test pre-mission risk reduction and system level ground testing for fielding warfighter capabilities that defend the homeland
-Provides operations and maintenance and equipment upgrades of the Prime Consolidated Integration Lab (PCIL) in Huntsville, Alabama to support flight test pre-mission risk reduction and post-flight reconstruction
-Use of the PCIL for testing provides confidence in models and simulations used for evaluation of performance of GMD homeland defense capabilities
-Provides equipment upgrades at VAFB and the MDIOC for test support systems

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Provide the infrastructure and support for planning and integration of GM BVT-03, GTI-07c BMDS ground test, GT-08 BMDS ground tests, and planning for cybersecurity tests for data collection to support performance evaluation of GMD Increment 6 homeland defense capabilities -Provide laboratory environments to support hardware and software testing prior to entry into BMDS level tests -Provide the infrastructure and support for execution of tests requested by the warfighter to enhance doctrine and tactics, techniques, and procedures (TTPs) and tests of opportunity presented by real world events and BMDS/external test activities ***FY 2021 Plans:*** -Provide the infrastructure and support for execution of GM BVT-03, GT-08 BMDS ground tests, and three cybersecurity tests for data collection to support performance evaluation of GMD Increment 6 homeland defense capabilities -Provide laboratory environments to support hardware and software testing prior to entry into BMDS level tests -Provide the infrastructure and support for execution of tests requested by the warfighter to enhance doctrine and TTPs and tests of opportunity presented by real world events and BMDS/external test activities ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Flight Test Execution	28.652	43.773	8.773
Articles:	-	-	-
Description: Flight tests demonstrate the capabilities and/or phenomenology that cannot be adequately tested or obtained during ground testing. Flight tests also provide opportunities to test actual hardware and to demonstrate BMDS Element interoperability under operationally realistic conditions. This accomplishment area provides the industry and government personnel for planning, integration, execution, and analysis for BMDS homeland defense flight tests. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Continue planning for Ground-based Midcourse Defense Flight Test, BVT-03. This flight test mission demonstrates the 2- or 3-Stage selectable boost vehicle software capability that provides additional engagement battlespace to the warfighter. This test will utilize a previously fielded GBI with a CE-I Exoatmospheric Kill Vehicle and a C1 booster launched from VAFB, California ***FY 2021 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Conduct pre-mission analysis, execution rehearsals, flight test execution, and post-mission analysis for GM BVT-03. This flight test mission demonstrates the 2- or 3-Stage selectable boost vehicle software capability that provides additional engagement battlespace to the warfighter. This test will utilize a previously fielded GBI with a CE-I Exoatmospheric Kill Vehicle and a C1 booster launched from VAFB, California ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 is in accordance with the IMTP Version 21.1.			
Title: Ground Test Execution	11.794	15.301	20.914
Articles:	-	-	-
Description: Ground tests demonstrate and validate Warfighter TTPs and provide performance assessments for fielding decisions. Ground tests are executed both in the Hardware-in-the-loop (HWIL) lab and in the field. HWIL lab tests integrate and assess BMDS system- level performance based on new element capabilities. Ground tests in the field use existing fielded element assets and tactical communication networks, to integrate, assess and demonstrate the element capabilities. Cybersecurity tests provide cyber resiliency capabilities and vulnerabilities assessments. This accomplishment area provides the industry and government personnel for planning, integration, execution, and analysis for BMDS homeland defense ground and cybersecurity tests. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** -Support planning, integration, execution and analysis of GTI-07c (USNORTHCOM/USINDOPACOM) (N/I) -Support planning for GTI-08a and GTD-08a (USNORTHCOM/USINDOPACOM) (N/I) for Operational Assessment (OA) of performance for Inc 6B.1 OCB decisions. This event provides data to support fielding for the BMDS Inc 6B.1 capability which includes Long Range Discrimination Radar (LRDR), GMD GS8, GMD 2/3 stage capability, and advanced SBX discrimination -Support planning for three Cybersecurity Test events to support BMDS weapon system fielding and operational acceptance ***FY 2021 Plans:*** -Conduct pre-mission analysis, integration, ground test execution, and post-mission analysis for GTI-08a and GTD-08a (USNORTHCOM/USINDOPACOM) (N/I) for Operational Assessment (OA) of performance for Inc 6B.1 OCB decisions. This event provides data to support fielding for the BMDS Inc 6B.1 capability which includes Long Range Discrimination Radar (LRDR), GMD GS8, GMD 2/3 stage capability, and advanced SBX discrimination -Conduct pre-mission analysis, integration and execution and post-mission analysis for three Cybersecurity Test events to support BMDS weapon system fielding and operational acceptance			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-Initiate planning of GTI-08b (N/I) for OA of performance for Inc 6B.2 Operational Capability. This event provides data to support fielding for the BMDS Inc 6B.2 capability which includes EKV 11 with improved discrimination capability and Space-based Kill Assessment (SKA) -Support and participate in the MDA transition to the new IMTP future ground test Concept of Operations (CONOPs) approach. This approach supports more agile fielding as components of the BMDS are ready to integrate and test than conducting a single major test event when all BMDS components are ready ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 provides for the new future ground test CONOPs approach, the increased IMTP ground tests and the cybersecurity tests. The increase also provides for three BMDS level cybersecurity tests in FY 2021 as compared to zero BMDS level cybersecurity tests in FY 2020.			
Title: Program Operations	11.412	11.194	10.851
Articles:	-	-	-
Description: Program Operations provides for government management of the GMD Test program. This effort includes program and business management support activities, financial management, cost and schedule performance analyses, cost estimation and analyses, configuration management, and integration. It also includes activities to provide critical program status and decision quality data and GMD test program compliance with internal and external direction, policies, and regulations to deliver critical capability within a consistent and disciplined process and technical and testing oversight, quality/safety/mission assurance, integrated logistics support, and government manpower and infrastructure to test the GMD system and components. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	69.004	95.231	64.407

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0208866C: MD08: *GMD Procurement*	405.464	285.471	0.000	-	0.000	0.000	10.225	2.130	36.400	Continuing	Continuing
• 0208866C: MD08: *Midcourse Defense O&M*	139.204	153.218	158.054	-	158.054	175.511	179.368	219.013	169.852	Continuing	Continuing
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 0604874C: *Improved Homeland Defense Interceptors*	407.858	515.000	664.138	-	664.138	921.349	1,339.439	856.712	1,258.000	Continuing	Continuing
• 0604894C: *Multi Object Kill Vehicle*	5.754	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	5.754

Remarks

D. Acquisition Strategy

GMD awarded a competitive Development and Sustainment Contract (DSC) on December 30, 2011. This contract included development, fielding, test, systems engineering, integration, and configuration management; equipment manufacturing and upgrade; training, operations and sustainment of the GMD system and associated support facilities.

On January 31, 2018, the DSC Extension was awarded to the Boeing Company with a period of performance through 1QFY2024. The DSC Extension includes supporting test, engineering, software, and performance based logistics scope. The DSC structure breaks out major efforts into separate Contract Line Item Numbers with individual incentives for management insight, accounting and property accountability.

GM is also implementing a more robust Program Board structure allowing more Government insight and decisions into the technical baseline and has changed business processes for greater Government involvement in Program decisions. In addition, GM utilizes Government laboratory modeling & simulation, and analysis capabilities to augment Boeing's efforts. These efforts utilize existing MDA and Other Government Agency competitively awarded contracts with the COLSA Corporation, Vandenberg Air Force Base, CA, MDA Integration and Operations Center (MDIOC), U.S. Army Combat Capabilities Development Command Aviation & Missile Center (CCDC formerly known as AMRDEC), and Pacific Missile Range Facility (PMRF) in Hawaii.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Operations - Contract Support Services	C/CPFF	Various AL/AK/ : CA/ CO/VA	11.057	5.717	Oct 2018	5.941	Oct 2019	6.059	Oct 2020	-		6.059	Continuing	Continuing	Continuing
Program Operations - Government Civilian Salaries	MIPR	MDA AL/ : VA	8.938	5.695	Oct 2018	5.253	Oct 2019	4.792	Oct 2020	-		4.792	Continuing	Continuing	Continuing
		Subtotal	19.995	11.412		11.194		10.851		-		10.851	Continuing	Continuing	N/A

Remarks

N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Cyber Security - Advanced Research Center Cyber Support	C/IDIQ	COLSA Corp : AL	4.162	0.000		0.000		0.000		-		0.000	0.000	4.162	0.000
Resources - Cyber Security - NSITE/GT Communications	MIPR	Aviation & Missile Research & Development : AL	0.138	0.000		0.000		0.000		-		0.000	0.000	0.138	0.000
Resources - Cyber Win10 Implementation - MDDC Lab Analysis Infrastructure	C/IDIQ	Analytical Services, In. : Al	1.449	0.000		0.000		0.000		-		0.000	0.000	1.449	0.000
Resources - Engineering & Analysis - Industry Support	C/CPAF	Boeing : AL	4.221	0.000		0.000		0.000		-		0.000	0.000	4.221	0.000
Resources - Engineering & Analysis - OGA Support	MIPR	AMRDEC : AL	4.098	0.000		0.000		0.000		-		0.000	0.000	4.098	0.000
Resources - Government Infrastructure Support, Labs, and Communications	MIPR	VAFB : CA/AL/CO	26.094	8.257	Nov 2018	9.776	Nov 2019	8.927	Nov 2020	-		8.927	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resources - Prime Infrastructure Support, Labs, and Communications	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/OR/TX//VA	33.266	8.889	Nov 2018	15.187	Nov 2019	14.942	Nov 2020	-		14.942	Continuing	Continuing	Continuing
Flight Test Execution - Planning and Silo Refurbishment	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/OR/TX/VA	101.034	7.127	Nov 2018	19.651	Nov 2019	8.773	Nov 2020	-		8.773	Continuing	Continuing	Continuing
Flight Test Execution - Range, Resources, and Engineering	MIPR	VAFB/PMRF : CA/HI	49.460	21.525	Nov 2018	24.122	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - Cybersecurity Testing	C/CPFF	Various : Various	4.300	0.000		11.440	Nov 2019	10.929	Nov 2020	-		10.929	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test Sprints	C/CPFF	Various : Various	0.000	1.000	Nov 2018	0.000		8.618	Nov 2020	-		8.618	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-04 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	3.355	0.000		0.000		0.000		-		0.000	0.000	3.355	0.000
Ground Test Execution - Ground Test-06 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	8.163	0.000		0.000		0.000		-		0.000	0.000	8.163	0.000
Ground Test Execution - Ground Test-07 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	10.544	10.794	Nov 2018	2.230	Nov 2019	0.000		-		0.000	Continuing	Continuing	Continuing
Ground Test Execution - Ground Test-08 Campaign	C/CPAF	Boeing : AL/AK/AZ/ CA/CO/TX/VA	0.091	0.000		1.631	Nov 2019	1.367	Nov 2020	-		1.367	Continuing	Continuing	Continuing
		Subtotal	250.375	57.592		84.037		53.556		-		53.556	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	270.370	69.004		95.231		64.407		-		64.407	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
FTG-11 (OT) (GM, OT Intercept Flight Test)	▲						
GTI-18 Sprint 3 (N/I): (BMDS Ground Test)	✦						
GTI-19 Sprint 1 (N/I) (BMDS Ground Test)	✦						
GTD-07b (N/I) (BMDS Ground Test)	✦						
Warfighter TP 07b (BMDS Ground Test)	✦						
GTI-19 Sprint 3 (BMDS Ground Test)	✦						
GTI-07c (N/I) (BMDS Ground Test)		✦					
GTI-08a (N/I) (BMDS Ground Test)		✧ ✧	✧				
GM BVT-03 (GM, DT Interceptor Only Flight Test)			△				
CVPA-08a (N/I) (BMDS Cybersecurity Test)			○				
GTD-08a (N/I) (BMDS Ground Test)			✧ ✧				
FTX-26 (OT) (SN, OT Target Only Flight Test)			△				
AA-08a (N/I) (BMDS Cybersecurity Test)			○				
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)				✧			
Element Cyber Event: GM CVI-11				◇			
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)				✧			
CVPA-08b (N/I) (BMDS Cybersecurity Test)				○			
GTD-08b (N/I) (BMDS Ground Test)				✧			
AA-08b (N/I) (BMDS Cybersecurity Test)				○			
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)				✧ ✧ ✧			
Element Cyber Event: GM ACD-11					◇		
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)					✧ ✧		
GTD-11 (N/I) (BMDS Ground Test)					✧		
CVPA-11 (N/I) (BMDS Cybersecurity Test)					△		

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
AA-11 (N/I) (BMDS Cybersecurity Test)						△	
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)						✧ ✧	
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)							✧ ✧
GTD-13 (N/I) (BMDS Ground Test)							✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
FTG-11 (OT) (GM, OT Intercept Flight Test)	2	2019	2	2019
GTI-18 Sprint 3 (N/I): (BMDS Ground Test)	2	2019	2	2019
GTI-19 Sprint 1 (N/I) (BMDS Ground Test)	3	2019	3	2019
GTD-07b (N/I) (BMDS Ground Test)	3	2019	3	2019
Warfighter TP 07b (BMDS Ground Test)	4	2019	4	2019
GTI-19 Sprint 3 (BMDS Ground Test)	4	2019	4	2019
GTI-07c (N/I) (BMDS Ground Test)	1	2020	1	2020
GTI-08a (N/I) (BMDS Ground Test)	3	2020	1	2021
GM BVT-03 (GM, DT Interceptor Only Flight Test)	1	2021	1	2021
CVPA-08a (N/I) (BMDS Cybersecurity Test)	1	2021	1	2021
GTD-08a (N/I) (BMDS Ground Test)	2	2021	3	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
AA-08a (N/I) (BMDS Cybersecurity Test)	3	2021	3	2021
GTI-08b Sprint 1 (N/I) (BMDS Ground Test)	1	2022	1	2022
Element Cyber Event: GM CVI-11	2	2022	2	2022
GTI-08b Sprint 2 (N/I) (BMDS Ground Test)	3	2022	3	2022
CVPA-08b (N/I) (BMDS Cybersecurity Test)	3	2022	3	2022
GTD-08b (N/I) (BMDS Ground Test)	4	2022	4	2022
AA-08b (N/I) (BMDS Cybersecurity Test)	4	2022	4	2022
GTI-11 Sprint 1 (N/I) (BMDS Ground Test)	4	2022	2	2023
Element Cyber Event: GM ACD-11	3	2023	3	2023
GTI-11 Sprint 2 (N/I) (BMDS Ground Test)	3	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MT08 / *Midcourse Test*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
GTD-11 (N/I) (BMDS Ground Test)	4	2023	4	2023
CVPA-11 (N/I) (BMDS Cybersecurity Test)	4	2023	4	2023
AA-11 (N/I) (BMDS Cybersecurity Test)	1	2024	1	2024
GTI-13 Sprint 1 (N/I) (BMDS Ground Test)	3	2024	4	2024
GTI-13 Sprint 2 (N/I) (BMDS Ground Test)	1	2025	2	2025
GTD-13 (N/I) (BMDS Ground Test)	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program Wide Support*	9.083	3.630	2.908	2.664	-	2.664	2.510	2.461	4.050	1.815	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	3.630	2.908	2.664
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	3.630	2.908	2.664

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations User Services	Reqn	Various : Multi: AL, CA, CO, VA	0.870	1.987	Jun 2019	1.924	Jun 2020	1.796	Oct 2020	-		1.796	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Other Agency Services (MIPRs)	MIPR	Various : Multi: AL, VA	0.016	0.016	Aug 2019	0.000		0.082	Oct 2020	-		0.082	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, VA	5.134	0.661	Jul 2019	0.250	Dec 2019	0.050	Oct 2020	-		0.050	Continuing	Continuing	Continuing
Program Wide Support - Agency OperationsManagement	Various	Various : Multi: AL, VA, Aust, Japan	0.016	0.326	Jul 2019	0.044	Jul 2020	0.030	Jul 2021	-		0.030	Continuing	Continuing	Continuing
Program Wide Support - FFRDC/UARC	MIPR	MITRE Corporation : Multi: AL, VA	0.000	0.640	Aug 2019	0.690	Nov 2019	0.706	Dec 2020	-		0.706	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	3.047	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
		Subtotal	9.083	3.630		2.908		2.664		-		2.664	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	9.083	3.630		2.908		2.664		-		2.664	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604887C / *Ballistic Missile Defense Midcourse Defense Segment Test*	**Project (Number/Name)** MD40 / *Program Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	6.347	5.754	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	12.101
MD85: *Multi Object Kill Vehicle*	6.347	5.384	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.731
MD40: *Program-Wide Support*	-	0.370	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.370

Program MDAP/MAIS Code: 362

Note

Decrease in MOKV funding reflects realignment to other Department of Defense priorities.

A. Mission Description and Budget Item Justification

The MOKV program will enhance the Missile Defense System (MDS) Homeland Defense Interceptor performance to enable the Warfighter to counter more numerous and complex threats to the Homeland by enabling engagement of multiple objects from a single interceptor. The Missile Defense Agency (MDA) is developing the concepts for a MOKV based on a modular, open systems architecture designed to common interfaces and standards, making upgrades easier and broadening MDA's vendor and supplier base.

The MOKV will rely on a MDS architecture that balances performance across the Sensors, Command, Control, Battle Management and Communications (C2BMC), and GMD elements. Analyses show that having multiple kill vehicles on each interceptor can dramatically improve the performance of the system, significantly reduce the burden on interceptor inventory, and reduce cost to defend the Homeland.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	6.500	0.000	0.000	-	0.000
Current President's Budget	5.754	0.000	0.000	-	0.000
Total Adjustments	-0.746	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.146	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	-0.600	0.000	0.000	-	0.000

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2021 Missile Defense Agency	**Date:** February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*

Change Summary Explanation

Decrease in MOKV funding reflects realignment to other Department of Defense priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD85: *Multi Object Kill Vehicle*	6.347	5.384	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	11.731
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

MOKV funding realigned in PB20 to other Department of Defense priorities.

A. Mission Description and Budget Item Justification

MDA has implemented a structured, disciplined systems engineering process to assure the MOKV is a MDS solution. The systems engineering effort will define the requirements for a deployable MOKV. The Government will develop MOKV system engineering guidelines from industry concepts, government analysis, modeling, and simulation. Results from MOKV concept development and follow on technology risk reduction efforts will inform the Top Level Requirements development needed in order to execute a feasible, affordable future MOKV Product Development. MDA anticipates deploying this capability in the next decade to address the evolving threat.

As part of MOKV concept development, industry identified technology component risk reduction efforts that support their concepts. MOKV technology risk reduction efforts include maturation of engagement management algorithms, communications, seekers, advanced sensors, Divert and Attitude Control Systems propulsion, integrated avionics, and Guidance, Navigation and Control technology.

The GMD element of the MDS provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the United States Homeland against Intercontinental Ballistic Missile attacks. In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a MOKV that will be able to defeat complex future threats.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Multi Object Kill Vehicle	5.384	0.000	0.000
Articles:	-	-	-
Description: In order to address the evolving and expanding threat of ballistic missile attacks on the Homeland, MDA is developing a more capable ground-based interceptor with a MOKV that will be able to defeat complex future threats. The MOKV replaces a unitary kill vehicle (KV) on current GBIs with a payload containing multiple, smaller kill vehicles (KVs). The MOKV concept also allows for a potentially substantial reduction of the GBI inventory required to protect the homeland, as multiple GBIs with a unitary KV will no longer be required to address a target complex with multiple threats. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	5.384	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603294C: *Common Kill Vehicle Technology*	55.549	13.600	11.058	-	11.058	10.996	11.052	11.290	11.563	Continuing	Continuing

Remarks

D. Acquisition Strategy

The acquisition strategy for Technology Risk Reduction consists of three focus areas. First, through competition with missile integration contractors, develop kill vehicle architectures and interfaces with competitive design of MOKV concepts incorporating engagement management concept of operations, kill vehicles and enhanced discrimination capability. Second, conduct risk reduction activities to identify and mature the technology necessary to increase the reliability and performance of our kill vehicles using the Advanced Technology Innovation Broad Agency Announcement (BAA) and competitive procurements. Make investments that mitigate the component development gaps for future MOKV, and enhance the competitive environment. Make the necessary investments to maturing component technology; enhanced inertial navigation and kill vehicle-to-kill vehicle communications. Third, leverage the technical expertise of Federally Funded Research and Development Centers (FFRDCs), University Applied Research Centers (UARCs), and Universities and government laboratories to independently develop reference concept using proven modeling/analysis techniques.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi Object Kill Vehicle - MOKV Technology Development	C/CPFF	Various : Various	0.444	0.000		0.000		0.000		-		0.000	0.000	0.444	0.000
		Subtotal	0.444	0.000		0.000		0.000		-		0.000	0.000	0.444	N/A

Remarks
N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Multi Object Kill Vehicle - Contract Support Services	C/CPFF	Various : AL/AK/CA/ CO/VA	1.211	2.519	Nov 2018	0.000		0.000		-		0.000	0.000	3.730	0.000
Multi Object Kill Vehicle - FFRDC Support Services	MIPR	Various : Various	1.427	1.011	Nov 2018	0.000		0.000		-		0.000	0.000	2.438	0.000
Multi Object Kill Vehicle - MOKV Development	C/CPFF	Various : AL/AK/CA/ CO/VA	0.000	0.236	Nov 2018	0.000		0.000		-		0.000	0.000	0.236	0.000
Multi Object Kill Vehicle - Other Government Agencies	MIPR	Various : Various	3.265	1.618	Nov 2018	0.000		0.000		-		0.000	0.000	4.883	0.000
		Subtotal	5.903	5.384		0.000		0.000		-		0.000	0.000	11.287	N/A

Remarks
N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	N/A

Remarks
N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	6.347	5.384		0.000		0.000		-		0.000	0.000	11.731	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MOKV Development Acquisition Strategy	✦	✦	✦	✦																								

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD85 / *Multi Object Kill Vehicle*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MOKV Development Acquisition Strategy	1	2019	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	-	0.370	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.370
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2020 reflects proportional PWS changes as a result of the consolidation of the CKV Technology program element 0603294 with this program element 0604894C.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	0.370	0.000	0.000
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.370	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations Management	Allot	Various : Multi: AL, CA, CO, VA	0.000	0.370	Jul 2019	0.000		0.000		-		0.000	0.000	0.370	0.000
		Subtotal	0.000	0.370		0.000		0.000		-		0.000	0.000	0.370	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.370		0.000		0.000		-		0.000	0.000	0.370	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧																								

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0604894C / *Multi Object Kill Vehicle*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	4.706	0.961	11.138	1.148	-	1.148	1.172	1.194	1.231	1.255	Continuing	Continuing
MDCS: *Cyber Security Initiative*	4.706	0.961	11.138	1.148	-	1.148	1.172	1.194	1.231	1.255	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The decrease from FY 2020 to FY 2021 reflects a return to core funding levels following the FY 2020 Congressional add for Cheyenne Mountain cybersecurity upgrades.

A. Mission Description and Budget Item Justification

The Missile Defense Agency (MDA) Counterintelligence (CI) Division conducts CI in Cyberspace activities pursuant to Department of Defense (DoD) Directive DoDD 5240.02 (Counterintelligence) and DoD Instruction S-5240.23 (CI Activities in Cyberspace) to identify, disrupt, neutralize and mitigate foreign intelligence services and international terrorist organizations, hereafter referred to as foreign entities, to act in observable or exploitable ways. To this end, the MDA CI Division conducts activities to detect, neutralize and mitigate foreign entity-directed malicious and insider threat activities targeting MDA administrative and Missile Defense fire control networks and mobile devices.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.985	1.138	1.160	-	1.160
Current President's Budget	0.961	11.138	1.148	-	1.148
Total Adjustments	-0.024	10.000	-0.012	-	-0.012
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.024	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.012	-	-0.012

Change Summary Explanation

The FY 2020 increase reflects the $10 Million Congressional add for cybersecurity upgrades to the C2BMC user node at Cheyenne Mountain, CO.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MDCS: *Cyber Security Initiative*	4.706	0.961	11.138	1.148	-	1.148	1.172	1.194	1.231	1.255	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The decrease from FY 2020 to FY 2021 reflects a return to core funding levels following the FY 2020 Congressional add for Cheyenne Mountain cybersecurity upgrades.

A. Mission Description and Budget Item Justification

The DoD Counterintelligence in Cyberspace (CIC) mission initiative is externally funded and falls under the functional and fiscal management of the Director, Defense Intelligence Agency (DIA). The MDA Counterintelligence (CI) Division conducts defensive CIC activities pursuant to DoD Directive DoDD 5240.02 (Counterintelligence), DoD Instruction S-5240.23 (CI Activities in Cyberspace) and DoD Instruction 5240.26 (Countering Espionage, International Terrorism, and the CI Insider Threat), and an MDA Annex within an annual DIA-approved Implementation Plan.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: DoD CI in Cyberspace Initiative	0.961	11.138	1.148
Articles:	-	-	-
Description: This activity detects, identifies, neutralizes and mitigates malicious activities directed by foreign entities that target MDA cyber assets. The following actions are required on a continuing basis to accomplish the DoD CI in Cyberspace Initiative: -- Collaborate with the MDA Computer Emergency Response Team (CERT) to detect, neutralize and mitigate potential foreign entity directed malicious and insider threat activities targeting MDA administrative and fire control networks, and mobility devices -- Conduct CI Preliminary Inquiries into potential foreign entity directed malicious or insider threat activities and refers suspected incidents or events to the FBI or military department CI organizations for further investigation -- Conduct CI forensics analysis of MDA computer network activity logs to identify potential indicators of foreign entity directed malicious, insider threat or computer network attack/exploitation activities targeting MDA information -- Coordinate with national and DoD level intelligence, CI and law enforcement agencies to identify foreign entity cyber actor intrusion sets and the tactics, techniques and procedures used to target MDA and its Cleared Defense Contractor computer networks -- Coordinate with MDA cleared defense contractors that have been compromised by foreign intelligence entities to capture and triage exfiltrated MDA related data, allowing MDA engineering teams to perform proper damage assessments -- Provide required initial and periodic training to ensure the MDA workforce is kept apprised of foreign entity threats to DoD personnel, facilities, information, activities, and information technology systems -- Protect MDA Sensitive Compartmented Information Facility (SCIF) and Special Access Program (SAP) areas from cellular/ wireless device monitoring			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
-- Provide support to the MDA Insider Threat program Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. - Provide cybersecurity resilience upgrades for the USNORTHCOM C2BMC user node at Cheyenne Mountain, CO. - Conduct C2BMC Management Node Continuity of Operations planning in support of USNORTHCOM ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The decrease from FY 2020 to FY 2021 reflects a return to core funding levels following the FY 2020 Congressional add for Cheyenne Mountain cybersecurity upgrades.			
Accomplishments/Planned Programs Subtotals	0.961	11.138	1.148

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing

Remarks

D. Acquisition Strategy

This project leverages expertise in the intelligence community, counterintelligence community, and information assurance community, including the Military Services, Federally Funded Research and Development Centers (FFRDCs), University Affiliated Research Centers (UARCs), and industry.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DoD CI in Cyberspace Initiative - CI in Cyberspace	Allot	MDA : VA	0.699	0.224	Oct 2018	0.146	Oct 2019	0.161	Oct 2020	-		0.161	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Counterintelligence	C/CPFF	TEAMS : VA, AL	3.291	0.712	Nov 2018	0.883	Nov 2019	0.819	Nov 2020	-		0.819	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Cybersecurity Upgrades at Cheyenne Mountain	C/CPAF	Lockheed Martin : CO	0.000	0.000		10.000	Feb 2020	0.000		-		0.000	Continuing	Continuing	Continuing
DoD CI in Cyberspace Initiative - Technical Surveillance & Countermeasures	MIPR	USA-TAO : Ft. Detrick, MD	0.716	0.025	Nov 2018	0.109	Nov 2019	0.168	Nov 2020	-		0.168	Continuing	Continuing	Continuing
		Subtotal	4.706	0.961		11.138		1.148		-		1.148	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	4.706	0.961		11.138		1.148		-		1.148	Continuing	Continuing	N/A

Remarks

Award Dates reflect date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MDCS Cyber Security Initiative	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 0305103C / *Cyber Security Initiative*	**Project (Number/Name)** MDCS / *Cyber Security Initiative*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MDCS Cyber Security Initiative	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	35.008	36.114	36.349	34.144	-	34.144	34.657	35.268	36.627	37.734	Continuing	Continuing
MD12: *Space Tracking and Surveillance System (STSS)*	32.051	31.448	32.633	32.044	-	32.044	32.439	32.989	33.836	34.740	Continuing	Continuing
MC12: *Cyber Operations*	1.424	2.925	2.190	0.744	-	0.744	0.843	0.861	0.917	0.936	Continuing	Continuing
MD40: *Program-Wide Support*	1.533	1.741	1.526	1.356	-	1.356	1.375	1.418	1.874	2.058	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

N/A

A. Mission Description and Budget Item Justification

The two Space Tracking and Surveillance System (STSS) satellites launched in 2009 provide an on-orbit capability to validate remote sensor fire control integration to inform design and operation of the Missile Defense Agency (MDA) space-layer capabilities. MDA uses STSS data to characterize contribution of space data into the Missile Defense System (MDS) and to provide sensor measurements and background data supporting trade studies and analyses for MDA space-layer options for both Homeland and Regional Defense.

STSS continues to provide risk reduction for MDA space capabilities, models, algorithms, interface definitions, communications architectures, and performance across threat object acquisition, tracking, complex target signatures, discrimination and multi-mission support. STSS also informs the MDS Concept of Operations, timelines and performance requirements for remote space sensor cuing for ballistic missile engagements, expanding battle space for weapon systems such as Aegis Ballistic Missile Defense (BMD).

The STSS program demonstrates the functions and interfaces required for space data delivery to the MDS, validating the data quality necessary for interceptors to launch and/or engage on STSS sensor data. The two STSS satellites are operated from the ground station processing center at the Missile Defense Space Center (MDSC). The STSS satellites demonstrate MDA space-layer capabilities and reduce risk for future systems (e.g., Hypersonic and Ballistic Tracking Space Sensor) by viewing high-value Targets of Opportunity and participating in MDS flight tests. Though the STSS satellites are operating beyond their life expectancy, MDA will continue STSS operations due to the continued contributions to the MDS mission.

The MDSC provides MDA's only centralized collaboration and integration environment that leverages existing Overhead Persistent Infrared (OPIR) enterprise integration in support of MDS research and development test, and sensor operations. The MDSC capabilities and infrastructure support flight tests, operational concept and prototype development, technology demonstrations, experiments, and algorithm development within a multi-security, collaborative environment to integrate and exploit national space asset data. The MDSC also conducts studies and experiments with MDA assets such as the Spacebased Kill Assessment (SKA), and STSS, as well as other agencies' assets.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	36.955	35.849	35.623	-	35.623
Current President's Budget	36.114	36.349	34.144	-	34.144
Total Adjustments	-0.841	0.500	-1.479	-	-1.479
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.500			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.841	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-1.479	-	-1.479

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD12: *Space Tracking and Surveillance System (STSS)*	32.051	31.448	32.633	32.044	-	32.044	32.439	32.989	33.836	34.740	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Two Space Tracking and Surveillance System (STSS) satellites provide a low earth orbit sensor capability with visible and infrared sensors for integrated testing with other Missile Defense System (MDS) elements. STSS demonstrates space-based capabilities including persistent tracking and integrated MDS discrimination improvements. These two satellites provide valuable risk reduction for acquisition, tracking, complex scenes, and discrimination functionality to include stereo data fusion, cuing radars over the horizon and over-the-horizon fire control.

The on-orbit sensors collect invaluable background, scene, and target signature data to support the Missile Defense Agency (MDA) space-layer and other weapon sensor development trade studies. STSS activities provide information for integration of space-based missile tracking (midcourse phase); remote sensor and weapons cuing via the Command and Control, Battle Management and Communications (C2BMC); features and discrimination; and hit/impact point assessments. STSS enables early capability assessment to address the Warfighter's need for highly available early missile tracking from space, providing an operationally suitable means of global persistent surveillance and engagement. Capabilities being assessed for MDA space-layer capabilities include detecting and acquiring missiles; tracking missiles and their deployed objects; performing autonomous acquisition-to-track handover within a satellite; performing tracking handover to a satellite from a ground cue; performing uplink and downlink of mission, health, and status data both directly and via crosslink between two satellites; reporting missile and intercept event to close the fire-control loop; filtering reports to C2BMC; and providing near real-time object data to external users. STSS support to other mission areas improves definition for Enterprise system approaches.

The Missile Defense Space Center (MDSC) provides capabilities and infrastructure to support space operations, integration and testing with the MDS. It provides a multi-level security environment for sensor data management and integration across space and terrestrial sensor data activities. MDSC experiments leverage DoD and national security space capabilities. MDSC activities support analyses, demonstration and integration of space sensor capabilities into developmental and operational MDA elements. MDSC enables the development of advanced technology and algorithms including fusion of multiple sensor types (radar, overhead persistent infrared, electro-optical and other emerging sensor technologies). It also supports mission integration of space-based missile tracking, sensor and weapons cuing via C2BMC, features and discrimination, kill and impact point assessments into the MDS and other non-MDA mission areas, including Space Situational Awareness and battle space characterization.

Lessons learned and data gathered from the STSS demonstration satellites program provide valuable information for MDA space-layer modeling and simulation activities in assessing the capability provided by Overhead Persistent Infrared sensors.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Demonstration Satellites	31.448	32.633	32.044
Articles:	-	-	-

Description: The Space Tracking and Surveillance System (STSS) demonstration satellites collect and deliver critical space and missile characterization data used to design and inform the Missile Defense System (MDS) and space-layer capabilities. The Missile Defense Space Center (MDSC) facilities and activities are required for safe STSS satellite operations and sustainment. STSS activities include:
- Perform risk reduction for MDA tracking and surveillance initiatives and Overhead Persistent Infrared (OPIR) Enterprise integration and demonstrations across OPIR cuing, Joint Tasking Operations, and data utility
- Collect data to support joint OPIR mission utility assessments across Space Situational Awareness, and Battle Space Awareness missions to include integration, analyses, and studies to confirm data sharing capabilities
- Participate in Integrated Master Test Plan events
- Conduct satellite testing to demonstrate critical space capabilities, including:
-- Ability to support MDS integrated discrimination efforts
-- Ability to support Hit/Kill assessment from space
-- Ability to cue MDS sensors from space
-- Ability to provide precision cue to MDS sensors
- Perform satellite functionality testing and calibration as part of the satellite operations
- Conduct missile tracking experiments as identified in the test specific sections
- Provide Air Force Space Command Space Situational Awareness support

MDSC efforts related to STSS include:
- Analyze space radiation environment and its influence on MDA space system performance
- Analyze space based sensor data from STSS and OPIR observations, both individually and combined, to identify phenomenology and techniques to aid tracking and discrimination architectures
- Provide data for concept studies and analyses for alternative sensor payload configurations
- Sustain MDSC resources for all participant activities, including data, voice, and/or video communications, and support MDA cybersecurity directives
- Document requirements and perform tracking, design, implementation, and verification necessary for the MDSC facility
- Implement on-going and emerging cybersecurity requirements

Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows:

FY 2020 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- SEE ABOVE ***FY 2021 Plans:*** - SEE ABOVE ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	31.448	32.633	32.044

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing
• 1206895C: *Ballistic Missile Defense System Space Programs*	96.146	140.565	32.068	-	32.068	28.591	41.201	39.090	39.630	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

D. Acquisition Strategy

The STSS demonstration satellites program follows MDA's capability-based acquisition strategy that emphasizes testing, incremental development, and evolutionary acquisition. The STSS effort utilizes a single prime contractor, Northrop Grumman Aerospace Systems (NGAS) with the subcontractor Raytheon providing the sensor payload. This contract implements MDA's capability-based acquisition strategy by using existing satellite hardware as a low risk opportunity, building upon the lessons learned from previous development efforts, and establishing a series of planned enhancements to bring added capability to the MDS.

MDSC efforts will be acquired on the Specialized Warfighter Development Contract and Integrated Research and Development for Enterprise Solutions vehicles. These contracts are responsible for integrating Research, Development, Test and Evaluation, operations support, resource and infrastructure management for the MDSC.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - Capability Based R&D	SS/CPAF	NGAS : Redondo Beach, CA, Schriever AFB, CO	21.306	21.001	Nov 2018	20.544	Nov 2019	20.859	Nov 2020	-		20.859	Continuing	Continuing	Continuing
Demonstration Satellites - STSS Support to Missile Defense Space Center (MDSC)	C/CPFF	Northrop Grumman/ Jacobs Engineering : Schriever AFB, CO	3.467	3.484	Nov 2018	4.087	Nov 2019	4.173	Nov 2020	-		4.173	Continuing	Continuing	Continuing
Demonstration Satellites - Systems Engineering	FFRDC	Aerospace : Los Angeles, CA	0.501	0.494	Nov 2018	0.573	Nov 2019	0.293	Nov 2020	-		0.293	Continuing	Continuing	Continuing
		Subtotal	25.274	24.979		25.204		25.325		-		25.325	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of Program Element (PE) 0603893C, MD12

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - Contract Support Services (CSS)	C/Various	Various : AL, CO	2.881	2.241	Nov 2018	2.687	Nov 2019	2.645	Nov 2020	-		2.645	Continuing	Continuing	Continuing
Demonstration Satellites - IT User Services	C/CPAF	Northrop Grumman/ Jacobs Engineering : AL, AK, CA, CO, HI, NM, VA	0.590	0.604	Dec 2018	0.646	Dec 2019	0.651	Dec 2020	-		0.651	Continuing	Continuing	Continuing
Demonstration Satellites - MDA Civilian	Allot	MDA : AL, CO	2.181	2.204	Oct 2018	3.131	Oct 2019	2.542	Oct 2020	-		2.542	Continuing	Continuing	Continuing
Demonstration Satellites - Other Government Agency (OGA) Civilian	MIPR	SMC : Schriever AFB, CO	0.161	0.164	Nov 2018	0.167	Nov 2019	0.171	Nov 2020	-		0.171	Continuing	Continuing	Continuing
Demonstration Satellites - Program Mission Support	Various	Various : Various	0.556	0.828	Nov 2018	0.358	Nov 2019	0.258	Nov 2020	-		0.258	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstration Satellites - UARC	C/CPFF	Utah University, Space Dynamics Laboratory : AL, AK, CA, CO, HI, MA, UT, VA	0.408	0.428	Nov 2018	0.440	Nov 2019	0.452	Nov 2020	-		0.452	Continuing	Continuing	Continuing
		Subtotal	6.777	6.469		7.429		6.719		-		6.719	Continuing	Continuing	N/A

Remarks

All efforts listed above are a continuation of PE 0603893C, MD12

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	32.051	31.448		32.633		32.044		-		32.044	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019	▲																											
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019	✦	✦	✦	✦																								
MIS Operations - 1Q2019-4Q2019	✦	✦	✦	✦																								
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019	✦	✦	✦	✦																								
MDSC TIL Operations - 1Q2019-4Q2019	✦	✦	✦	✦																								
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019		▲																										
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019			▲																									
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019				▲																								
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2020					▲																							
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020					✧	✧	✧	✧																				
MIS Operations - 1Q2020-4Q2020					✧	✧	✧	✧																				
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020					✧	✧	✧	✧																				
MDSC TIL Operations - 1Q2020-4Q2020					✧	✧	✧	✧																				
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2020						△																						
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2020							△																					
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2020								△																				
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2021									△																			
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021									✧	✧	✧	✧																
MIS Operations - 1Q2021-4Q2021									✧	✧	✧	✧																
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021									✧	✧	✧	✧																
MDSC TIL Operations - 1Q2021-4Q2021									✧	✧	✧	✧																
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2021										△																		
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2021											△																	
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2021												△																

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 1206893C / *Space Tracking and Surveillance System*	MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2022													△															
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022													✧	✧	✧	✧												
MIS Operations - 1Q2022-4Q2022													✧	✧	✧	✧												
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022													✧	✧	✧	✧												
MDSC TIL Operations - 1Q2022-4Q2022													✧	✧	✧	✧												
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2022														△														
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2022															△													
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2022																△												
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2023																	△											
MDSC TIL Operations - 1Q2023-4Q2023																	✧											
Mission Planning, Tasking and Analysis - 1Q2023-4Q2023																	✧											
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023																	✧	✧	✧	✧								
MIS Operations - 1Q2023-4Q2023																	✧	✧	✧	✧								
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2023																		△										
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2023																			△									
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2023																				△								
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2024																					△							
MDSC TIL Operations - 1Q2024-4Q2024																					✧							
Mission Planning, Tasking and Analysis - 1Q2024-4Q2024																					✧							
STSS Demonstration Satellites On-Orbit Operations - 1Q2024-4Q2024																					✧	✧	✧	✧				
MIS Operations - 1Q2024-4Q2024																					✧	✧	✧	✧				
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2024																						△						
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2024																							△					
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2024																								△				

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2025							△
MDSC TIL Operations - 1Q2025-4Q2025							✧ ✧ ✧ ✧
STSS Demonstration Satellites On-Orbit Operations - 1Q2025-4Q2025							✧ ✧ ✧ ✧
Mission Planning, Tasking and Analysis - 1Q2025-4Q2025							✧ ✧ ✧ ✧
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2025							△
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2025							△
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2025							△

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 1Q2019	1	2019	1	2019
STSS Demonstration Satellites On-Orbit Operations - 1Q2019-4Q2019	1	2019	4	2019
MIS Operations - 1Q2019-4Q2019	1	2019	4	2019
Mission Planning, Tasking and Analysis - 1Q2019-4Q2019	1	2019	4	2019
MDSC TIL Operations - 1Q2019-4Q2019	1	2019	4	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 2Q2019	2	2019	2	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 3Q2019	3	2019	3	2019
STSS Demonstration Satellites-BMDS Flight Tests/Targets of Opportunity - 4Q2019	4	2019	4	2019
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2020	1	2020	1	2020
STSS Demonstration Satellites On-Orbit Operations - 1Q2020-4Q2020	1	2020	4	2020
MIS Operations - 1Q2020-4Q2020	1	2020	4	2020
Mission Planning, Tasking and Analysis - 1Q2020-4Q2020	1	2020	4	2020
MDSC TIL Operations - 1Q2020-4Q2020	1	2020	4	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2020	2	2020	2	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2020	3	2020	3	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2020	4	2020	4	2020
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2021	1	2021	1	2021
STSS Demonstration Satellites On-Orbit Operations - 1Q2021-4Q2021	1	2021	4	2021
MIS Operations - 1Q2021-4Q2021	1	2021	4	2021
Mission Planning, Tasking and Analysis - 1Q2021-4Q2021	1	2021	4	2021
MDSC TIL Operations - 1Q2021-4Q2021	1	2021	4	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2021	2	2021	2	2021

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2021	3	2021	3	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2021	4	2021	4	2021
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2022	1	2022	1	2022
STSS Demonstration Satellites On-Orbit Operations - 1Q2022-4Q2022	1	2022	4	2022
MIS Operations - 1Q2022-4Q2022	1	2022	4	2022
Mission Planning, Tasking and Analysis - 1Q2022-4Q2022	1	2022	4	2022
MDSC TIL Operations - 1Q2022-4Q2022	1	2022	4	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2022	2	2022	2	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2022	3	2022	3	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2022	4	2022	4	2022
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2023	1	2023	1	2023
MDSC TIL Operations - 1Q2023-4Q2023	1	2023	1	2023
Mission Planning, Tasking and Analysis - 1Q2023-4Q2023	1	2023	1	2023
STSS Demonstration Satellites On-Orbit Operations - 1Q2023-4Q2023	1	2023	4	2023
MIS Operations - 1Q2023-4Q2023	1	2023	4	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2023	2	2023	2	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2023	3	2023	3	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2023	4	2023	4	2023
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2024	1	2024	1	2024
MDSC TIL Operations - 1Q2024-4Q2024	1	2024	1	2024
Mission Planning, Tasking and Analysis - 1Q2024-4Q2024	1	2024	1	2024
STSS Demonstration Satellites On-Orbit Operations - 1Q2024-4Q2024	1	2024	4	2024
MIS Operations - 1Q2024-4Q2024	1	2024	4	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2024	2	2024	2	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2024	3	2024	3	2024

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD12 / *Space Tracking and Surveillance System (STSS)*

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2024	4	2024	4	2024
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 1Q2025	1	2025	1	2025
MDSC TIL Operations - 1Q2025-4Q2025	1	2025	4	2025
STSS Demonstration Satellites On-Orbit Operations - 1Q2025-4Q2025	1	2025	4	2025
Mission Planning, Tasking and Analysis - 1Q2025-4Q2025	1	2025	4	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 2Q2025	2	2025	2	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 3Q2025	3	2025	3	2025
STSS Demonstration Satellites-MDS Flight Tests/Targets of Opportunity - 4Q2025	4	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MC12 / *Cyber Operations*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC12: *Cyber Operations*	1.424	2.925	2.190	0.744	-	0.744	0.843	0.861	0.917	0.936	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of hardware replacement and executing steady-state support to meet cybersecurity requirements.

A. Mission Description and Budget Item Justification

Space Tracking and Surveillance System (STSS) Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/ Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for MDA STSS mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	2.925	2.190	0.744
Articles:	-	-	-

Description: This activity maintains the Assessment and Authorization (A&A) and C&A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of MDA mission, test, and administrative systems.
Recurring accomplishments include the following:
- Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&Ms
- Conduct cybersecurity design, engineering, and architecture planning for STSS information technology systems
- Plan and test the cybersecurity controls for STSS and MDSC systems
- Conduct SCA testing continuous monitoring of STSS and MDSC mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities

Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows:

FY 2020 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MC12 / *Cyber Operations*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Completes STSS system hardware replacement for cyber security requirements compliance and executes steady-state support to meet cyber security requirements ***FY 2021 Plans:*** See Above ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of hardware replacement and executing steady-state support to meet cybersecurity requirements.			
Accomplishments/Planned Programs Subtotals	2.925	2.190	0.744

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MC12 / *Cyber Operations*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - Civ Cyber Labor	Allot	MDA : Schriever AFB	0.176	0.170	Oct 2018	0.180	Oct 2019	0.171	Oct 2020	-		0.171	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Contractor Support	C/Various	Various : AL, CO	0.352	0.574	Nov 2018	0.571	Nov 2019	0.573	Nov 2020	-		0.573	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - Information Assurance	C/CPAF	NGAS : Schriever AFB, CO/Redondo Beach, CA	0.896	2.181	Nov 2018	1.439	Mar 2020	0.000		-		0.000	0.000	4.516	4.516
		Subtotal	1.424	2.925		2.190		0.744		-		0.744	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.424	2.925		2.190		0.744		-		0.744	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MC12 / *Cyber Operations*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC12 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MC12 / *Cyber Operations*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC12 Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	1.533	1.741	1.526	1.356	-	1.356	1.375	1.418	1.874	2.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency PEs each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	1.741	1.526	1.356
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	1.741	1.526	1.356

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Operations and Support Services	C/CPAF	Northrop Grumman : CO	1.260	1.332	Aug 2019	1.503	Jul 2020	1.315	Nov 2020	-		1.315	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various Multi: AL, CA, CO, : VA	0.054	0.409	Jul 2019	0.023	Jul 2020	0.041	Jul 2021	-		0.041	Continuing	Continuing	Continuing
Program Wide Support - Prior year no longer funded in the FYDP	Various	Various : Various	0.219	0.000		0.000		0.000		-		0.000	0.000	0.219	0.000
		Subtotal	1.533	1.741		1.526		1.356		-		1.356	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1.533	1.741		1.526		1.356		-		1.356	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206893C / *Space Tracking and Surveillance System*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	45.122	96.146	140.565	32.068	-	32.068	28.591	41.201	39.090	39.630	Continuing	Continuing
MD33: *MD Space Exp Center (MDSEC)*	43.904	17.406	26.013	30.408	-	30.408	27.060	39.139	36.670	37.040	Continuing	Continuing
MD42: *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*	-	0.000	108.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	108.000
MD37: *Space Sensor Layer*	-	73.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	73.000
MC33: *MD Space Exp Center (MDSEC)*	0.469	5.000	5.380	0.386	-	0.386	0.396	0.405	0.420	0.428	Continuing	Continuing
MD40: *Program-Wide Support*	0.749	0.740	1.172	1.274	-	1.274	1.135	1.657	2.000	2.162	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

In FY 2019 the Hypersonic and Ballistic Tracking Space Sensor (HBTSS), formerly called the Space Sensor Layer (SSL) effort was funded in Budget Project MD37. In FY 2020 it was funded in Budget Project MD42. Both FY 2019 and FY 2020 funding was provided via Congressional plus up. Beginning in FY 2021, in accordance with Department decisions, funding responsibility has transferred from MDA to SDA for continued HBTSS development efforts. Decrease from FY 2020 to FY 2021 reflects this transfer of funding responsibility for continuation of the Hypersonic and Ballistic Tracking Space Sensor to the SDA PE 1206410SDA.

A. Mission Description and Budget Item Justification

Spacebased Kill Assessment (SKA): The SKA project will deliver hit and kill assessment from space. MDA Missile Defense System (MDS) intercept testing experience provided a solid understanding of kill assessment physics to enable exploration of this critical capability. SKA incorporates Government Accountability Office (GAO) recommendations to examine the operational feasibility of disaggregating large satellites (report number GAO-15-7) and to provide data for the business case for shared or dedicated satellite control, including the ground antenna networks (report number GAO-13-315). The favorable cost and schedule performance on SKA is also consistent with the GAO's assessment of commercially hosted payload programs (report number GAO-18-493). The SKA experiment utilizes a network of small Infrared (IR) sensors integrated onto commercial host satellites that while on orbit observe missile defense intercepts and deliver hit and kill assessment declarations to the MDS. After successful participation in MDS Flight Tests in FY 2019, the MDA Director made the decision to transition SKA to an operational element of the MDS.

HBTSS: The HBTSS, formerly known as the Space Sensor Layer (SSL), is a missile defense sensor which is part of the USD(R&E) Space Sensor Layer (SSL) which is a department-wide effort led by the Space Development Agency (SDA). This multi-tiered architecture will consist of systems in different orbits that provide an integrated capability to meet critical warfighter requirements in a contested space environment. HBTSS will execute the Defense Planning Guidance (DPG), Missile Defense Review (MDR), and FY19 National Defense Authorization Act (NDAA) guidance to provide this space tracking sensor capability. This program will develop prototype

space sensors to prove out the capability to detect and track hypersonic threats and boosting conventional ballistic missiles. The HBTSS prototype sensors will launch and demonstrate the ability to detect hypersonic and missile threats in a high clutter environment. Beginning in FY 2021, in accordance with Department decisions, funding responsibility has transferred from MDA to SDA for continued HBTSS development efforts.

This PE also funds Cybersecurity efforts necessary to support BMDS Space Programs.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	94.484	27.565	21.236	-	21.236
Current President's Budget	96.146	140.565	32.068	-	32.068
Total Adjustments	1.662	113.000	10.832	-	10.832
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	113.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.376	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	2.038	0.000	10.832	-	10.832

Change Summary Explanation

Increase in FY 2020 reflects the Congressional plus ups for development of the missile defense Hypersonic and Ballistic Tracking Space Sensor (HBTSS) and for investment in MDS RDT&E mission support systems to increase protection of critical MDS data/knowledge capital.

Increase in FY 2021 provides for development to operationalize the Spacebased Kill Assessment with development of ground testing capability, continued hit kill algorithm maturation, deployment of an operationalized Payload Operations Center to support the warfighter by providing an initial real-time hit assessment capability.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD33: *MD Space Exp Center (MDSEC)*	43.904	17.406	26.013	30.408	-	30.408	27.060	39.139	36.670	37.040	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The increase from FY 2020 to FY 2021 provides for participation in multi-phase ground test campaign, standing up SKA POC operations and support at the MDIOC, procurement of follow-on commercial data services, and implementing robust cyber security protection measures within operational architecture in support of full POC operations.

A. Mission Description and Budget Item Justification

The Spacebased Kill Assessment (SKA) system is composed of two segments: a space segment and a ground segment.

The space segment is composed of a network of small infrared (IR) sensors (sensors, processor cards and cabling), each mated to a different satellite. The total number of sensors and their network placement are specifically tailored for the hit and kill assessment missions. The space segment includes key design features to improve its resiliency.

The ground segment monitors the health and status of the on-orbit sensors, commands the sensors to perform the hit and kill assessment mission and analyzes the data to make a hit/kill assessment determination for the Missile Defense System (MDS). The ground segment also includes the equipment necessary for communications security and information assurance. The Missile Defense Space Center (MDSC) provides the critical infrastructure for SKA data, routing SKA data between the commercial payload integrator and the SKA Payload Analysis Center. The operational command and control center for SKA, the Payload Operations Center (POC), will support MDS Post Intercept Assessment (PIA) capabilities.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Spacebased Kill Assessment	17.406	26.013	30.408
Articles:	-	-	-
Description: The Spacebased Kill Assessment (SKA) project is designed to deliver hit and kill assessment for Homeland Defense. It includes: - SKA sensor-host satellite integration and testing - On-orbit operations by experimenting and participating in MDS flight tests - Integration of SKA into the MDS operational baseline			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Integration of SKA messages into Post Intercept Assessment (PIA) module for delivery to the Warfighter - Development of hit and kill assessment algorithms required to add SKA to the operational MDS - Supporting engineering trade studies and concept evaluations for current and future space based sensors Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows: ***FY 2020 Plans:*** - Continue on-orbit operations by experimenting and participating in MDS flight tests - Continue development of hit and kill assessment algorithms required to add SKA to the operational MDS - Continue development of capability for ground test participation required to add SKA to the operational MDS - Begin network upgrades and an operational training program - Complete build out of SKA Payload Operations Center (POC) at the MDIOC ***FY 2021 Plans:*** - Complete development of modeling and simulation capability for ground test participation required to add SKA to the operational MDS - Begin to participate in MDS ground testing to support operational declaration - Transition to POC for SKA operations - Complete operational network upgrades and training program ***FY 2020 to FY 2021 Increase/Decrease Statement:*** The increase from FY 2020 to FY 2021 provides for participation in multi-phase ground test campaign, standing up SKA POC operations and support at the MDIOC, procurement of follow-on commercial data services, and implementing robust cyber security protection measures within operational architecture in support of full POC operations.			
Title: Space Sensor Layer (SSL)	0.000	0.000	0.000
Articles:	-	-	-
Description: Space Sensor Layer (SSL) is a future space-based missile tracking sensor/system concept to address warfighter requirements. The goal of this effort is to develop prototype space sensor concepts to: -Detect and track traditional and emerging threats -Support Missile Warning (MW)/Missile Defense (MD) mission -Leverage inherent multi-domain capabilities to provide as capable support to the Overhead Persistent Infrared (OPIR) Enterprise ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	17.406	26.013	30.408

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603882C: *Ballistic Missile Defense Midcourse Defense Segment*	790.316	1,303.716	1,004.305	-	1,004.305	776.125	726.566	767.592	1,068.536	Continuing	Continuing
• 0603884C: *Ballistic Missile Defense Sensors*	382.759	352.288	281.957	-	281.957	576.699	656.539	574.703	593.592	Continuing	Continuing
• 0603892C: *AEGIS BMD*	724.731	737.269	814.936	-	814.936	674.825	553.402	478.000	449.145	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0603904C: *Missile Defense Integration and Operations Center (MDIOC)*	51.689	56.161	55.356	-	55.356	55.721	57.457	59.798	61.334	Continuing	Continuing
• 0603914C: *Ballistic Missile Defense Test*	510.292	399.738	378.302	-	378.302	385.910	396.524	394.949	417.261	Continuing	Continuing
• 0603915C: *Ballistic Missile Defense Targets*	561.349	542.939	536.133	-	536.133	593.939	519.028	520.625	540.675	Continuing	Continuing

Remarks

D. Acquisition Strategy

SKA leverages experience that the Johns Hopkins University Applied Physics Laboratory (JHU/APL) has with its extensive history of performing kill assessment activities and conducting experiments associated with the Aegis BMD program. JHU/APL is the developer of the SKA experiment and its primary subcontractor will

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

be responsible for payload integration and hosting accommodation using a firm fixed price contract to contain costs. The SKA experiment uses a commercial satellite program as the platform host for a DOD payload, taking full advantage of a multi-billion dollar space and ground system that already exists.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spacebased Kill Assessment - Development and Experimentation	C/CPFF	JHU/APL : Laurel, MD	14.728	12.777	Nov 2018	10.385	Nov 2019	14.717	Nov 2020	-		14.717	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Experimental Ops Team	C/CPFF	JHU/APL : Laurel, MD	0.000	1.056	Nov 2018	1.082	Nov 2019	1.072	Nov 2020	-		1.072	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Integrate SKA into MDS Comms Network	C/CPFF	Various : Schriever AFB, CO	0.000	0.000		0.760	Dec 2019	0.000		-		0.000	0.000	0.760	0.760
Spacebased Kill Assessment - MDSC Support	C/CPFF	Northrop Grumman/ Jacobs : Schriever AFB, CO	0.185	0.366	Nov 2018	0.278	Nov 2019	0.301	Nov 2020	-		0.301	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Post Intercept Assessment	C/CPFF	JHU/APL : Laurel, MD	0.000	0.000		0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition To Ops (Mission Systems)	C/Various	Various : MDA CO, AL	0.000	0.250	Jul 2019	7.384	Nov 2019	4.878	Nov 2020	-		4.878	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Transition to Ops (Developer)	C/CPFF	JHU/APL : Laurel, MD	0.000	1.660	Sep 2019	4.192	Nov 2019	7.674	Nov 2020	-		7.674	Continuing	Continuing	Continuing
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - Ground Segment	C/CPAF	Jacobs : Schriever AFB	3.798	0.000		0.000		0.000		-		0.000	0.000	3.798	3.798
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - Space Prototype Concept Activity	MIPR	SMC SpEC OTA : Various	7.207	0.000		0.000		0.000		-		0.000	0.000	7.207	7.207
		Subtotal	25.918	16.109		24.081		28.642		-		28.642	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spacebased Kill Assessment - Contract Support Services (CSS)	C/Various	Various : CO, VA	0.355	0.289	Nov 2018	0.722	Nov 2019	0.527	Nov 2020	-		0.527	Continuing	Continuing	Continuing
Spacebased Kill Assessment - FFRDC/ UARC	Various	Various : CO, AL, MD, VA, CA	0.786	0.753	Nov 2018	0.902	Nov 2019	0.927	Nov 2020	-		0.927	Continuing	Continuing	Continuing
Spacebased Kill Assessment - IT User Services	C/CPAF	Northrop Grumman : AK, CA, CO, HI, NM, VA	0.046	0.000		0.054	Nov 2019	0.054	Nov 2020	-		0.054	Continuing	Continuing	Continuing
Spacebased Kill Assessment - MDA Civilian	Allot	MDA : VA	0.222	0.230	Oct 2018	0.217	Oct 2019	0.220	Oct 2020	-		0.220	Continuing	Continuing	Continuing
Spacebased Kill Assessment - Program Mission Support	C/Various	Various : CO, AL, MD, VA	0.082	0.025	Oct 2018	0.037	Oct 2019	0.038	Oct 2020	-		0.038	Continuing	Continuing	Continuing
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - Contract Support Services (CSS)	C/CPFF	Various : CO, AL	4.805	0.000		0.000		0.000		-		0.000	0.000	4.805	4.805
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - FFRDC	MIPR	Various : CA, CO, NM, VA	6.766	0.000		0.000		0.000		-		0.000	0.000	6.766	6.766
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - MDA Civilian	Allot	MDA : CO, AL	0.744	0.000		0.000		0.000		-		0.000	0.000	0.744	0.744
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - Program Mission Support	C/Various	Various : CO, AL, VA	0.978	0.000		0.000		0.000		-		0.000	0.000	0.978	0.978
Space Sensor Layer (SSL) - Space Sensor Layer (SSL) - UARC	C/CPFF	Various : UT, MD	3.202	0.000		0.000		0.000		-		0.000	0.000	3.202	3.202
		Subtotal	17.986	1.297		1.932		1.766		-		1.766	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	43.904	17.406		26.013		30.408		-		30.408	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency | **Date:** February 2020

Appropriation/Budget Activity	**R-1 Program Element (Number/Name)**	**Project (Number/Name)**
0400 / 4	PE 1206895C / *Ballistic Missile Defense System Space Programs*	MD33 / *MD Space Exp Center (MDSEC)*

Significant Event Complete ▲ | Milestone Decision Complete ★ | Element Test Complete ◆ | System Level Test Complete ● | Complete Activity ✦
Significant Event Planned △ | Milestone Decision Planned ☆ | Element Test Planned ◇ | System Level Test Planned ○ | Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
SKA On-Orbit Check-out	✦	✦																										
SKA Experimentation - 1Q2019-4Q2019	✦	✦	✦	✦																								
SKA Experimentation - 1Q2020-4Q2020					✧	✧	✧	✧																				
MDS Integration					✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧								
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)							△																					
SKA/PIA Experimentation - 1Q2021-4Q2021									✧	✧	✧	✧																
FTT-21 (TH, DT Intercept Flight Test)										△																		
FTX-26 (OT) (SN, OT Target Only Flight Test)											△																	
SKA/PIA Experimentation - 1Q2022-4Q2022													✧	✧	✧	✧												
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)														△														
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)														△														
GM CTV-03+ (GM, DT Interceptor Only Flight Test)														△														
FTG-17 (GM, DT Intercept Flight Test)																	△											
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)																	△											
SKA/PIA Operations/Experimentation - 1Q2023-4Q2023																	✧	✧	✧	✧								
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)																			△									
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)																					△							
FTG-18 (GM, DT/OT Intercept Flight Test)																					△							
SKA/PIA Operations/Experimentation - 1Q2024-4Q2024																					✧	✧	✧	✧				
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)								△																				
SKA/PIA Operations/Experimentation - 1Q2025-4Q2025																									✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD33 / *MD Space Exp Center (MDSEC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
SKA On-Orbit Check-out	1	2019	2	2019
SKA Experimentation - 1Q2019-4Q2019	1	2019	4	2019
SKA Experimentation - 1Q2020-4Q2020	1	2020	4	2020
MDS Integration	1	2020	4	2023
FTM-44 (AEGIS 5.1, DT Intercept Flight Test)	3	2020	3	2020
SKA/PIA Experimentation - 1Q2021-4Q2021	1	2021	4	2021
FTT-21 (TH, DT Intercept Flight Test)	2	2021	2	2021
FTX-26 (OT) (SN, OT Target Only Flight Test)	3	2021	3	2021
SKA/PIA Experimentation - 1Q2022-4Q2022	1	2022	4	2022
JFTM-07 E1 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022
JFTM-07 E2 (JAPAN, DT Intercept Flight Test)	2	2022	2	2022
GM CTV-03+ (GM, DT Interceptor Only Flight Test)	2	2022	2	2022
FTG-17 (GM, DT Intercept Flight Test)	1	2023	1	2023
FTM-37 (OT) (AEGIS 5.4.1, OT Intercept Flight Test)	1	2023	1	2023
SKA/PIA Operations/Experimentation - 1Q2023-4Q2023	1	2023	4	2023
FTM-38 (AEGIS 5.0, DT/OT Intercept Flight Test)	3	2023	3	2023
FTX-38 (AEGIS BL 10 (BMD 6.0) Test)	1	2024	1	2024
FTG-18 (GM, DT/OT Intercept Flight Test)	1	2024	1	2024
SKA/PIA Operations/Experimentation - 1Q2024-4Q2024	1	2024	4	2024
FTM-30 (AEGIS 5.1, DT/OT Intercept Flight Test)	4	2020	4	2020
SKA/PIA Operations/Experimentation - 1Q2025-4Q2025	1	2025	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD42: *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*	-	0.000	108.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	108.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2019 Hypersonic and Ballistic Tracking Space Sensor (HBTSS), formerly called the Space Sensor Layer (SSL), efforts were funded in project MD37 and were funded in Project MD42 for FY 2020.

Decrease from FY 2020 to FY 2021 reflects the transfer of funding responsibility for continuation of the Hypersonic and Ballistic Tracking Space Sensor from Program Element (PE) 1206895C, Budget Project MD42, to the SDA in PE 1206410SDA.

A. Mission Description and Budget Item Justification

HBTSS will provide a resilient, flexible, global capability to detect and track hypersonic threats and boosting conventional ballistic missiles. The high quality tracking data will be handed off to the hypersonic weapons systems to allow long range engagement of the threat while enhanced tracking accuracy through missile burn out will provide the warfighting community increased capability in missile defense weapons systems engagement and higher accuracy impact predictions.

The HBTSS priority is to maintain the pace of the development schedule to meet the urgent warfighter need to address rapidly developing threats. To meet this priority, HBTSS must use high technology readiness level components, take advantage of existing government capabilities to minimize development, use a management culture that does not slow down the pace of development, and use Other Transaction Authority (OTA) to minimize contracting cycle times. OTAs allow the Government to work with traditional, non-traditional, and new space businesses to identify innovative solutions.

The HBTSS requirements are derived from United States Strategic Command (USSTRATCOM) Prioritized Capabilities List (PCL), the National Defense Authorization Act for Fiscal Year 2019, and the Joint Requirements Oversight Council (JROC) Capability Development Document (CDD) for Missile Warning (MW)/Missile Defense (MD) Overhead Persistent Infrared (OPIR).

The primary technical activity in this phase is developing the target signal-to-clutter algorithms. These algorithms will be evaluated in a Signal-chain Processing Demonstration (SCPD) in which prototype data processing subsystems will process, and distribute the mission data. This activity also includes development of prototype infrared sensor payloads and provides insight into the constellation architecture, communications approach, and preliminary command and control design aspects.

Like other MDA space sensors, HBTSS is planned to integrate with the existing Joint OPIR Ground (JOG) architecture for mission tasking and data distribution. This OPIR enterprise architecture will be integrated with the terrestrial Missile Defense System (MDS) sensors to improve missile defense architecture capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

MDA is collaborating with the Defense Advanced Research Projects Agency (DARPA), the U.S. Air Force, and the SDA to develop the HBTSS capability. DARPA and Air Force research focuses on spacecraft design, constellation management, and improving industrial production capacity. MDA's research focuses on developing payloads and signal-chain processing to detect and track missile targets of interest. HBTSS will provide a capability integral to the SDA enterprise architecture.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Hypersonic and Ballistic Tracking Space Sensor (HBTSS)	0.000	108.000	0.000
Articles:	-	-	-
Description: HBTSS is a space-based missile tracking sensor/system program to address warfighter requirements. The goal of this effort is to develop prototype space sensors to: -Detect and track hypersonic threats and detect and track boosting conventional ballistic missiles -Support MW/MD mission -Support other missions, as capable -Leverage inherent multi-domain capabilities to provide as capable support to the OPIR Enterprise Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows: ***FY 2020 Plans:*** - Complete Preliminary Concept Reviews - Define and initiate purchases of key long-lead components for on-orbit demonstrations - Commence flight payload development for competitive prototyping of sensor concepts - Continue development and test of signal to clutter and tracking algorithms - Continue development and implementation of ground system to support on-orbit demonstrations - Continue Phase IIa efforts to include engineering requirements development, threat modeling, HBTSS acquisition support and integration of SDA space transport layer optical crosslink communications approach ***FY 2021 Plans:*** - FY 2021 HBTSS funding is budgeted in the Space Development Agency PE 1206410SDA ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2019 efforts were funded in Budget Project MD37 Space Sensor Layer (SSL) and in this budget project MD42 in FY 2020. Decrease from FY 2020 to FY 2021 reflects the transfer of funding responsibility for continuation of HBTSS from PE 1206895C, Budget Project MD42, to the SDA in PE 1206410SDA.			
Accomplishments/Planned Programs Subtotals	0.000	108.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication*	500.965	549.756	593.353	-	593.353	593.330	546.471	581.376	543.971	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 1206893C: *Space Tracking and Surveillance System*	36.114	36.349	34.144	-	34.144	34.657	35.268	36.627	37.734	Continuing	Continuing

Remarks

D. Acquisition Strategy

The HBTSS acquisition approach delivers a warfighting capability in stages called spirals. Each spiral is of limited duration, capability focused, and allows the first HBTSS spiral to maintain schedule and allows future spirals to add new technology and capabilities when ready.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Ground Segment	C/Various	Jacobs : Schriever AFB, CO	0.000	0.000		19.500	Feb 2020	0.000		-		0.000	0.000	19.500	19.500
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Long Lead Procurement	C/TBD	TBD : TBD	0.000	0.000		48.000	Jun 2020	0.000		-		0.000	0.000	48.000	48.000
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Phase IIa Team 1	C/FFP	Harris Corporation : Various	0.000	0.000		8.500	Feb 2020	0.000		-		0.000	0.000	8.500	8.500
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Phase IIa Team 2	C/FFP	Leidos : San Diego, CA	0.000	0.000		8.500	Feb 2020	0.000		-		0.000	0.000	8.500	8.500
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Phase IIa Team 3	C/FFP	Northrop Grumman : Los Angeles, CA	0.000	0.000		8.500	Feb 2020	0.000		-		0.000	0.000	8.500	8.500
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Phase IIa Team 4	C/FFP	Raytheon : Los Angeles, CA	0.000	0.000		8.500	Feb 2020	0.000		-		0.000	0.000	8.500	8.500
		Subtotal	0.000	0.000		101.500		0.000		-		0.000	0.000	101.500	N/A

Remarks

Decrease from FY 2020 to FY 2021 reflects the transfer of funding responsibility for continuation of the Hypersonic and Ballistic Tracking Space Sensor from Program Element (PE) 1206895C, Budget Project MD42, to the SDA in PE 1206410SDA.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Contract Support Services (CSS)	C/Various	Various : CO, AL	0.000	0.000		1.308	Feb 2020	0.000		-		0.000	0.000	1.308	1.308
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - FFRDC/UARC	C/Various	Various : CA, CO, AL	0.000	0.000		2.806	Feb 2020	0.000		-		0.000	0.000	2.806	2.806
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - MDA Civilian	Allot	MDA : CO, AL	0.000	0.000		1.385	Feb 2020	0.000		-		0.000	0.000	1.385	1.385
Hypersonic and Ballistic Tracking Space Sensor (HBTSS) - Program Mission Support	C/Various	Various : CA, CO, AL	0.000	0.000		1.001	Feb 2020	0.000		-		0.000	0.000	1.001	1.001
		Subtotal	0.000	0.000		6.500		0.000		-		0.000	0.000	6.500	N/A

Remarks

Decrease from FY 2020 to FY 2021 reflects the transfer of funding responsibility for continuation of the Hypersonic and Ballistic Tracking Space Sensor from Program Element (PE) 1206895C, Budget Project MD42, to the SDA in PE 1206410SDA.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	0.000		108.000		0.000		-		0.000	0.000	108.000	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Ground System Development						✧	✧	✧	✧																			
Long Lead Procurement							✧	✧	✧																			
Preliminary Concept Review (PCR)									✧																			

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD42 / *Hypersonic & Ballistic Tracking Space Sensor (HBTSS) Prototyping*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Ground System Development	2	2020	1	2021
Long Lead Procurement	3	2020	1	2021
Preliminary Concept Review (PCR)	1	2021	1	2021

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	R-1 Program Element (Number/Name) PE 1206895C / *Ballistic Missile Defense System Space Programs*	Project (Number/Name) MD37 / *Space Sensor Layer*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD37: *Space Sensor Layer*	-	73.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	73.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2019 Hypersonic and Ballistic Tracking Space Sensor (HBTSS), formerly called the Space Sensor Layer (SSL) efforts were funded in this Project MD37 and were funded in Project MD42 in Fiscal Year (FY) 2020.

A. Mission Description and Budget Item Justification

The Space Sensor Layer (SSL) priority is to maintain the pace of the development schedule to meet the urgent warfighter need to address rapidly developing threats. To meet this priority, SSL must use high technology readiness level components, take advantage of existing government capabilities to minimize development, use a management culture that does not slow down the pace of development and use Other Transaction Agreements (OTA) to minimize contracting cycle times. OTAs allow the Government to work with traditional, non-traditional, and New Space businesses to identify innovative solutions.

The SSL requirements are derived from Unites States Strategic Command (USSTRATCOM) Prioritized Capabilities List (PCL), the National Defense Authorization Act for Fiscal Year 2019, and DoD requirements from the Joint Requirements Oversight Council (JROC).

The current SSL objectives are as follows:
-Complete multiple, competing Preliminary Concept Reviews (PCR) for prototype constellations at Low-Earth Orbit altitude
-Estimate the costs and schedules for developing the competing prototype systems
-Complete risk reduction activities that will enable the MDA to initiate development of the SSL prototype, if authorized and appropriated.

The primary technical activity in this phase is developing the target signal-to-clutter algorithms. These algorithms will be evaluated in a Signal Chain Processing (SCP) demonstration in which prototype data processing subsystems will process, and distribute the mission data. This activity also includes development of prototype infrared sensor payloads and provides insight into the constellation architecture, communications approach, and preliminary command and control design aspects.

MDA is working concurrently and collaboratively with the Defense Advanced Research Projects Agency (DARPA), the U.S. Air Force Space and Missile Systems Center (SMC), and the SDA. DARPA's and SMC's research focuses on spacecraft design, constellation management, and improving industrial production capacity. MDA's research focuses on developing payloads and signal chain processing to detect and track missile targets of interest.

Like other MDA space sensors, SSL is planned to integrate with the existing Joint Overhead Persistent Infrared (OPIR) Ground (JOG) architecture for mission tasking and data distribution. This OPIR enterprise architecture will be integrated with the terrestrial Missile Defense System (MDS) sensors to improve missile defense architecture capabilities.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Space Sensor Layer (SSL)	73.000	0.000	0.000
Articles:	-	-	-
Description: SSL is a future space-based missile tracking sensor/system concept to address warfighter requirements. The goal of this effort is to develop prototype space sensor concepts to: -Detect and track traditional and emerging threats -Support Missile Warning (MW)/Missile Defense (MD) mission -Leverage inherent multi-domain capabilities to provide as capable support to the OPIR Enterprise Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** N/A ***FY 2020 to FY 2021 Increase/Decrease Statement:*** FY 2019 Hypersonic and Ballistic Tracking Space Sensor (HBTSS), formerly called the Space Sensor Layer (SSL) effort were funded in this Project MD37 and were funded in Budget Project MD42 in FY 2020.			
Accomplishments/Planned Programs Subtotals	73.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 0603890C: *BMD Enabling Programs*	614.855	634.449	599.380	-	599.380	552.815	544.582	560.863	582.675	Continuing	Continuing
• 0604181C: *Hypersonic Defense*	132.612	390.204	206.832	-	206.832	107.521	111.084	115.487	118.333	Continuing	Continuing
• 1206893C: *Space Tracking and Surveillance System*	36.114	36.349	34.144	-	34.144	34.657	35.268	36.627	37.734	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SSL acquisition approach delivers a warfighting capability in stages called spirals. Each spiral is of limited duration, capability focused, and allows the first SSL spiral to maintain schedule and allows future spirals to add new technology and capabilities when ready.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Sensor Layer (SSL) - Phase IIa Team 1	C/FFP	Harris Corporation : Various	0.000	16.000	Sep 2019	0.000		0.000		-		0.000	4.000	20.000	20.000
Space Sensor Layer (SSL) - Phase IIa Team 2	C/FFP	Leidos : San Diego, CA	0.000	16.000	Sep 2019	0.000		0.000		-		0.000	4.000	20.000	20.000
Space Sensor Layer (SSL) - Phase IIa Team 3	C/FFP	Northrop Grumman : Los Angeles, CA	0.000	16.000	Sep 2019	0.000		0.000		-		0.000	4.000	20.000	20.000
Space Sensor Layer (SSL) - Phase IIa Team 4	C/FFP	Raytheon : Los Angeles, CA	0.000	16.000	Sep 2019	0.000		0.000		-		0.000	4.000	20.000	20.000
		Subtotal	0.000	64.000		0.000		0.000		-		0.000	16.000	80.000	N/A

Remarks

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. In FY 2020, Space Sensor Layer efforts continued in Budget Project MD42, Hypersonic and Ballistic Tracking Space Sensor. Beginning in FY 2021, in accordance with Department decisions, funding responsibility has transferred from MDA to SDA for continued SSL/ HBTSS development efforts.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Sensor Layer (SSL) - Contract Support Services (CSS)	C/Various	Various : CO, AL	0.000	3.058	Jun 2019	0.000		0.000		-		0.000	0.000	3.058	2.640
Space Sensor Layer (SSL) - FFRDC	Various	Various : CO, CA, NM	0.000	2.746	Jun 2019	0.000		0.000		-		0.000	0.000	2.746	4.472
Space Sensor Layer (SSL) - Ground Segment	MIPR	Naval Research Lab : Washington, DC	0.000	0.400	Aug 2019	0.000		0.000		-		0.000	0.000	0.400	0.400
Space Sensor Layer (SSL) - Ground Segment Design	C/CPAF	Jacobs : Schriever AFB	0.000	0.573	Sep 2019	0.000		0.000		-		0.000	0.000	0.573	0.573
Space Sensor Layer (SSL) - MDA Civilian	Allot	MDA : CO	0.000	0.972	Nov 2018	0.000		0.000		-		0.000	0.000	0.972	1.376

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Sensor Layer (SSL) - Program Mission Support	Various	Various : CO	0.000	0.085	Dec 2018	0.000		0.000		-		0.000	0.000	0.085	0.289
Space Sensor Layer (SSL) - UARC	C/CPFF	Space Dynamics Lab : CO, UT	0.000	1.166	Jun 2019	0.000		0.000		-		0.000	0.000	1.166	1.063
		Subtotal	0.000	9.000		0.000		0.000		-		0.000	0.000	9.000	N/A

Remarks

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. In FY 2020, Space Sensor Layer efforts continued in Budget Project MD42, Hypersonic and Ballistic Tracking Space Sensor. Beginning in FY 2021, in accordance with Department decisions, funding responsibility has transferred from MDA to SDA for continued SSL/ HBTSS development efforts.

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	73.000		0.000		0.000		-		0.000	16.000	89.000	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

The SSL program is a collaborative effort between the Missile Defense Agency (MDA), Defense Advanced Research Projects Agency (DARPA), Space Development Agency (SDA) and the USAF to develop the capability to detect and track evolving threats. In FY 2020, Space Sensor Layer efforts continued in Budget Project MD42, Hypersonic and Ballistic Tracking Space Sensor. Beginning in FY 2021, in accordance with Department decisions, funding responsibility has transferred from MDA to SDA for continued SSL/ HBTSS development efforts.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
Prototype Concept Development	✧	✧	✧	✧	✧	✧	✧	✧																				
Other Transaction Award					▲																							
Concept Requirement Review						△																						
Signal Chain Processing Demonstration								△																				

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD37 / *Space Sensor Layer*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
Prototype Concept Development	1	2019	4	2020
Other Transaction Award	1	2020	1	2020
Concept Requirement Review	2	2020	2	2020
Signal Chain Processing Demonstration	4	2020	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC33: *MD Space Exp Center (MDSEC)*	0.469	5.000	5.380	0.386	-	0.386	0.396	0.405	0.420	0.428	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Decrease from FY 2020 to FY 2021 reflects completion of cyber feasibility study and hardware replacement funded through FY 2020 Congressional Plus-Up and executing steady-state support to meet cybersecurity requirements.

A. Mission Description and Budget Item Justification

Ballistic Missile Defense System (BMDS) Space Programs Cyber Operations sustain the Missile Defense Agency (MDA) Risk Management Framework (RMF) and Security Controls Assessments (SCA)/Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information System Security Manager (PM/ISSM) Plans of Action and Milestones (POA&Ms) for BMDS Space Program mission systems. Activities in this Project are necessary to comply with the Federal Information Security Management Act (FISMA).

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Network / System Certification and Accreditation (C&A)	5.000	5.380	0.386
Articles:	-	-	-

Description: This activity maintains the Assessment and Authorization (A&A) and C&A data repository, capturing the RMF documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority (DAA) accreditation decisions) and POA&Ms on all MDA information systems. This activity prepares and submits C&A documentation and accreditation recommendations to the MDA Chief Information Officer (CIO) /Certification Authority and the DAA. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality, and non-repudiation of the MDA mission, test, and administrative systems. Recurring accomplishments include the following:
- Monitor and track cybersecurity and mitigations detailed in Information Technology security POA&Ms
- Conduct cybersecurity design, engineering, and architecture planning for information technology systems
- Plan and test the cybersecurity controls for space systems
- Conduct SCA testing continuous monitoring of mission systems and provide POA&Ms to mitigate cybersecurity vulnerabilities

Specific and/or unique accomplishments to each Fiscal Year (FY) are as follows:

FY 2020 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
- Invest in MDS RDT&E mission support systems to increase protection of critical MDS data/knowledge capital ***FY 2021 Plans:*** See above ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Decrease from FY 2020 to FY 2021 reflects completion of cyber feasibility study and hardware replacement funded through FY 2020 Congressional Plus-Up and executing steady-state support to meet cybersecurity requirements.			
Accomplishments/Planned Programs Subtotals	5.000	5.380	0.386

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Network / System Certification and Accreditation (C&A) - CORE Upgrade	C/CPFF	Northrop Grumman : Schriever AFB, CO	0.000	1.157	Jan 2019	0.000		0.000		-		0.000	0.000	1.157	1.157
Network / System Certification and Accreditation (C&A) - Contractor Support Services (CSS)	C/Various	Various : AL, CO, MD	0.469	0.812	Dec 2018	0.380	Nov 2019	0.386	Nov 2020	-		0.386	Continuing	Continuing	Continuing
Network / System Certification and Accreditation (C&A) - MDSEA Solutions	C/CPFF	Jacobs : Schriever AFB, CO	0.000	1.106	Feb 2019	0.000		0.000		-		0.000	0.000	1.106	1.106
Network / System Certification and Accreditation (C&A) - Network/Comm Assurance	Various	Various : Various	0.000	0.148	Apr 2019	1.500	Mar 2020	0.000		-		0.000	0.000	1.648	1.648
Network / System Certification and Accreditation (C&A) - SKA Communications	C/CPFF	JHU/APL : MD	0.000	0.360	Feb 2019	0.000		0.000		-		0.000	0.000	0.360	0.360
Network / System Certification and Accreditation (C&A) - Strengthening Risk Management Framework	C/CPAF	Northrop Grumman : Schriever AFB, CO	0.000	1.417	Mar 2019	3.500	Mar 2020	0.000		-		0.000	0.000	4.917	3.917
		Subtotal	0.469	5.000		5.380		0.386		-		0.386	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.469	5.000		5.380		0.386		-		0.386	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MC33 Cyber Operations	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MC33 / *MD Space Exp Center (MDSEC)*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MC33 Cyber Operations	1	2019	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD40: *Program-Wide Support*	0.749	0.740	1.172	1.274	-	1.274	1.135	1.657	2.000	2.162	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Program Wide Support (PWS) is allocated on a pro-rata basis across multiple Agency Program Elements (PE) each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.

A. Mission Description and Budget Item Justification

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment, Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Program Wide Support	0.740	1.172	1.274
Articles:	-	-	-
Description: PWS contains non-headquarters management costs in support of MDA functions and activities across the entire MDS. These functions include Government Civilians and Contract Support Services. This effort provides integrity and oversight of the MDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes personnel to support global deployments performing deployment site preparation and activation, and provides facility capabilities for MDA Executing Agent locations worldwide. Other MDA wide costs include: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations across multiple geographic locations; commercial and ancillary facility services; management of all facility aspects regardless of lifecycle stage; supplies and maintenance; compliance with statutory environmental requirements; data and unified communications support; materiel and readiness and central property management of equipment; Facilities Sustainment,			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Restoration and Modernization (FSRM) program, (formerly Real Property Maintenance) to keep the Department's inventory of facilities in good working order; and similar operating expenses. PWS is allocated on a pro-rata basis across most Agency PEs and therefore fluctuates per PE by fiscal year based on the total Agency budget in that fiscal year. ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** Increase from FY 2020 to FY 2021 reflects the PWS allocation on a pro-rata basis across multiple Agency PE's each fiscal year based on the total Agency budget, and therefore fluctuates per PE by fiscal year.			
Accomplishments/Planned Programs Subtotals	0.740	1.172	1.274

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Wide Support - Agency Facilities and Maintenance	MIPR	Various : Multi: AL, CA, CO, VA	0.000	0.000		0.000		0.371	Nov 2020	-		0.371	Continuing	Continuing	Continuing
Program Wide Support - Agency Operations Management	C/CPAF	Various Multi: AL, CA, : CO, VA	0.050	0.012	Jul 2019	0.018	Jul 2020	0.000		-		0.000	0.000	0.080	0.000
Program Wide Support - Agency Operations and Support Services	C/CPFF	Various : Multi: AL, CO, CA, VA	0.699	0.728	Apr 2019	1.154	Jul 2020	0.903	Dec 2020	-		0.903	Continuing	Continuing	Continuing
		Subtotal	0.749	0.740		1.172		1.274		-		1.274	Continuing	Continuing	N/A

Remarks

N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.749	0.740		1.172		1.274		-		1.274	Continuing	Continuing	N/A

Remarks

Award Date reflects date of first obligation. Additional obligations may incrementally occur throughout the year.

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Significant Event Complete ▲ Milestone Decision Complete ★ Element Test Complete ◆ System Level Test Complete ● Complete Activity ✦
Significant Event Planned △ Milestone Decision Planned ☆ Element Test Planned ◇ System Level Test Planned ○ Planned Activity ✧

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
MD40 Program-Wide Support	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧	✧

Exhibit R-4A, **RDT&E Schedule Details:** PB 2021 Missile Defense Agency		**Date:** February 2020
Appropriation/Budget Activity 0400 / 4	**R-1 Program Element (Number/Name)** PE 1206895C / *Ballistic Missile Defense System Space Programs*	**Project (Number/Name)** MD40 / *Program-Wide Support*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
MD40 Program-Wide Support	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502C / *Small Business Innovation Research - MDA*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	91.161	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	91.161
MD45: *Small Business Innovation Research*	-	91.161	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	91.161

Program MDAP/MAIS Code: 362

Note

Funds are transferred into this PE in the execution year.

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Missile Defense Systems (MDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	0.000	0.000	-	0.000
Current President's Budget	91.161	0.000	0.000	-	0.000
Total Adjustments	91.161	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	91.161	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

FY 2019 funds were transferred to SBIR/STTR from other Program Elements in accordance with the SBIR/STTR Reauthorization Act of 2011.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502C / *Small Business Innovation Research - MDA*	**Project (Number/Name)** MD45 / *Small Business Innovation Research*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD45: *Small Business Innovation Research*	-	91.161	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	91.161
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Small Business Innovation Research - MDA	91.161	0.000	0.000
Articles:	-	-	-

Description: Small Business Innovation Research (SBIR) explores innovative concepts pursuant to Public Law 106-554 (Small Business Reauthorization Act of 2000) and Public Law 107-50 (Small Business Technology Transfer Program Reauthorization Act of 2001), which mandates a two-phase competition for small businesses with innovative technology that can be commercialized. SBIR and Small Business Technology Transfer (STTR) programs will develop new dual-use technology for future Missile Defense Agency (MDA) Ballistic Missile Defense Systems (BMDS) needs. Dual-use means that the technology will be judged on the potential for future private sector investment both as a vehicle for reducing development time and cost, unit costs of new BMDS technology, and as a route to national economic growth through new commercial products. MDA will conduct the competition, award, and manage the contracts.

FY 2020 Plans:

- SEE ABOVE.

FY 2021 Plans:

- SEE ABOVE.

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0605502C / *Small Business Innovation Research - MDA*	**Project (Number/Name)** MD45 / *Small Business Innovation Research*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A			
Accomplishments/Planned Programs Subtotals	91.161	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606942C / *Assessments and Evaluations Cyber Vulnerabilities*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	3.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
MC39: *Assessment and Evaluation of Cyber Vulnerabilities*	-	3.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400

Program MDAP/MAIS Code: 362

Note

This Program Element (PE) reflects OSD addition in FY 2019. All prior and subsequent FYs are funded in PE 0603914C MC04. This is a continuation of efforts funded within the Management and Support Office of the Secretary of Defense (OSD) PE 0604942DZ Assessments & Evaluation.

Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency received $3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

This Program Element (PE) provides funds for cyber vulnerability assessments of critical elements of the Ballistic Missile Defense System (BMD) that Missile Defense Agency (MDA) is responsible for conducting, as directed by Sec. 1647 of the Fiscal Year 2017 National Defense Authorization Act.

Resources will be used for assessments and non-recurring engineering for mitigations for elements of the BMD system that MDA is responsible for conducting.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	3.400	0.000	0.000	-	0.000
Current President's Budget	3.400	0.000	0.000	-	0.000
Total Adjustments	0.000	0.000	0.000	-	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606942C *I Assessments and Evaluations Cyber Vulnerabilities*

• Other Adjustment	0.000	0.000	0.000	-	0.000

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606942C / *Assessments and Evaluations Cyber Vulnerabilities*	**Project (Number/Name)** MC39 / *Assessment and Evaluation of Cyber Vulnerabilities*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MC39: *Assessment and Evaluation of Cyber Vulnerabilities*	-	3.400	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.400
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements. Missile Defense Agency (MDA) received $3.4 million in FY 2019 for Cyber Vulnerability Assessment and Mitigation.

A. Mission Description and Budget Item Justification

N/A

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: Cyber Vulnerability Testing	3.400	0.000	0.000
Articles:	-	-	-

Description: Pursuant to section 1647 of Public Law 114-92, the National Defense Authorization Act (NDAA) for Fiscal Year (FY) 2016, and Congress mandated the Department of Defense (DoD) conduct cyber vulnerability evaluations of all major DoD weapons by December 31, 2019. The alternative provides $84.1 million to the applicable Components for platform level assessments, platform mitigations, and red team enhancements.

Implement cybersecurity test requirements as directed by the National Defense Authorization Act (NDAA) for Fiscal Year 2016, Pub. L. No. 114-328, *1647 (a), Director, Operational Test and Evaluation (DOT&E), and Deputy Assistant Secretary of Defense, Developmental Test and Evaluation (DT&E) to include planning, coordination, and execution of Cooperative Vulnerability and Penetration Assessments, Adversarial Assessments, Cyber Table Top Exercises, and Element Cybersecurity Experiments.

FY 2020 Plans:

N/A

FY 2021 Plans:

N/A

FY 2020 to FY 2021 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0606942C / *Assessments and Evaluations Cyber Vulnerabilities*	**Project (Number/Name)** MC39 / *Assessment and Evaluation of Cyber Vulnerabilities*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
N/A			
Accomplishments/Planned Programs Subtotals	3.400	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0901598C / *Management HQ - MDA*

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	227.319	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing
MD38: *Management Headquarters*	227.319	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing

Program MDAP/MAIS Code: 362

Note

The Management Headquarters Activity (MHA) Program Element (PE) 0901598C includes decreases in accordance with Department of Defense (DoD) reform efforts to maintain major headquarter activities' civilian staffing at reduced levels. DoD efforts to establish a common MHA framework resulted in a net funding decrease due to the transfer of civilian manpower performing functions MDA considered MHA in prior years. Funding and civilian manpower performing these non-MHA functions were appropriately transferred to Program Wide Support.

The FY 2021 funding request was reduced by $.712 million during DWR to reduce Civilian Labor.

The FY 2021 funding request was reduced by $1.154 million during DWR to reduce contractor support.

A. Mission Description and Budget Item Justification

As prescribed by DoD Instruction 5100.73 Major Headquarters Activities, MDA's Management Headquarters PE supports the operation of MDA's management headquarters activities. This program element funds government civilian salaries and benefits, travel, contract support services, and operations of non-fielded activities.

Management Headquarters Activities provide executive leadership planning, develop centralized agency policy, prepare and defend annual budget submissions, respond to external inquiries, and implement SECDEF and Presidential priorities. As a DoD research, development and acquisition agency, the Headquarters Activities provide cost efficient oversight, direction, and control of initiatives and processes that assure best value, high quality, on-time, and successful performance of MDA acquisition programs. This is accomplished by ensuring acquisition and procurement program management emphasizes systems engineering; incorporates life cycle management objectives; implements risk management; and assesses cost, schedule or performance trade-offs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Missile Defense Agency	Date: February 2020
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0901598C / *Management HQ - MDA*

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	28.626	27.065	27.446	-	27.446
Current President's Budget	28.626	27.065	26.902	-	26.902
Total Adjustments	0.000	0.000	-0.544	-	-0.544
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Missile Defeat and Defense Enhancement	0.000	0.000	0.000	-	0.000
• Other Adjustment	0.000	0.000	-0.544	-	-0.544

Change Summary Explanation

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency			Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0901598C / *Management HQ - MDA*	**Project (Number/Name)** MD38 / *Management Headquarters*	

COST ($ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
MD38: *Management Headquarters*	227.319	28.626	27.065	26.902	-	26.902	26.708	26.364	26.495	27.036	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The Management Headquarters Activity (MHA) Program Element (PE) 0901598C includes decreases in accordance with Department of Defense (DoD) reform efforts to maintain major headquarter activities' civilian staffing at reduced levels. DoD efforts to establish a common MHA framework resulted in a net funding decrease due to the transfer of civilian manpower performing functions MDA considered MHA in prior years.

A. Mission Description and Budget Item Justification

The MDA Headquarters provides oversight, direction and control over MDA's acquisition programs and fielded systems. The MDA Headquarters staff functions (government salaries, government travel, and contract support services) support the mission and operations of the world-wide MDA mission.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
Title: MHA Civilian Salaries	15.929	16.720	17.657
Articles:	-	-	-
Description: Provide mission support, oversight, and management of: - Acquisition, implementation of international initiatives to increase missile defense coverage to deployed forces and allies, efficiency-oriented administrative services, business operations, financial resources, human capitol, general counsel, internal review, public affairs, and media release. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: MHA Travel	0.990	0.925	0.906
Articles:	-	-	-
Description: Provide mission essential government travel.			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Missile Defense Agency		Date: February 2020
Appropriation/Budget Activity 0400 / 6	**R-1 Program Element (Number/Name)** PE 0901598C / *Management HQ - MDA*	**Project (Number/Name)** MD38 / *Management Headquarters*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: MHA Contract Services	11.707	9.420	8.339
Articles:	-	-	-
Description: Provide contract support services to mission activities for acquisition, business operations, internal review, general counsel, administrative support and public affairs. Specific and/or unique accomplishments to each FY are as follows: ***FY 2020 Plans:*** - SEE ABOVE. ***FY 2021 Plans:*** - SEE ABOVE. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	28.626	27.065	26.902

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A