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**Department of Defense
Fiscal Year (FY) 2018 Budget Amendment**

November 2017



Missile Defense Agency

Defense-Wide Justification Book Volume 2a of 5

Research, Development, Test & Evaluation, Defense-Wide

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Missile Defense Agency • Budget Amendment FY 2018 • RDT&E Program

Table of Volumes

| | |
|--|----------|
| Defense Advanced Research Projects Agency..... | Volume 1 |
| Missile Defense Agency..... | Volume 2 |
| Office of the Secretary Of Defense..... | Volume 3 |
| Chemical and Biological Defense Program..... | Volume 4 |
| Defense Contract Management Agency..... | Volume 5 |
| DoD Human Resources Activity..... | Volume 5 |
| Defense Information Systems Agency..... | Volume 5 |
| Defense Logistics Agency..... | Volume 5 |
| Defense Security Cooperation Agency..... | Volume 5 |
| Defense Security Service..... | Volume 5 |
| Defense Technical Information Center..... | Volume 5 |
| Defense Threat Reduction Agency..... | Volume 5 |
| The Joint Staff..... | Volume 5 |
| United States Special Operations Command..... | Volume 5 |
| Washington Headquarters Service..... | Volume 5 |
| Operational Test and Evaluation, Defense..... | Volume 5 |

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Defense Geospatial Intelligence Agency..... (see NIP and MIP Justification Books)
Defense Intelligence Agency..... (see NIP and MIP Justification Books)
National Security Agency.....(see NIP and MIP Justification Books)

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Missile Defense Agency • Budget Amendment FY 2018 • RDT&E Program

Volume 2a Table of Contents

Introduction and Explanation of Contents.....Volume 2a - v

Comptroller Exhibit R-1..... Volume 2a - vii

Program Element Table of Contents (by Budget Activity then Line Item Number)..... Volume 2a - xxvii

Program Element Table of Contents (Alphabetically by Program Element Title).....Volume 2a - xxix

MDA Overview.....Volume 2a - xxxi

Exhibit R-2's..... Volume 2a - 1

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Introduction & Explanation of Contents

The Department of Defense FY 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment Submission RDT&E (Includes Procurement, 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 2018 Missile Defeat and Defense Enhancements (MDDE) Budget Amendment Overview

Volume 2b

- P-1 Comptroller Exhibit
- MDA MILCON Exhibits
- MDA Procurement Exhibits

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Department of Defense
 FY 2018 President's Budget Amendment
 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

| Appropriation ----- | FY 2016 Base + OCO ----- | FY 2017 Base Enactment ----- | FY 2017 OCO Enactment ----- | FY 2017 Total (Base + OCO) ----- |
|--|--------------------------------|---------------------------------------|--------------------------------------|---|
| Research, Development, Test & Eval, DW | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 |
| Total Research, Development, Test & Evaluation | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 |

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Department of Defense
 FY 2018 President's Budget Amendment
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 (Dollars in Thousands)

03 Nov 2017

| Appropriation | FY 2018 Base Request | FY 2018 June Amendment Base | FY 2018 Amendment Emergency | FY 2018 OCO Request | FY 2018 Amendment OCO | FY 2018 Total OCO | FY 2018 Grand Total |
|--|----------------------------|--------------------------------------|-----------------------------------|---------------------------|-----------------------------|-------------------------|------------------------|
| Research, Development, Test & Eval, DW | 6,200,711 | | 597,500 | | | | 6,798,211 |
| Total Research, Development, Test & Evaluation | 6,200,711 | | 597,500 | | | | 6,798,211 |

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03 Nov 2017

| | FY 2016 Base + OCO | FY 2017 Base Enactment | FY 2017 OCO Enactment | FY 2017 Total (Base + OCO) |
|--|-----------------------|------------------------------|-----------------------------|----------------------------------|
| Summary Recap of Budget Activities | | | | |
| Advanced Technology Development | 187,246 | 160,025 | 4,300 | 164,325 |
| Advanced Component Development And Prototypes | 5,898,841 | 5,747,291 | 44,450 | 5,791,741 |
| Management Support | 124,565 | 31,160 | | 31,160 |
| Total Research, Development, Test & Evaluation | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 |
| Summary Recap of FYDP Programs | | | | |
| Intelligence and Communications | 941 | 969 | | 969 |
| Research and Development | 6,173,840 | 5,906,347 | 48,750 | 5,955,097 |
| Administration and Associated Activities | 35,871 | 31,160 | | 31,160 |
| Space | | | | |
| Total Research, Development, Test & Evaluation | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 |

UNCLASSIFIED

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|--|----------------------------|--------------------------------------|-----------------------------------|---------------------------|-----------------------------|-------------------------|------------------------|
| Summary Recap of Budget Activities | | | | | | | |
| Advanced Technology Development | 291,554 | | | | | | 291,554 |
| Advanced Component Development And Prototypes | 5,879,210 | | 597,500 | | | | 6,476,710 |
| Management Support | 29,947 | | | | | | 29,947 |
| Total Research, Development, Test & Evaluation | 6,200,711 | | 597,500 | | | | 6,798,211 |
| Summary Recap of FYDP Programs | | | | | | | |
| Intelligence and Communications | 986 | | | | | | 986 |
| Research and Development | 6,117,877 | | 583,500 | | | | 6,701,377 |
| Administration and Associated Activities | 29,947 | | | | | | 29,947 |
| Space | 51,901 | | 14,000 | | | | 65,901 |
| Total Research, Development, Test & Evaluation | 6,200,711 | | 597,500 | | | | 6,798,211 |

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Defense-Wide
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Defense-Wide
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|--|-----------------------|------------------------------|-----------------------------|----------------------------------|
| | ----- | ----- | ----- | ----- |
| Missile Defense Agency | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 |
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|--|----------------------------|--------------------------------------|-----------------------------------|---------------------------|-----------------------------|-------------------------|------------------------|
| ----- | ----- | ----- | ----- | ----- | ----- | ----- | ----- |
| Missile Defense Agency | 6,200,711 | | 597,500 | | | | 6,798,211 |
| Total Research, Development, Test & Evaluation | 6,200,711 | | 597,500 | | | | 6,798,211 |

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 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

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

| Line No | Program Element Number | Item | Act | FY 2016 Base + OCO | FY 2017 Base Enactment | FY 2017 OCO Enactment | FY 2017 Total (Base + OCO) | S e c |
|---------|------------------------|--|-----|--------------------|------------------------|-----------------------|----------------------------|-------|
| 27 | 0603176C | Advanced Concepts and Performance Assessment | 03 | 11,853 | 15,015 | | 15,015 | U |
| 28 | 0603177C | Discrimination Sensor Technology | 03 | 27,981 | | | | U |
| 29 | 0603178C | Weapons Technology | 03 | 50,263 | 49,643 | | 49,643 | U |
| 30 | 0603179C | Advanced C4ISR | 03 | 9,661 | 3,626 | | 3,626 | U |
| 31 | 0603180C | Advanced Research | 03 | 16,987 | 23,433 | 4,300 | 27,733 | U |
| 34 | 0603274C | Special Program - MDA Technology | 03 | 9,650 | 11,795 | | 11,795 | U |
| 40 | 0603294C | Common Kill Vehicle Technology | 03 | 60,851 | 56,513 | | 56,513 | U |
| | | Advanced Technology Development | | 187,246 | 160,025 | 4,300 | 164,325 | |
| 74 | 0603881C | Ballistic Missile Defense Terminal Defense Segment | 04 | 197,617 | 201,834 | | 201,834 | U |
| 75 | 0603882C | Ballistic Missile Defense Midcourse Defense Segment | 04 | 1,260,480 | 967,780 | | 967,780 | U |
| 77 | 0603884C | Ballistic Missile Defense Sensors | 04 | 233,020 | 221,977 | 6,400 | 228,377 | U |
| 78 | 0603890C | BMD Enabling Programs | 04 | 406,326 | 426,594 | 7,000 | 433,594 | U |
| 79 | 0603891C | Special Programs - MDA | 04 | 390,264 | 304,677 | | 304,677 | U |
| 80 | 0603892C | AEGIS BMD | 04 | 804,211 | 919,066 | | 919,066 | U |
| 81 | 0603893C | Space Tracking & Surveillance System | 04 | 27,262 | 32,129 | | 32,129 | U |
| 82 | 0603895C | Ballistic Missile Defense System Space Programs | 04 | 21,040 | 20,690 | | 20,690 | U |
| 83 | 0603896C | Ballistic Missile Defense Command and Control, Battle Management and Communicati | 04 | 425,996 | 433,278 | 16,650 | 449,928 | U |

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

| Line No | Program Element Number | Item | Act | FY 2018 Base Request | FY 2018 June Amendment Base | FY 2018 Amendment Emergency | FY 2018 OCO Request | FY 2018 Amendment OCO | FY 2018 Total OCO | FY 2018 Grand Total | S e c |
|---------|------------------------|--|-----|----------------------|-----------------------------|-----------------------------|---------------------|-----------------------|-------------------|---------------------|-------|
| 27 | 0603176C | Advanced Concepts and Performance Assessment | 03 | 12,996 | | | | | | 12,996 | U |
| 28 | 0603177C | Discrimination Sensor Technology | 03 | | | | | | | | U |
| 29 | 0603178C | Weapons Technology | 03 | 5,495 | | | | | | 5,495 | U |
| 30 | 0603179C | Advanced C4ISR | 03 | | | | | | | | U |
| 31 | 0603180C | Advanced Research | 03 | 20,184 | | | | | | 20,184 | U |
| 34 | 0603274C | Special Program - MDA Technology | 03 | | | | | | | | U |
| 40 | 0603294C | Common Kill Vehicle Technology | 03 | 252,879 | | | | | | 252,879 | U |
| | | Advanced Technology Development | | 291,554 | | | | | | 291,554 | |
| 74 | 0603881C | Ballistic Missile Defense Terminal Defense Segment | 04 | 230,162 | | 62,100 | | | | 292,262 | U |
| 75 | 0603882C | Ballistic Missile Defense Midcourse Defense Segment | 04 | 828,097 | | 129,000 | | | | 957,097 | U |
| 77 | 0603884C | Ballistic Missile Defense Sensors | 04 | 247,345 | | 30,800 | | | | 278,145 | U |
| 78 | 0603890C | BMD Enabling Programs | 04 | 449,442 | | 16,200 | | | | 465,642 | U |
| 79 | 0603891C | Special Programs - MDA | 04 | 320,190 | | 45,000 | | | | 365,190 | U |
| 80 | 0603892C | AEGIS BMD | 04 | 852,052 | | 8,736 | | | | 860,788 | U |
| 81 | 0603893C | Space Tracking & Surveillance System | 04 | | | | | | | | U |
| 82 | 0603895C | Ballistic Missile Defense System Space Programs | 04 | | | | | | | | U |
| 83 | 0603896C | Ballistic Missile Defense Command and Control, Battle Management and Communicati | 04 | 430,115 | | 24,747 | | | | 454,862 | U |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

UNCLASSIFIED

Page D-3A

Volume 2a - xvi

UNCLASSIFIED

Defense-Wide
 FY 2018 President's Budget Amendment
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03 Nov 2017

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| Line No | Program Element Number | Item | Act | FY 2016 Base + OCO | FY 2017 Base Enactment | FY 2017 OCO Enactment | FY 2017 Total (Base + OCO) | S e c |
|---------|------------------------|---|-----|--------------------|------------------------|-----------------------|----------------------------|-------|
| 84 | 0603898C | Ballistic Missile Defense Joint Warfighter Support | 04 | 47,566 | 47,776 | | 47,776 | U |
| 85 | 0603904C | Missile Defense Integration & Operations Center (MDIOC) | 04 | 46,191 | 54,750 | | 54,750 | U |
| 86 | 0603906C | Regarding Trench | 04 | 8,918 | 8,785 | | 8,785 | U |
| 87 | 0603907C | Sea Based X-Band Radar (SBX) | 04 | 81,265 | 85,787 | 4,500 | 90,287 | U |
| 88 | 0603913C | Israeli Cooperative Programs | 04 | 267,595 | 268,735 | | 268,735 | U |
| 89 | 0603914C | Ballistic Missile Defense Test | 04 | 290,267 | 294,441 | | 294,441 | U |
| 90 | 0603915C | Ballistic Missile Defense Targets | 04 | 517,589 | 528,455 | | 528,455 | U |
| 94 | 0604115C | Technology Maturation Initiatives | 04 | 24,743 | 86,392 | | 86,392 | U |
| 96 | 0604181C | Hypersonic Defense | 04 | | | | | U |
| 105 | 0604873C | Long Range Discrimination Radar (LRDR) | 04 | 132,278 | 170,112 | 9,900 | 180,012 | U |
| 106 | 0604874C | Improved Homeland Defense Interceptors | 04 | 282,864 | 219,346 | | 219,346 | U |
| 107 | 0604876C | Ballistic Missile Defense Terminal Defense Segment Test | 04 | 20,980 | 58,444 | | 58,444 | U |
| 108 | 0604878C | Aegis BMD Test | 04 | 78,468 | 95,012 | | 95,012 | U |
| 109 | 0604879C | Ballistic Missile Defense Sensor Test | 04 | 83,597 | 88,150 | | 88,150 | U |
| 110 | 0604880C | Land-Based SM-3 (LBSM3) | 04 | 29,288 | 43,293 | | 43,293 | U |
| 111 | 0604881C | AEGIS SM-3 Block IIA Co-Development | 04 | 165,456 | 106,038 | | 106,038 | U |
| 112 | 0604887C | Ballistic Missile Defense Midcourse Segment Test | 04 | 54,619 | 62,781 | | 62,781 | U |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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|---------|------------------------|---|-----|----------------------|-----------------------------|-----------------------------|---------------------|-----------------------|-------------------|---------------------|----|
| 84 | 0603898C | Ballistic Missile Defense Joint Warfighter Support | 04 | 48,954 | | | | | | 48,954 | U |
| 85 | 0603904C | Missile Defense Integration & Operations Center (MDIOC) | 04 | 53,265 | | | | | | 53,265 | U |
| 86 | 0603906C | Regarding Trench | 04 | 9,113 | | | | | | 9,113 | U |
| 87 | 0603907C | Sea Based X-Band Radar (SBX) | 04 | 130,695 | | 15,000 | | | | 145,695 | U |
| 88 | 0603913C | Israeli Cooperative Programs | 04 | 105,354 | | | | | | 105,354 | U |
| 89 | 0603914C | Ballistic Missile Defense Test | 04 | 305,791 | | 10,402 | | | | 316,193 | U |
| 90 | 0603915C | Ballistic Missile Defense Targets | 04 | 410,425 | | 49,700 | | | | 460,125 | U |
| 94 | 0604115C | Technology Maturation Initiatives | 04 | 128,406 | | | | | | 128,406 | U |
| 96 | 0604181C | Hypersonic Defense | 04 | 75,300 | | | | | | 75,300 | U |
| 105 | 0604873C | Long Range Discrimination Radar (LRDR) | 04 | 357,659 | | | | | | 357,659 | U |
| 106 | 0604874C | Improved Homeland Defense Interceptors | 04 | 465,530 | | 170,900 | | | | 636,430 | U |
| 107 | 0604876C | Ballistic Missile Defense Terminal Defense Segment Test | 04 | 36,239 | | | | | | 36,239 | U |
| 108 | 0604878C | Aegis BMD Test | 04 | 134,468 | | 3,315 | | | | 137,783 | U |
| 109 | 0604879C | Ballistic Missile Defense Sensor Test | 04 | 84,239 | | 17,600 | | | | 101,839 | U |
| 110 | 0604880C | Land-Based SM-3 (LBSM3) | 04 | 30,486 | | | | | | 30,486 | U |
| 111 | 0604881C | AEGIS SM-3 Block IIA Co-Development | 04 | 9,739 | | | | | | 9,739 | U |
| 112 | 0604887C | Ballistic Missile Defense Midcourse Segment Test | 04 | 76,757 | | | | | | 76,757 | U |

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|--|------------------------|--|-----|-----------------------|------------------------------|-----------------------------|----------------------------------|-------------|
| -- | ----- | ---- | --- | ----- | ----- | ----- | ----- | - |
| 113 | 0604894C | Multi-Object Kill Vehicle | 04 | | | | | U |
| 115 | 0305103C | Cyber Security Initiative | 04 | 941 | 969 | | 969 | U |
| 116 | 1206893C | Space Tracking & Surveillance System | 04 | | | | | U |
| 117 | 1206895C | Ballistic Missile Defense System Space Programs | 04 | | | | | U |
| | | Advanced Component Development And Prototypes | | 5,898,841 | 5,747,291 | 44,450 | 5,791,741 | |
| 155 | 0605502C | Small Business Innovation Research - MDA | 06 | 88,694 | | | | U |
| 184 | 0901598C | Management HQ - MDA | 06 | 35,871 | 31,160 | | 31,160 | U |
| | | Management Support | | 124,565 | 31,160 | | 31,160 | |
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| 113 | 0604894C | Multi-Object Kill Vehicle | 04 | 6,500 | | | | | | 6,500 | U |
| 115 | 0305103C | Cyber Security Initiative | 04 | 986 | | | | | | 986 | U |
| 116 | 1206893C | Space Tracking & Surveillance System | 04 | 34,907 | | | | | | 34,907 | U |
| 117 | 1206895C | Ballistic Missile Defense System Space Programs | 04 | 16,994 | | 14,000 | | | | 30,994 | U |
| | | Advanced Component Development And Prototypes | | 5,879,210 | | 597,500 | | | | 6,476,710 | |
| 155 | 0605502C | Small Business Innovation Research - MDA | 06 | | | | | | | | U |
| 184 | 0901598C | Management HQ - MDA | 06 | 29,947 | | | | | | 29,947 | U |
| | | Management Support | | 29,947 | | | | | | 29,947 | |
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R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

UNCLASSIFIED

Page D-5A

Volume 2a - xx

UNCLASSIFIED

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| 29 | 0603178C | Weapons Technology | 03 | 50,263 | 49,643 | | 49,643 | U |
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| 31 | 0603180C | Advanced Research | 03 | 16,987 | 23,433 | 4,300 | 27,733 | U |
| 34 | 0603274C | Special Program - MDA Technology | 03 | 9,650 | 11,795 | | 11,795 | U |
| 40 | 0603294C | Common Kill Vehicle Technology | 03 | 60,851 | 56,513 | | 56,513 | U |
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| 82 | 0603895C | Ballistic Missile Defense System Space Programs | 04 | 21,040 | 20,690 | | 20,690 | U |
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|---------|------------------------|--|-----|----------------------|-----------------------------|-----------------------------|---------------------|-----------------------|-------------------|---------------------|-------|
| 27 | 0603176C | Advanced Concepts and Performance Assessment | 03 | 12,996 | | | | | | 12,996 | U |
| 28 | 0603177C | Discrimination Sensor Technology | 03 | | | | | | | | U |
| 29 | 0603178C | Weapons Technology | 03 | 5,495 | | | | | | 5,495 | U |
| 30 | 0603179C | Advanced C4ISR | 03 | | | | | | | | U |
| 31 | 0603180C | Advanced Research | 03 | 20,184 | | | | | | 20,184 | U |
| 34 | 0603274C | Special Program - MDA Technology | 03 | | | | | | | | U |
| 40 | 0603294C | Common Kill Vehicle Technology | 03 | 252,879 | | | | | | 252,879 | U |
| | | Advanced Technology Development | | 291,554 | | | | | | 291,554 | |
| 74 | 0603881C | Ballistic Missile Defense Terminal Defense Segment | 04 | 230,162 | | 62,100 | | | | 292,262 | U |
| 75 | 0603882C | Ballistic Missile Defense Midcourse Defense Segment | 04 | 828,097 | | 129,000 | | | | 957,097 | U |
| 77 | 0603884C | Ballistic Missile Defense Sensors | 04 | 247,345 | | 30,800 | | | | 278,145 | U |
| 78 | 0603890C | BMD Enabling Programs | 04 | 449,442 | | 16,200 | | | | 465,642 | U |
| 79 | 0603891C | Special Programs - MDA | 04 | 320,190 | | 45,000 | | | | 365,190 | U |
| 80 | 0603892C | AEGIS BMD | 04 | 852,052 | | 8,736 | | | | 860,788 | U |
| 81 | 0603893C | Space Tracking & Surveillance System | 04 | | | | | | | | U |
| 82 | 0603895C | Ballistic Missile Defense System Space Programs | 04 | | | | | | | | U |
| 83 | 0603896C | Ballistic Missile Defense Command and Control, Battle Management and Communicati | 04 | 430,115 | | 24,747 | | | | 454,862 | U |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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Page D-6A

Volume 2a - xxii

UNCLASSIFIED

Missile Defense Agency
 FY 2018 President's Budget Amendment
 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

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

| Line No | Program Element Number | Item | Act | FY 2016 Base + OCO | FY 2017 Base Enactment | FY 2017 OCO Enactment | FY 2017 Total (Base + OCO) | Se |
|---------|------------------------|---|-----|--------------------|------------------------|-----------------------|----------------------------|----|
| 84 | 0603898C | Ballistic Missile Defense Joint Warfighter Support | 04 | 47,566 | 47,776 | | 47,776 | U |
| 85 | 0603904C | Missile Defense Integration & Operations Center (MDIOC) | 04 | 46,191 | 54,750 | | 54,750 | U |
| 86 | 0603906C | Regarding Trench | 04 | 8,918 | 8,785 | | 8,785 | U |
| 87 | 0603907C | Sea Based X-Band Radar (SBX) | 04 | 81,265 | 85,787 | 4,500 | 90,287 | U |
| 88 | 0603913C | Israeli Cooperative Programs | 04 | 267,595 | 268,735 | | 268,735 | U |
| 89 | 0603914C | Ballistic Missile Defense Test | 04 | 290,267 | 294,441 | | 294,441 | U |
| 90 | 0603915C | Ballistic Missile Defense Targets | 04 | 517,589 | 528,455 | | 528,455 | U |
| 94 | 0604115C | Technology Maturation Initiatives | 04 | 24,743 | 86,392 | | 86,392 | U |
| 96 | 0604181C | Hypersonic Defense | 04 | | | | | U |
| 105 | 0604873C | Long Range Discrimination Radar (LRDR) | 04 | 132,278 | 170,112 | 9,900 | 180,012 | U |
| 106 | 0604874C | Improved Homeland Defense Interceptors | 04 | 282,864 | 219,346 | | 219,346 | U |
| 107 | 0604876C | Ballistic Missile Defense Terminal Defense Segment Test | 04 | 20,980 | 58,444 | | 58,444 | U |
| 108 | 0604878C | Aegis BMD Test | 04 | 78,468 | 95,012 | | 95,012 | U |
| 109 | 0604879C | Ballistic Missile Defense Sensor Test | 04 | 83,597 | 88,150 | | 88,150 | U |
| 110 | 0604880C | Land-Based SM-3 (LBSM3) | 04 | 29,288 | 43,293 | | 43,293 | U |
| 111 | 0604881C | AEGIS SM-3 Block IIA Co-Development | 04 | 165,456 | 106,038 | | 106,038 | U |
| 112 | 0604887C | Ballistic Missile Defense Midcourse Segment Test | 04 | 54,619 | 62,781 | | 62,781 | U |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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Missile Defense Agency
 FY 2018 President's Budget Amendment
 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

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

| Line No | Program Element Number | Item | Act | FY 2018 Base Request | FY 2018 June Amendment Base | FY 2018 Amendment Emergency | FY 2018 OCO Request | FY 2018 Amendment OCO | FY 2018 Total OCO | FY 2018 Grand Total | Se |
|---------|------------------------|---|-----|----------------------|-----------------------------|-----------------------------|---------------------|-----------------------|-------------------|---------------------|----|
| 84 | 0603898C | Ballistic Missile Defense Joint Warfighter Support | 04 | 48,954 | | | | | | 48,954 | U |
| 85 | 0603904C | Missile Defense Integration & Operations Center (MDIOC) | 04 | 53,265 | | | | | | 53,265 | U |
| 86 | 0603906C | Regarding Trench | 04 | 9,113 | | | | | | 9,113 | U |
| 87 | 0603907C | Sea Based X-Band Radar (SBX) | 04 | 130,695 | | 15,000 | | | | 145,695 | U |
| 88 | 0603913C | Israeli Cooperative Programs | 04 | 105,354 | | | | | | 105,354 | U |
| 89 | 0603914C | Ballistic Missile Defense Test | 04 | 305,791 | | 10,402 | | | | 316,193 | U |
| 90 | 0603915C | Ballistic Missile Defense Targets | 04 | 410,425 | | 49,700 | | | | 460,125 | U |
| 94 | 0604115C | Technology Maturation Initiatives | 04 | 128,406 | | | | | | 128,406 | U |
| 96 | 0604181C | Hypersonic Defense | 04 | 75,300 | | | | | | 75,300 | U |
| 105 | 0604873C | Long Range Discrimination Radar (LRDR) | 04 | 357,659 | | | | | | 357,659 | U |
| 106 | 0604874C | Improved Homeland Defense Interceptors | 04 | 465,530 | | 170,900 | | | | 636,430 | U |
| 107 | 0604876C | Ballistic Missile Defense Terminal Defense Segment Test | 04 | 36,239 | | | | | | 36,239 | U |
| 108 | 0604878C | Aegis BMD Test | 04 | 134,468 | | 3,315 | | | | 137,783 | U |
| 109 | 0604879C | Ballistic Missile Defense Sensor Test | 04 | 84,239 | | 17,600 | | | | 101,839 | U |
| 110 | 0604880C | Land-Based SM-3 (LBSM3) | 04 | 30,486 | | | | | | 30,486 | U |
| 111 | 0604881C | AEGIS SM-3 Block IIA Co-Development | 04 | 9,739 | | | | | | 9,739 | U |
| 112 | 0604887C | Ballistic Missile Defense Midcourse Segment Test | 04 | 76,757 | | | | | | 76,757 | U |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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Missile Defense Agency
 FY 2018 President's Budget Amendment
 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

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

| Line No | Program Element Number | Item | Act | FY 2016 Base + OCO | FY 2017 Base Enactment | FY 2017 OCO Enactment | FY 2017 Total (Base + OCO) | S e c |
|------------------------------|------------------------|--|-----|-----------------------|------------------------------|-----------------------------|----------------------------------|-------------|
| 113 | 0604894C | Multi-Object Kill Vehicle | 04 | | | | | U |
| 115 | 0305103C | Cyber Security Initiative | 04 | 941 | 969 | | 969 | U |
| 116 | 1206893C | Space Tracking & Surveillance System | 04 | | | | | U |
| 117 | 1206895C | Ballistic Missile Defense System Space Programs | 04 | | | | | U |
| | | Advanced Component Development And Prototypes | | 5,898,841 | 5,747,291 | 44,450 | 5,791,741 | |
| 155 | 0605502C | Small Business Innovation Research - MDA | 06 | 88,694 | | | | U |
| 184 | 0901598C | Management HQ - MDA | 06 | 35,871 | 31,160 | | 31,160 | U |
| | | Management Support | | 124,565 | 31,160 | | 31,160 | |
| Total Missile Defense Agency | | | | 6,210,652 | 5,938,476 | 48,750 | 5,987,226 | |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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Missile Defense Agency
 FY 2018 President's Budget Amendment
 Exhibit R-1 FY 2018 President's Budget Amendment
 Total Obligational Authority
 (Dollars in Thousands)

03 Nov 2017

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

| Line No | Program Element Number | Item | Act | FY 2018 Base Request | FY 2018 June Amendment Base | FY 2018 Amendment Emergency | FY 2018 OCO Request | FY 2018 Amendment OCO | FY 2018 Total OCO | FY 2018 Grand Total | Se |
|------------------------------|------------------------|---|-----|----------------------|-----------------------------|-----------------------------|---------------------|-----------------------|-------------------|---------------------|----|
| 113 | 0604894C | Multi-Object Kill Vehicle | 04 | 6,500 | | | | | | 6,500 | U |
| 115 | 0305103C | Cyber Security Initiative | 04 | 986 | | | | | | 986 | U |
| 116 | 1206893C | Space Tracking & Surveillance System | 04 | 34,907 | | | | | | 34,907 | U |
| 117 | 1206895C | Ballistic Missile Defense System Space Programs | 04 | 16,994 | | 14,000 | | | | 30,994 | U |
| | | Advanced Component Development And Prototypes | | 5,879,210 | | 597,500 | | | | 6,476,710 | |
| 155 | 0605502C | Small Business Innovation Research - MDA | 06 | | | | | | | | U |
| 184 | 0901598C | Management HQ - MDA | 06 | 29,947 | | | | | | 29,947 | U |
| | | Management Support | | 29,947 | | | | | | 29,947 | |
| Total Missile Defense Agency | | | | 6,200,711 | | 597,500 | | | | 6,798,211 | |

R-118AMD: FY 2018 President's Budget Amendment (Published Version), as of November 3, 2017 at 10:36:40

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Missile Defense Agency • Budget Amendment FY 2018 • RDT&E Program

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 |
|--------|-----------------|------------------------|--|----------------|
| 74 | 04 | 0603881C | Ballistic Missile Defense Terminal Defense Segment..... | Volume 2a - 1 |
| 75 | 04 | 0603882C | Ballistic Missile Defense Midcourse Defense Segment..... | Volume 2a - 3 |
| 77 | 04 | 0603884C | Ballistic Missile Defense Sensors..... | Volume 2a - 7 |
| 78 | 04 | 0603890C | BMD Enabling Programs..... | Volume 2a - 11 |
| 79 | 04 | 0603891C | Special Programs - MDA..... | Volume 2a - 15 |
| 80 | 04 | 0603892C | AEGIS BMD..... | Volume 2a - 17 |
| 83 | 04 | 0603896C | Ballistic Missile Defense Command and Control, Battle Management & Communication..... | Volume 2a - 19 |
| 87 | 04 | 0603907C | Sea Based X-Band Radar (SBX)..... | Volume 2a - 23 |
| 89 | 04 | 0603914C | Ballistic Missile Defense Test..... | Volume 2a - 25 |
| 90 | 04 | 0603915C | Ballistic Missile Defense Targets..... | Volume 2a - 27 |
| 106 | 04 | 0604874C | Improved Homeland Defense (HLD) Interceptors..... | Volume 2a - 29 |
| 108 | 04 | 0604878C | Aegis BMD Test..... | Volume 2a - 31 |
| 109 | 04 | 0604879C | Ballistic Missile Defense Sensor Test..... | Volume 2a - 33 |
| 117 | 04 | 1206895C | Ballistic Missile Defense System Space Programs..... | Volume 2a - 35 |

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Missile Defense Agency • Budget Amendment FY 2018 • RDT&E Program

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

| Program Element Title | Program Element Number | Line # | BA | Page |
|--|-------------------------------|---------------|-----------|----------------|
| AEGIS BMD | 0603892C | 80 | 04..... | Volume 2a - 17 |
| Aegis BMD Test | 0604878C | 108 | 04..... | Volume 2a - 31 |
| BMD Enabling Programs | 0603890C | 78 | 04..... | Volume 2a - 11 |
| Ballistic Missile Defense Command and Control, Battle Management & Communication | 0603896C | 83 | 04..... | Volume 2a - 19 |
| Ballistic Missile Defense Midcourse Defense Segment | 0603882C | 75 | 04..... | Volume 2a - 3 |
| Ballistic Missile Defense Sensor Test | 0604879C | 109 | 04..... | Volume 2a - 33 |
| Ballistic Missile Defense Sensors | 0603884C | 77 | 04..... | Volume 2a - 7 |
| Ballistic Missile Defense System Space Programs | 1206895C | 117 | 04..... | Volume 2a - 35 |
| Ballistic Missile Defense Targets | 0603915C | 90 | 04..... | Volume 2a - 27 |
| Ballistic Missile Defense Terminal Defense Segment | 0603881C | 74 | 04..... | Volume 2a - 1 |
| Ballistic Missile Defense Test | 0603914C | 89 | 04..... | Volume 2a - 25 |
| Improved Homeland Defense (HLD) Interceptors | 0604874C | 106 | 04..... | Volume 2a - 29 |
| Sea Based X-Band Radar (SBX) | 0603907C | 87 | 04..... | Volume 2a - 23 |
| Special Programs - MDA | 0603891C | 79 | 04..... | Volume 2a - 15 |

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**Missile Defense Agency
Missile Defeat and Defend Enhancement (MDDE)
Fiscal Year (FY) 2018
Budget Amendment**

OVERVIEW



Approved for Public Release
Volume 2a 18-C-0061
Volume 2b 18-C-0062

The Missile Defense Agency (MDA) requests \$2.0 billion in the Missile Defeat and Defend Enhancement (MDDE) Fiscal Year (FY) 2018 Budget Amendment to address the rapidly developing threat by increasing current capacity, expanding the sensor network and accelerating missile defense technology development. Recent escalation of the threat from North Korea has demonstrated an advanced and accelerated capability. This Budget Amendment request for MDA is in direct response to this increased threat.

Increasing Current Capacity:

- \$463 million to begin the build out of an additional Ground-Based Interceptor field (Missile Field 4) at Fort Greely, AK with associated equipment to include 20 new silos.
- \$184 million to fund long-lead components for 4 additional Ground-Based Interceptors (GBIs), accelerate the Redesigned Kill Vehicle (RKV) efforts, and continue GBI booster development. The Administration plans to request funding for a total of 20 additional GBIs to be deployed by 2023.
- \$127 million for redesigned kill vehicle risk (RKV) reduction activities, to include the addition of a non-intercept target to the initial RKV flight test.
- \$505 million to procure 50 additional THAAD interceptors to increase inventory levels in support of warfighter requirements.
- \$127 million for USPACOM Joint Emergent Operational Need (JEON) to deliver improved BMDS capability to the Korean Peninsula, including integration of existing BMD assets to improve engagement options and coverage area.

- \$451 million to procure 16 additional SM-3 Block IIA missiles. This will provide a more robust defense against IRBMs and other threats.
- \$66 million for additional SM-3 Block IIA testing.

Expanding the Sensor Network:

- \$16 million to upgrade the traveling wave tube redesign and initiate software re-hosting to extend the life of COBRA DANE radar which provides critical coverage of the current threat to the Homeland.
- \$15 million for Sea-Based X-Band (SBX) to replace the obsolete Superdome processor with a new X86 processor and associated software. Upgrades will improve the performance of the SBX in support of testing and real world events.
- \$14 million to conduct a study for a potential space-based missile defense tracking system prototype design.
- \$10 million to complete studies and analysis, and field communications improvements for Mobile Sensor Integration Program (IOC 2019).
- \$5 million to conduct studies and evaluations in support of a Medium Range Discriminating Radar to address gaps in coverage and better protect the Homeland and Regional allies. Radar includes BMDS threat discrimination improvements, which will enhance BMD effectiveness against the evolving threat.

Accelerating Technology Development

- \$45 million for a Special Access Program. Details at higher classification.
- \$9 million for advanced discrimination to allow BMDS sensors to identify lethal objects and reduce number of interceptors required to address a threat.

MDA requests \$2.0 billion to accelerate BMDS capability to address the alarming recent real-world events. The combination of increasing current capacity, expanding the sensor network and accelerating the development of advanced technology in this request is necessary to ensure continued protection of the Homeland and our allies by the BMDS.

Missile Defeat and Defend Enhancement (MDDE) FY18 Budget Amendment

| Acceleration Effort | Description | Program Element | Budget Project | FY17 ATR | FY18 Budget Amendment |
|-------------------------------------|---|---|----------------|----------|-----------------------|
| Increasing Current Capacity | 20 Additional GBIs with Redesigned Kill Vehicles | Advance Procurement | MD08 | - | 56.000 |
| | | 0603882C - BMD Midcourse Defense | MD08 | 72.000 | 53.000 |
| | | 0604874C - Improved Homeland Defense Interceptors | MD97 | 8.000 | 75.000 |
| | | Subtotal | | 80.000 | 184.000 |
| | Begin Missile Field #4 at Fort Greely with 20 New Silos | 0603882C - BMD Midcourse Defense | MD08 | 9.000 | 51.000 |
| | | Advance Procurement | MD08 | 47.000 | 32.000 |
| | | Procurement | MD08 | - | 180.000 |
| | | MILCON Major | MM08 | - | 200.000 |
| | | Subtotal | | 56.000 | 463.000 |
| | Risk Reduction for 20 GBIs (RKV) | 0603882C - BMD Midcourse Defense | MD08 | - | 25.000 |
| | | 0603915C - BMD Targets | MT05 | - | 6.100 |
| | | 0604874C - Improved Homeland Defense Interceptors | MD97 | - | 95.900 |
| | | Subtotal | | - | 127.000 |
| | 50 Additional THAAD Interceptors | Procurement | MD07 | - | 505.000 |
| | USFK JEON - THAAD/PATRIOT | 0603881C - BMD Terminal Defense | MD07 | - | 62.100 |
| | | 0603881C - BMD Terminal Defense | MD06 | - | - |
| | | 0603892C - BMD Aegis | MX09 | - | 4.000 |
| | | 0603884C - BMD Sensors | MD11 | - | 17.800 |
| | | 0603890C - BMD Enabling Programs | MD24 | - | 16.200 |
| | | 0603896C - BMD C2BMC | MD01 | - | 3.000 |
| | | 0603914C - BMD Test | MT04 | - | 9.500 |
| | | 0603915C - BMD Targets | MT05 | - | 9.900 |
| | | Procurement | MD07 | - | 4.140 |
| | | Subtotal | | - | 126.640 |
| | | 16 Additional Aegis SM-3 Block IIA Missiles | Procurement | MD09 | - |
| | Aegis SM-3 Block IIA Missile Test | 0604878C - Aegis BMD Test | MT09 | 46.000 | 3.315 |
| | | 0603892C-Aegis BMD | MM09 | | 4.736 |
| | | 0604879C-Sensors Test | MT11 | | 17.600 |
| | | 0603896C-C2BMC | MT01 | | 5.747 |
| | | 0603914C-Test | MT04 | | 0.902 |
| | | 0603915C-Targets | MT05 | | 33.700 |
| | | Subtotal | | 46.000 | 66.000 |
| | Upgrades 4 Aegis BMD ships | Procurement | MD90 | 13.000 | - |
| Expanding the Sensor Network | Missile Defense Tracking System | 1206895C - BMD Space Program | MD33 | - | 14.000 |
| | COBRA DANE Upgrade | 0603884C - BMD Sensors | MD11 | 16.000 | 5.000 |
| | | Procurement | MD11 | - | 11.000 |
| | | Subtotal | | 16.000 | 16.000 |
| | SBX Software Upgrades | 0603907C - Sea Based X-Band Radar (SBX) | MX46 | 15.000 | 15.000 |
| | Mobile Sensor Integration Program | 0603896C - BMD C2BMC | MD01 | 10.000 | 10.000 |
| | Medium Range Discriminating Radar | 0603884C - BMD Sensors | MD11 | - | 5.000 |
| Accelerating Technology Development | MDA - Classified | 0603891C - Special Programs | MD27 | 2.000 | 45.000 |
| | Advanced Discrimination | 0603884C - BMD Sensors | MD11 | 3.600 | 3.000 |
| | | 0603890C - BMD Enabling Programs | MD24 | 1.100 | - |
| | | 0603896C - BMD C2BMC | MD01 | 6.300 | 6.000 |
| | Subtotal | | | 11.000 | 9.000 |
| | | | | 249.000 | 2,036.640 |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| | |
|---|---|
| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603881C / <i>Ballistic Missile Defense Terminal Defense Segment</i> |
|---|---|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|--|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 1,141.624 | 197.617 | 201.834 | 292.262 | - | 292.262 | 194.328 | 253.778 | 264.377 | 267.254 | Continuing | Continuing |
| MD07: <i>THAAD</i> | 1,068.268 | 186.100 | 187.699 | 277.669 | - | 277.669 | 176.302 | 230.270 | 239.792 | 244.604 | Continuing | Continuing |
| MC07: <i>Cyber Operations</i> | 1.188 | 0.572 | 3.367 | 3.325 | - | 3.325 | 7.563 | 10.595 | 10.686 | 8.698 | Continuing | Continuing |
| MD06: <i>Patriot Advanced Capability-3 (PAC-3)</i> | 6.486 | 1.066 | 1.130 | 1.162 | - | 1.162 | 1.171 | 1.245 | 1.264 | 1.290 | Continuing | Continuing |
| MD40: <i>Program-Wide Support</i> | 65.682 | 9.879 | 9.638 | 10.106 | - | 10.106 | 9.292 | 11.668 | 12.635 | 12.662 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

The increase from FY 2017 to FY 2018 provides increased THAAD Software Build 4.0 development.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100 million is required to fund Phase 1, 2 and 3 efforts for emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON).

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 Commanders a globally-transportable, rapidly-deployable capability to intercept and destroy short-range, medium-range, and limited intermediate-range ballistic missile threats inside or outside the atmosphere during terminal phase of flight. Continued development and integration will provide enhanced debris mitigation capability, improved interoperability with other BMDS elements, and training devices to support the THAAD Institutional Training Base.

This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100 million is required to address emergency warfighting readiness requirements.

+\$62.100M Project MD07 THAAD: required to fund Phase 1, 2 and 3 efforts in the THAAD portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement – MSE) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
|---|----------------------------|

| | |
|---|---|
| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603881C I <i>Ballistic Missile Defense Terminal Defense Segment</i> |
|---|---|

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 212.230 | 206.834 | 231.105 | - | 231.105 |
| Current President's Budget | 197.617 | 201.834 | 292.262 | - | 292.262 |
| Total Adjustments | -14.613 | -5.000 | 61.157 | - | 61.157 |
| • Congressional General Reductions | 0.000 | -5.000 | | | |
| • 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 | -9.999 | 0.000 | | | |
| • SBIR/STTR Transfer | -4.614 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 62.100 | - | 62.100 |
| • Other Adjustment | 0.000 | 0.000 | -0.943 | - | -0.943 |

Change Summary Explanation

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$62.100M is required to address emergency warfighting readiness requirements.

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Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency **Date:** November 2017

| | |
|---|--|
| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603882C I <i>Ballistic Missile Defense Midcourse Defense Segment</i> |
|---|--|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|-------------------------------------|--------------------|----------------|----------------|---------------------|--------------------|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| Total Program Element | 2,381.252 | 1,260.480 | 967.780 | 957.097 | - | 957.097 | 630.842 | 651.047 | 567.451 | 551.701 | Continuing | Continuing |
| MD08: <i>Ground Based Midcourse</i> | 2,191.513 | 1,193.273 | 909.751 | 906.692 | - | 906.692 | 579.986 | 598.610 | 518.755 | 509.040 | Continuing | Continuing |
| MC08: <i>Cyber Operations</i> | 6.848 | 14.686 | 16.308 | 18.818 | - | 18.818 | 22.495 | 23.766 | 22.702 | 16.623 | Continuing | Continuing |
| MD40: <i>Program-Wide Support</i> | 182.891 | 52.521 | 41.721 | 31.587 | - | 31.587 | 28.361 | 28.671 | 25.994 | 26.038 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

Decrease from FY 2017 to FY 2018 reflect the completion and delivery of Ground Based Interceptors (GBIs) 48-58, completion of operational spares used for CE-I's and the flight test rotations used for FTG-11 and CTV-03; and completion and delivery of CE-II GBI upgrades.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$81.000M is required to address emergency warfighting requirements in support of non-recurring engineering in advance of Procurement to begin an increase in capability of the Ground-based Interceptors (GBI) by 20 from 44 to 64 (\$72.0M) and to add 20 new silos in a new missile field in Fort Greely, AK (Missile Field #4) (\$9.0M). This is a congressional special interest item.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$129.000M is required to address emergency warfighting requirements in support of increased the capacity of GBIs for the warfighter.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 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 Communications Network (GCN), In-Flight Interceptor Communications System (IFICS) Data Terminal (IDT) and ground Launch Support Systems (LSS). By the end of 2017, the Missile Defense Agency (MDA) will have 44 operationally deployed GBIs located at Fort Greely, Alaska (40 GBIs) and Vandenberg Air Force Base, California (4 GBIs). Each GBI delivers a single Exoatmospheric Kill Vehicle (EKV) 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; Vandenberg Air Force Base, California; Eareckson Air Station, Alaska; and Fort Drum, New York. The GMD capability leverages integration of BMDS sensors in Alaska, California, United Kingdom, Japan, and Greenland. 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, support Salvo Flight Test-11, modernize the GMD ground system, provide fire control and communications, develop GBI software enhancements that improve reliability and discrimination, improve GMD models and simulations, and participate with other BMDS assets in system ground tests.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$81.0 million was required to address emergency warfighting readiness requirements of the BMDS.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603882C <i>I Ballistic Missile Defense Midcourse Defense Segment</i> |
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+\$72.000M Project MD08 Ground Based Midcourse: required to fund non-recurring engineering in advance of Procurement to begin an increase in capability of the Ground-based Interceptors (GBI) by 20 from 44 to 64, +\$9.000M required to fund the addition of 20 new silos in a new missile field in Fort Greely, AK (Missile Field #4). This is a congressional special interest item. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$129.0M is required to address emergency warfighting readiness requirements.

\$129.0M Project MD08 Ground Based Midcourse:. This is a base budget requirement.

+\$53.0M is required to continue booster development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. Continues work to increase GBI inventory from 44 to 64.

+\$51.0M is required to continue ground systems development to increase the capacity of GBIs for the warfighter to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. Continues work for 20 new silos and associated support equipment for a new missile field (Missile Field #4) to accommodate the GBIs at Fort Greely, AK.

+\$25.0M is required for risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 1,269.913 | 862.080 | 701.311 | - | 701.311 |
| Current President's Budget | 1,260.480 | 967.780 | 957.097 | - | 957.097 |
| Total Adjustments | -9.433 | 105.700 | 255.786 | - | 255.786 |
| • Congressional General Reductions | 0.000 | -5.000 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 110.700 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | 9.999 | 0.000 | | | |
| • SBIR/STTR Transfer | -19.432 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 129.000 | - | 129.000 |
| • Other Adjustment | 0.000 | 0.000 | 126.786 | - | 126.786 |

Change Summary Explanation

The increase from PB17 to PB18 in FY 2018 begins work to ensure no fewer than 44 GBIs are deployed through the FYDP.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$81.0 million was required to address emergency warfighting requirements in support of non-recurring engineering in advance of Procurement to begin an increase in capability of the Ground-based Interceptors (GBI) by 20 from 44 to 64 (\$72.0M) and to add 20 new silos in a new missile field in Fort Greely, AK (Missile Field #4) (\$9.0M). This is a congressional special interest item.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | Date: November 2017 |
| 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 | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$129.0 million is required to address emergency warfighting requirements in support of increased the capacity of GBIs for the warfighter. | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | | | | | R-1 Program Element (Number/Name) PE 0603884C / <i>Ballistic Missile Defense Sensors</i> | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
| Total Program Element | 932.886 | 233.020 | 228.377 | 278.145 | - | 278.145 | 247.643 | 362.850 | 401.267 | 497.503 | Continuing | Continuing |
| MD11: <i>BMDs Radars</i> | 864.338 | 221.705 | 217.803 | 244.332 | - | 244.332 | 211.357 | 241.261 | 299.852 | 260.420 | Continuing | Continuing |
| MD41: <i>Pacific Radar</i> | - | 0.000 | 0.000 | 21.000 | - | 21.000 | 25.800 | 99.000 | 83.300 | 216.060 | 0 | 445.160 |
| MC11: <i>Cyber Operations</i> | 2.675 | 1.196 | 1.045 | 3.636 | - | 3.636 | 1.089 | 8.950 | 4.410 | 1.156 | Continuing | Continuing |
| MD40: <i>Program-Wide Support</i> | 65.873 | 10.119 | 9.529 | 9.177 | - | 9.177 | 9.397 | 13.639 | 13.705 | 19.867 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600 million was required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$30.800 million is required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) network of layered Sensors provides essential situational awareness and fire control data for the command and control of BMDS weapon systems, such as Ground-based Midcourse Defense (GMD), Aegis Ballistic Missile Defense, and Terminal High Altitude Area Defense (THAAD). The suite of remote ground-based sensors provides early warning, midcourse and terminal ballistic missile defense threat data enabling layered detection and tracking of ballistic 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, 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 ballistic missile threats.

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.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | Date: November 2017 |
| Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | R-1 Program Element (Number/Name) PE 0603884C I Ballistic Missile Defense Sensors | |
| <p>The BMD Sensors Program contributes to regional 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, adding flexibility to respond to geographical changes in threats. Radars provide early warning tracking and discrimination data through all phases of ballistic missile flight. Through the BMDS C2BMC and coalition data links, the AN/TPY-2 provides fire control data to enable remote Standard Missile (SM)-3 engagements by Aegis BMD, to allow earlier engagement by the Arrow Weapon System, and to cue deployed THAAD and U.S. and partner PATRIOT batteries.</p> <p>The BMDS sensor network also includes the COBRA DANE Radar at Eareckson Air Station, Alaska, and the Upgraded Early Warning Radars (UEWRs) at Beale Air Force Base, CA; Fylingdales Royal Air Force, United Kingdom, and Thule Air Base in Greenland. 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 expected to be completed in CY 2017 and 2018 respectively. The addition of the Clear UEWR and Cape Cod UEWRs to the BMDS sensor architecture will improve BMDS sensor coverage and provide new engagement options against long-range missile threats.</p> <p>The Pacific Radar is a new sensor within the Ballistic Missile Defense System that addresses NORTHCOM and PACOM radar requirements for the defense of Hawaii. The Pacific Radar is an long range ballistic missile defense sensor that provides a persistent operational capability for the defense of the Pacific region and improves the discrimination capability to address multiple threats including the no warning strategic challenges of the road mobile ICBM. The radar will leverage development efforts from other sensors projects to reuse discrimination, low elevation acquisition, and tracking algorithms. The Pacific Radar final testing/integration and delivery is planned for CY 2023.</p> <p>Cyber Operations sustains the Risk Management Framework (RMF)and Controls Validation Testing (CVT) activities, analysis of validation results, risk assessments and reviews of Plans of Action and Milestones (POA&Ms) for the Sensors mission system.</p> <p>This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.</p> <p>FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+6.400M was required to address emergency warfighting readiness requirements. \$+6.400M Project MD11-BMDS Radar to implement AN/TPY-2 Noise Mitigation.</p> <p>FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600 million was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.</p> <p>+\$19.600M Project MD11 BMDS Radars. This is a base budget requirement.</p> <p>+\$3.600M is required to support Advanced Discrimination efforts focused on countering the emergent threats to the homeland, forward deployed forces, and allies.</p> <p>+\$16.000M is required to extend the lifespan of the COBRA DANE radar, which provides critical coverages of North Korean threats. Upgrades include critical life extension redesign and software rehosting to ensure continued operations. This is a base budget requirement.</p> | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | | |
| Appropriation/Budget Activity | | R-1 Program Element (Number/Name) | | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P) | | PE 0603884C / Ballistic Missile Defense Sensors | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$30.800M is required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level. | | | | | | |
| +\$30.800M Project MD11 BMDS Radars. This is a base budget requirement. | | | | | | |
| +\$3.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication. | | | | | | |
| +\$5.000M is required to conduct studies and evaluations in support of a Medium Range Discriminating Radar (MRDR) to address gaps in the BMDS and better protect the homeland and regional allies. An MRDR would include BMDS threat discrimination improvements to enhance BMD effectiveness against the evolving threat. | | | | | | |
| +\$17.800M is required to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement – MSE) ballistic missile defense system that expands engagement options and increases coverage area. | | | | | | |
| +\$5.000M is required to extend the lifespan of the COBRA DANE radar, a long-range sensor that provides critical coverage of potential North Korean threats. Nearly all of the major COBRA DANE systems have aged well beyond their intended design lifespan and the majority of the radar components are largely obsolete. Upgrades includes critical life extension redesign and software re-hosting to ensure continued operations of COBRA DANE. | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | | 228.392 | 230.077 | 144.893 | - | 144.893 |
| Current President's Budget | | 233.020 | 228.377 | 278.145 | - | 278.145 |
| Total Adjustments | | 4.628 | -1.700 | 133.252 | - | 133.252 |
| • 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 | -8.100 | | | |
| • Reprogrammings | | 9.606 | 0.000 | | | |
| • SBIR/STTR Transfer | | -4.978 | 0.000 | | | |
| • FY 2017 Request for Additional Appropriations | | 0.000 | 6.400 | 0.000 | - | 0.000 |
| • FY 2018 Missile Defeat and Defense Enhancement | | 0.000 | 0.000 | 30.800 | - | 30.800 |
| • Other Adjustment | | 0.000 | 0.000 | 102.452 | - | 102.452 |
| Change Summary Explanation | | | | | | |
| The increase from PB17 to PB18 in FY2018 reflects funding for the new Pacific Radar, a long range BMD sensor that addresses NORTHCOM and PACOM radar requirements for the defensive of Hawaii, and studies for a potential Atlantic Radar. The increase also reflects AN/TPY-2 transition to Gallium Nitride (GaN) Transmit/Receive module technology, software improvements to implement C2BMC interface updates, and Objective Debris Mitigation (ODM). Increased funding | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | Date: November 2017 |
| Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | R-1 Program Element (Number/Name) PE 0603884C I Ballistic Missile Defense Sensors | |
| <p>for Cyber Operations reflects compliance with new Cyber Supply Chain requirements. Also includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.</p> <p>FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$19.600 million was required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.</p> <p>FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$30.800million is required to address emergency warfighting requirements in support of Advanced Discrimination and extended lifespan of the COBRA DANE radar. Additional details are available at a higher classification level.</p> | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603890C / <i>BMD Enabling Programs</i> |
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| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 1,296.311 | 406.326 | 433.594 | 465.642 | - | 465.642 | 466.760 | 540.409 | 629.864 | 501.915 | Continuing | Continuing |
| MD24: <i>System Engineering & Integration</i> | 494.423 | 146.148 | 139.866 | 166.558 | - | 166.558 | 151.837 | 157.982 | 156.943 | 156.690 | Continuing | Continuing |
| MT23: <i>Enabling - Test</i> | 18.225 | 16.043 | 17.749 | 22.767 | - | 22.767 | 20.811 | 20.735 | 22.008 | 21.751 | Continuing | Continuing |
| MD28: <i>Intelligence & Security</i> | 107.954 | 39.085 | 41.254 | 44.708 | - | 44.708 | 44.557 | 47.744 | 48.732 | 49.477 | Continuing | Continuing |
| MD30: <i>BMD Information Management Systems</i> | 234.332 | 90.685 | 92.628 | 84.499 | - | 84.499 | 81.337 | 89.036 | 91.592 | 95.019 | Continuing | Continuing |
| MC30: <i>Cyber Operations</i> | 31.503 | 27.194 | 42.881 | 41.458 | - | 41.458 | 45.070 | 56.616 | 73.479 | 56.086 | Continuing | Continuing |
| MD31: <i>Modeling & Simulation</i> | 125.432 | 39.972 | 44.458 | 49.824 | - | 49.824 | 63.465 | 97.374 | 140.616 | 51.374 | Continuing | Continuing |
| MC31: <i>Engineering Cyber Operations</i> | 0.204 | 0.613 | 5.253 | 3.838 | - | 3.838 | 6.500 | 13.308 | 34.988 | 13.448 | Continuing | Continuing |
| MD32: <i>Quality, Safety, and Mission Assurance</i> | 177.382 | 28.864 | 31.022 | 30.516 | - | 30.516 | 29.796 | 31.387 | 31.901 | 32.550 | Continuing | Continuing |
| MD40: <i>Program-Wide Support</i> | 106.856 | 17.722 | 18.483 | 21.474 | - | 21.474 | 23.387 | 26.227 | 29.605 | 25.520 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17026 PA): +\$1.100 million was required to address emergency warfighting requirements in support of Joint Emergent Operational Need. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$16.200 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON).

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense System (BMDS) Enabling Programs provide critical products and processes needed to combine element missile defense systems into a single, integrated and layered BMDS to provide new defensive capabilities and evaluate existing capabilities against the emerging threats. Specifically, the Enabling Programs:

- Define BMDS architectures and functional requirements, conduct Analyses of Alternatives (AoA) for the DoD, and provide engineering requirements, execution support, and pre- and post-mission analysis for BMD System tests
- Provide validated models and simulations for BMD System assessment

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | Date: November 2017 |
| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | | R-1 Program Element (Number/Name) PE 0603890C <i>I BMD Enabling Programs</i> |
| <ul style="list-style-type: none"> - Assess BMDS performance and deliver capabilities to the Warfighter - Provide multi-disciplinary security and intelligence support for BMDS acquisition, development, test, and deployment - Identify potential threats and vulnerabilities to MDA and the BMDS and develop and implement strategies to mitigate those risks - Assess architecture alternatives to address advanced threats and provide recommendations for future BMDS configurations to keep pace with evolving threats - Provide Information Management tools and products supporting the development of BMDS 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 <p>This Program Element includes BMDS threat discrimination improvements, which will enhance BMDS effectiveness against the evolving adversary threat. The end 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), BMD Command, Control, Battle Management and Communications (C2BMC) (0603896C), and Aegis BMD (0603892C) PEs.</p> <p>This effort also investigates concepts and explores system engineering issues associated with innovative space applications for missile defense intercept and defeat system.</p> <p>FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+7.000M was required to address Joint Emergent Operational Need and emergency warfighting readiness requirements to ensure readiness of the BMDS.</p> <p>+ \$6.700 million project MD24 to begin NDAA-directed efforts to develop a Hypersonic Threat Defense program. Efforts include 180-day study, plume and hardbody signature data for threat analyses, an accelerated Analysis of Alternatives, leveraging DoD-level resources to augment promising technology analysis, and participation in a target of opportunity mission to obtain sensor data. This is a Joint Emergent Operational Need requirement.</p> <p>+ \$0.300 million project MT23 to provide additional M&S support for BMDS ground test planning and execution to ensure readiness of the BMDS.</p> <p>FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17026 PA): : +\$1.100M was required to address emergency warfighting readiness requirements. Additional details are available at a higher classification level.</p> <p>+ \$1.100M Project MD24 System Engineering & Integration: required to fund Advanced Discrimination efforts focused on countering the emergent threats to the homeland, forward deployed forces, and allies. Additional classified details will be provided under a separate cover. This is a base budget requirement.</p> <p>FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$16.200M is required to address emergency warfighting readiness requirements.</p> | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | |
| Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | | R-1 Program Element (Number/Name) PE 0603890C I BMD Enabling Programs | | | |
| +\$16.200M Project MD24 System Engineering & Integration: required to fund the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement – MSE) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement. | | | | | |
| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | 404.780 | 401.594 | 404.993 | - | 404.993 |
| Current President's Budget | 406.326 | 433.594 | 465.642 | - | 465.642 |
| Total Adjustments | 1.546 | 32.000 | 60.649 | - | 60.649 |
| • Congressional General Reductions | 0.000 | 0.000 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 25.000 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | 9.994 | 0.000 | | | |
| • SBIR/STTR Transfer | -8.448 | 0.000 | | | |
| • FY 2017 Request for Additional Appropriation | - | 7.000 | - | - | - |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 16.200 | - | 16.200 |
| • Other Adjustment | 0.000 | 0.000 | 44.449 | - | 44.449 |
| Change Summary Explanation | | | | | |
| The increase in FY2018 from PB17 to PB18 supports emerging Department of Defense priorities, including: | | | | | |
| -- Aegis Ashore Defense (\$10.000 million) | | | | | |
| -- M&S improvements (\$5.320 million) | | | | | |
| -- Discrimination Improvements and Countermeasures Mitigation (\$3.172 million) | | | | | |
| FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+7.000M was required to address Joint Emergent Operational Need and emergency warfighting readiness requirements to ensure readiness of the BMDS. | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCMENTS REPROGRAMMING (FY17-26 PA): +\$1.100 million was required to address emergency warfighting requirements in support of Joint Emergent Operational Need. Additional details are available at a higher classification level. | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$16.200 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON). | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | | | | | R-1 Program Element (Number/Name) PE 0603891C / <i>Special Programs - MDA</i> | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
| Total Program Element | 1,090.278 | 390.264 | 304.677 | 365.190 | - | 365.190 | 273.713 | 254.407 | 265.119 | 270.417 | Continuing | Continuing |
| MD27: <i>Special Programs</i> | 1,090.278 | 390.264 | 304.677 | 365.190 | - | 365.190 | 273.713 | 254.407 | 265.119 | 270.417 | 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. FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$2.0 million was required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$45.0 million is required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level.

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. FY 2017 Missile Defeat Enhancement REPROGRAMMING: +\$2.0M is required to address emergency warfighting readiness requirements. +\$2.0M Project MD27 Special Programs/CLASSIFIED: Additional details at higher classification. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$45.0M is required to address emergency warfighting readiness requirements. +\$45.0M Project MD27 Special Programs/CLASSIFIED: Additional details at higher classification. This is a base budget requirement. Additional classified details will be provided under a separate cover. 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 Amended 2018 Missile Defense Agency | | | | Date: November 2017 | |
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| Appropriation/Budget Activity | | R-1 Program Element (Number/Name) | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P) | | PE 0603891C / Special Programs - MDA | | | |
| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | 400.387 | 321.607 | 307.410 | - | 307.410 |
| Current President's Budget | 390.264 | 304.677 | 365.190 | - | 365.190 |
| Total Adjustments | -10.123 | -16.930 | 57.780 | - | 57.780 |
| • Congressional General Reductions | 0.000 | -16.930 | | | |
| • 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 | -0.994 | 0.000 | | | |
| • SBIR/STTR Transfer | -9.129 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 45.000 | - | 45.000 |
| • Other Adjustment | 0.000 | 0.000 | 12.780 | - | 12.780 |
| Change Summary Explanation | | | | | |
| FY 2016 to FY 2017 decrease reflects completion of work. 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. | | | | | |
| The increase in FY2018 from PB17 to PB18 reflect realignment to Department of Defense priorities. 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. | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$2.0 million was required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level. | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$45.0 million is required to address emergency warfighting requirements in support of Special Programs. Additional details are available at a higher classification level. | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | | | | | | | Date: November 2017 | | |
|---|-------------|---------|---------|--------------|-----------------------------------|---------------|---------|---------|---------|---------------------|------------------|------------|
| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P) | | | | | PE 0603892C / AEGIS BMD | | | | | | | |
| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
| Total Program Element | 4,739.838 | 804.211 | 919.066 | 860.788 | - | 860.788 | 805.051 | 789.217 | 656.164 | 695.306 | Continuing | Continuing |
| MD09: Aegis BMD | 4,510.326 | 686.536 | 806.028 | 292.063 | - | 292.063 | 285.018 | 356.447 | 324.925 | 332.936 | Continuing | Continuing |
| MG09: Aegis BMD SM-3 Development Articles | - | 0.000 | 0.000 | 253.276 | - | 253.276 | 166.129 | 73.523 | 18.291 | 0.000 | 0 | 511.219 |
| MM09: Aegis BMD SM-3 Development | - | 0.000 | 0.000 | 98.150 | - | 98.150 | 121.268 | 125.305 | 74.922 | 111.278 | 0 | 530.923 |
| MC09: Cyber Operations | 1.700 | 1.225 | 0.879 | 2.340 | - | 2.340 | 14.970 | 22.506 | 23.079 | 20.177 | Continuing | Continuing |
| MX09: Aegis BMD Development Support | 32.016 | 80.312 | 68.283 | 173.325 | - | 173.325 | 177.360 | 174.101 | 182.794 | 197.100 | Continuing | Continuing |
| MD40: Program-Wide Support | 195.796 | 36.138 | 43.876 | 41.634 | - | 41.634 | 40.306 | 37.335 | 32.153 | 33.815 | Continuing | Continuing |
| Program MDAP/MAIS Code: 362 | | | | | | | | | | | | |
| Note | | | | | | | | | | | | |
| Decrease from FY 2017 to FY 2018 is due to completion of Aegis Ballistic Missile Defense (BMD) 5.x Development functionality implementation, baseline certification testing and life cycle evolution as the program prepares to shift from development to the production phase. | | | | | | | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENCHANCEMENT (MDDE) BUDGET AMENDMENT: +\$8.736 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test. | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603892C / <i>AEGIS BMD</i> |
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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.

This Program Element also investigates concepts and performs systems engineering to address hypersonic threats.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$8.736M is required to address emergency warfighting readiness requirements.

+\$4.000M Project MX09 Aegis BMD Development Support: required to fund the Aegis BMD portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement – MSE) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement.

+\$4.736M Project MM09 Aegis BMD SM-3 Development: required to fund an SM-3 Block IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense.

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 830.647 | 959.066 | 841.738 | - | 841.738 |
| Current President's Budget | 804.211 | 919.066 | 860.788 | - | 860.788 |
| Total Adjustments | -26.436 | -40.000 | 19.050 | - | 19.050 |
| • Congressional General Reductions | 0.000 | -40.000 | | | |
| • 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 | -9.994 | 0.000 | | | |
| • SBIR/STTR Transfer | -16.442 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 8.736 | - | 8.736 |
| • Other Adjustment | 0.000 | 0.000 | 10.314 | - | 10.314 |

Change Summary Explanation

The increase in FY2018 from PB17 to PB18 is for completion of SM-3 Block IIA development efforts, which is offset by implementation of reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENT (MDDE) BUDGET AMENDMENT: +\$8.736 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| 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 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|--|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 1,786.627 | 425.996 | 449.928 | 454.862 | - | 454.862 | 461.275 | 501.956 | 496.411 | 514.139 | Continuing | Continuing |
| MD01: Command & Control, Battle Management, Communications (C2BMC) | 1,282.742 | 255.003 | 256.073 | 270.033 | - | 270.033 | 268.130 | 293.051 | 285.343 | 296.433 | Continuing | Continuing |
| MC01: Cyber Operations | 1.474 | 4.256 | 0.905 | 5.305 | - | 5.305 | 11.021 | 15.706 | 15.684 | 19.530 | Continuing | Continuing |
| MT01: C2BMC Test | 128.186 | 55.799 | 56.627 | 57.302 | - | 57.302 | 46.828 | 51.109 | 47.340 | 47.255 | Continuing | Continuing |
| MX01: Command & Control, Battle Management, Communications (C2BMC) Development Support | 300.964 | 96.140 | 116.552 | 103.440 | - | 103.440 | 114.132 | 120.070 | 125.220 | 127.736 | Continuing | Continuing |
| MD40: Program-Wide Support | 73.261 | 14.798 | 19.771 | 18.782 | - | 18.782 | 21.164 | 22.020 | 22.824 | 23.185 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination. Additional details are available at a higher classification level.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747million is required to address emergency warfighting requirements in support of Mobile Sensor Integration Program, Advanced Discrimination, USPACOM Joint Emergent Operational Need Statement (JEON), and Aegis SM-3 Block IIA Missile Test. Additional details are available at a higher classification level.

A. Mission Description and Budget Item Justification

The Ballistic Missile Defense Command and Control, Battle Management and Communications (C2BMC) Program provides hardware and develops software to link separate sensors and weapons into an integrated, layered missile defense system that provides greater performance and defensive coverage than is possible with stand-alone elements. This program element investigates concepts and performs systems engineering to address hypersonic threats. The C2BMC enables the Ballistic Missile Defense System (BMDS) to manage complex threats, including near-simultaneous enemy missiles aimed at theater, regional, or homeland assets. Systems linked through C2BMC include Patriot, Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), Aegis Ashore, Ground Based Midcourse Defense (GMD), and Army Integrated Air and Missile Defense Battle Command System (IBCS), and sensors such as the Army Navy/Ground Transportable Radar Surveillance model 2 (AN/TPY-2) Radar, Sea-Based X-Band Radar (SBX), Space-Based Infrared System (SBIRS), and BMDS Overhead Persistent Infra-Red (OPIR) Architecture (BOA). C2BMC provides the warfighter the capability to plan the BMD fight while concurrently tracking all potential ballistic missile threats, and pairing any sensor with any weapon system to defeat ballistic missile threats at any range, in all theaters. The C2BMC program also works to increase coalition partners'

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | Date: November 2017 |
| Appropriation/Budget Activity | R-1 Program Element (Number/Name) | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | PE 0603896C I Ballistic Missile Defense Command and Control, Battle Management & Communication | |
| capabilities. This effort also investigates concepts and explores system engineering issues associated with innovative space applications for a missile defense intercept and defeat system. | | |
| FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+16.650M was required to address Joint Emergent Operational Need requirements to ensure readiness of the BMDS. \$+16.650M Project MD01-C2BMC/C2BMC Development and Deployment to begin OSD Joint Rapid Acquisition Cell (JRAC)-directed efforts to develop and field a limited capability to provide missile warning and tracking of hypersonic weapons. | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination. | | |
| + \$16.300M Project MD01 Command & Control, Battle Management, Communications (C2BMC): This is a base budget requirement. | | |
| • + \$10.000M was required for studies and analysis to improve communications network for Mobile Sensor Integration Program. | | |
| • + \$6.300M was required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication. | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747million is required to address emergency warfighting requirements. | | |
| + \$19.000M Project MD01 Command & Control, Battle Management, Communications (C2BMC): This is a base budget requirement. | | |
| • + \$10.000M is required to complete studies and analysis, and field communications improvements for Mobile Sensor Integration Program. | | |
| • + \$6.000M is required to improve the BMDS ability to identify lethal and non-lethal objects. This Advanced Discrimination is required to continue to defend the homeland, deployed forces and regional allies against evolving threats of increasing sophistication. | | |
| • + \$3.000M is required to fund the C2BMC portion of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area. | | |
| + \$5.747M Project MT01 C2BMC Test: required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense. This is a base budget requirement. | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | |
|---|---------|--|--------------|---------------------|---------------|
| Appropriation/Budget Activity | | R-1 Program Element (Number/Name) | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | | PE 0603896C I Ballistic Missile Defense Command and Control, Battle Management & Communication | | | |
| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | 429.853 | 439.617 | 413.198 | - | 413.198 |
| Current President's Budget | 425.996 | 449.928 | 454.862 | - | 454.862 |
| Total Adjustments | -3.857 | 10.311 | 41.664 | - | 41.664 |
| • Congressional General Reductions | 0.000 | -10.239 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 3.900 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | 2.094 | 0.000 | | | |
| • SBIR/STTR Transfer | -5.951 | 0.000 | | | |
| • FY 2017 Request for Additional Appropriations | - | 16.650 | - | - | - |
| • FY 2018 Missile Defeat and Defense Enhancements | 0.000 | 0.000 | 24.747 | - | 24.747 |
| • Other Adjustments | 0.000 | 0.000 | 16.917 | - | 16.917 |
| Change Summary Explanation | | | | | |
| Increase in FY 2018 from PB 2017 to PB 2018 provides development and deployment of the Post Intercept Assessment (PIA) capability, Discrimination Improvements and Countermeasures Mitigation, Command & Control risk reduction efforts for NORTHCOM C2BMC mission suite, and increased C2BMC Cybersecurity measures. Also includes implementation of reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition. | | | | | |
| FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+16.650M was required to address Joint Emergent Operational Need requirements to ensure readiness of the BMDS. | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$16.300 million was required to address emergency warfighting readiness requirements in support of Mobile Sensor Integration Program and Advanced Discrimination. Additional details are available at a higher classification level. | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$24.747million is required to address emergency warfighting requirements in support of Mobile Sensor Integration Program, Advanced Discrimination, USPACOM Joint Emergent Operational Need Statement (JEON), and Aegis SM-3 Block IIA Missile Test. Additional details are available at a higher classification level. | | | | | |

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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603907C / <i>Sea Based X-Band Radar (SBX)</i> |
|---|---|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 350.627 | 81.265 | 90.287 | 145.695 | - | 145.695 | 114.545 | 126.250 | 97.666 | 97.659 | Continuing | Continuing |
| MX46: <i>Sea Based X-Band Radar Development Support</i> | 336.840 | 78.108 | 87.178 | 141.737 | - | 141.737 | 110.449 | 120.400 | 92.966 | 93.001 | Continuing | Continuing |
| MD40: <i>Program-Wide Support</i> | 13.787 | 3.157 | 3.109 | 3.958 | - | 3.958 | 4.096 | 5.850 | 4.700 | 4.658 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY2018 increase provides increase from 120-days to 330-days at sea for multiple operations, additional sustainment and test support.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000 million was required to address emergency warfighting requirements in support of X86 processor.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000 million is required to address emergency warfighting requirements in support of X86 processor.

A. Mission Description and Budget Item Justification

The SBX is an advanced X-Band radar that provides the capability for mid-course acquisition, tracking, discrimination and hit-assessment of ballistic missiles. 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 Ballistic Missile Defense System (BMDS) Homeland defense mission by tracking and discriminating sophisticated Intercontinental Ballistic Missile (ICBM) threats.

SBX Multiple Operations and Test Support status includes 330-days at sea per year for BMDS flight and ground test participation while remaining recallable to 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 BMDS.

FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+4.500 million was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

\$+3.500M Project MX46-SBX Radar Dev Support/XBR Operations and Support to extend SBX Operations to support NORTHCOM readiness requirements
 \$+1.000M Project MX46-SBX Radar Dev Support/XBR Operations and Support to update X-Band Radar and GMD Fire Control (GFC) interfaces to the x86 architecture to resolve incompatibility and increase radar availability.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000 million is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | | |
| Appropriation/Budget Activity 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | | R-1 Program Element (Number/Name) PE 0603907C I Sea Based X-Band Radar (SBX) | | | | |
| +\$15.000M Project MX46 – Sea Based X-Band Radar Development Support: required to replace the obsolete Superdome processor with a new X86 processor. Upgrades will improve the performance of the SBX in support of testing and real world events. This is a base budget requirement. | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS. | | | | | | |
| +\$15.000M Project MX46 – Sea Based X-Band Radar Development Support: required to replace the obsolete Superdome processor with a new X86 processor. Upgrades will improve the performance of the SBX in support of testing and real world events. This is a base budget requirement. | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | | 71.266 | 68.787 | 73.329 | - | 73.329 |
| Current President's Budget | | 81.265 | 90.287 | 145.695 | - | 145.695 |
| Total Adjustments | | 9.999 | 21.500 | 72.366 | - | 72.366 |
| • Congressional General Reductions | | 0.000 | -3.000 | | | |
| • Congressional Directed Reductions | | 0.000 | 0.000 | | | |
| • Congressional Rescissions | | 0.000 | 0.000 | | | |
| • Congressional Adds | | 0.000 | 20.000 | | | |
| • Congressional Directed Transfers | | 0.000 | 0.000 | | | |
| • Reprogrammings | | 9.999 | 0.000 | | | |
| • SBIR/STTR Transfer | | 0.000 | 0.000 | | | |
| • FY2017 Request for Additional Appropriations | | - | 4.500 | - | - | - |
| • FY 2018 Missile Defeat and Defense Enhancements | | 0.000 | 0.000 | 15.000 | - | 15.000 |
| • Other Adjustment | | 0.000 | 0.000 | 57.366 | - | 57.366 |
| Change Summary Explanation | | | | | | |
| The FY 2016 increase supports vessel maintenance and upgrades (flight deck certification, hull painting and caterpillar diesel engine overhauls). FY 2017 AMENDED BUDGET REQUEST JUSTIFICATION: \$+4.500M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS. The increase in FY2018 from PB17 to PB18 provides additional sustainment and an increase from 120-days to 330-days at sea for multiple operations and test support. | | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$15.000 million was required to address emergency warfighting requirements in support of X86 processor. | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$15.000 million is required to address emergency warfighting requirements in support of X86 processor. | | | | | | |

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Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency **Date:** November 2017

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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603914C / <i>Ballistic Missile Defense Test</i> |
|---|---|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|--|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 1,390.957 | 290.267 | 294.441 | 316.193 | - | 316.193 | 295.042 | 351.626 | 336.137 | 334.678 | Continuing | Continuing |
| MD04: <i>BMDs Test Development Program</i> | - | 0.000 | 0.000 | 0.000 | - | 0.000 | 0.000 | 17.500 | 28.900 | 22.600 | 0 | 69.000 |
| MT04: <i>BMDs Test Program</i> | 1,325.821 | 276.311 | 278.851 | 298.918 | - | 298.918 | 278.141 | 315.226 | 288.333 | 293.327 | Continuing | Continuing |
| MC04: <i>Cyber Operations</i> | 2.181 | 2.072 | 2.479 | 2.528 | - | 2.528 | 2.578 | 2.631 | 2.682 | 2.737 | Continuing | Continuing |
| MD40: <i>Program Wide Support</i> | 62.955 | 11.884 | 13.111 | 14.747 | - | 14.747 | 14.323 | 16.269 | 16.222 | 16.014 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

The increase from FY 2017 to FY 2018 is due to the addition of Integrated Master Test Plan flight test execution and logistics at Wake Island.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$10.402 million is required to address emergency warfighting requirements to fund Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test.

A. Mission Description and Budget Item Justification

MDA utilizes a disciplined system engineering process to develop and integrate the 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 to provide confidence that the BMDs will perform as designed, and support system performance assessment for incremental capability delivery decisions. 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 in support of Technical Capability Declarations, and to anchor BMDs M&S. As models are validated and accredited, MDA and the BMDs 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 on test matters
- 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 time period and beyond (through FY 2024)

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | | |
| Appropriation/Budget Activity | | R-1 Program Element (Number/Name) | | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | | PE 0603914C I Ballistic Missile Defense Test | | | | |
| <div>-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</div> <div>-Act as the single point of contact in MDA for all external ranges and common test resources</div> <div>-Collect, archive, and distribute all MDA test data/information</div> <div>-Certify that test personnel are trained and equipped to conduct safe and effective tests</div> <div>-Provide test personnel and support services to plan and execute tests</div> | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$10.402M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS. | | | | | | |
| +\$9.500M Project MT04 BMDS Test Program: fund the Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON) to deliver an integrated Upper Tier (THAAD and Aegis BMD) and Lower Tier (PAC3 Missile Segment Enhancement – MSE) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement. | | | | | | |
| +\$0.902 Project MT04 BMDS Test Program: required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense. | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | | 281.740 | 293.441 | 337.537 | - | 337.537 |
| Current President's Budget | | 290.267 | 294.441 | 316.193 | - | 316.193 |
| Total Adjustments | | 8.527 | 1.000 | -21.344 | - | -21.344 |
| • Congressional General Reductions | | 0.000 | -2.000 | | | |
| • Congressional Directed Reductions | | 0.000 | 0.000 | | | |
| • Congressional Rescissions | | 0.000 | 0.000 | | | |
| • Congressional Adds | | 0.000 | 3.000 | | | |
| • Congressional Directed Transfers | | 0.000 | 0.000 | | | |
| • Reprogrammings | | 8.527 | 0.000 | | | |
| • SBIR/STTR Transfer | | 0.000 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancements | | 0.000 | 0.000 | 10.402 | - | 10.402 |
| • Other Adjustment | | 0.000 | 0.000 | -31.746 | - | -31.746 |
| Change Summary Explanation | | | | | | |
| The decrease in FY2018 from PB17 to PB18 is due to other higher priority agency initiatives and includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition. | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$10.402 million is required to address emergency warfighting requirements in support of USPACOM Joint Emergent Operational Need Statement (JEON) and Aegis SM-3 Block IIA Missile Test. | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | | | | | R-1 Program Element (Number/Name) PE 0603915C / <i>Ballistic Missile Defense Targets</i> | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
| Total Program Element | 1,744.951 | 517.589 | 528.455 | 460.125 | - | 460.125 | 373.203 | 407.909 | 405.458 | 427.508 | Continuing | Continuing |
| MC05: <i>Cyber Operations</i> | - | 0.065 | 0.000 | 0.251 | - | 0.251 | 0.583 | 1.072 | 1.088 | 1.389 | 0 | 4.448 |
| MT05: <i>BMDS Targets Program</i> | 1,683.767 | 503.325 | 504.716 | 441.657 | - | 441.657 | 354.629 | 388.179 | 385.097 | 405.953 | Continuing | Continuing |
| MD40: <i>Program Wide Support</i> | 61.184 | 14.199 | 23.739 | 18.217 | - | 18.217 | 17.991 | 18.658 | 19.273 | 20.166 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

The decrease in FY2018 reflects re-phasing of funding for events in the BMDS Integrated Master Test Plan and includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700 million is required to address emergency warfighting readiness requirements to fund Phase 1, 2 and 3 efforts in support of USPACOM Joint Emergent Operational Need Statement (JEON), Aegis SM-3 Block IIA Missile Test, and risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

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. The Targets Program has realized past and future savings by centralized competition and management of targets and countermeasures using efficient acquisition strategies and lot buys resulting in economies of scale. 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. MDA's 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.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$9.900M Project MT05 BMDS Targets Program is required to fund target development and build to support Phase 1, 2 and 3 efforts of the USPACOM Joint Emergent Operational Need Statement (JEON), which will deliver an integrated Upper Tier (THAAD and Aegis BMD), and Lower Tier (PAC3 Missile Segment Enhancement - MSE) ballistic missile defense system that expands engagement options and increases coverage area. This is a base budget requirement.

+\$33.700M Project MT05 BMDS Targets Program is required to fund an SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense.

UNCLASSIFIED

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0603915C <i>I Ballistic Missile Defense Targets</i> |
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+\$6.100M Project MT05 BMDs Targets Program is required for risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 527.563 | 563.576 | 471.059 | - | 471.059 |
| Current President's Budget | 517.589 | 528.455 | 460.125 | - | 460.125 |
| Total Adjustments | -9.974 | -35.121 | -10.934 | - | -10.934 |
| • Congressional General Reductions | 0.000 | -41.400 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 9.300 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | -9.974 | 0.000 | | | |
| • SBIR/STTR Transfer | 0.000 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancements | 0.000 | 0.000 | 49.700 | - | 49.700 |
| • Other Adjustment | 0.000 | -3.021 | -60.634 | - | -60.634 |

Change Summary Explanation

The decrease in FY2018 from PB17 to PB18 reflects re-phasing of funding for events in the BMDs Integrated Master Test Plan and includes reduced contract spending for Mission Support Services in accordance with Department Service Requirement Review Board reductions through increased competition.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$49.700 million is required to address emergency warfighting readiness requirements to support USPACOM Joint Emergent Operational Need Statement (JEON), Aegis SM-3 Block IIA Missile Test, and risk reduction for additional 20 GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0604874C <i>I Improved Homeland Defense (HLD) Interceptors</i> |
|---|---|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---------------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 97.739 | 282.864 | 219.346 | 636.430 | - | 636.430 | 496.414 | 532.984 | 635.749 | 627.388 | Continuing | Continuing |
| MD97: <i>Improved HD Interceptors</i> | 97.739 | 270.780 | 205.741 | 619.060 | - | 619.060 | 472.098 | 506.467 | 603.371 | 596.701 | Continuing | Continuing |
| MD40: <i>Program Wide Support</i> | - | 12.084 | 13.605 | 17.370 | - | 17.370 | 24.316 | 26.517 | 32.378 | 30.687 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

Increase from FY 2017 to FY 2018 is due to buildup of Redesigned Kill Vehicle (RKV) components and extensive testing in support of component level and system level Critical Design Reviews (CDR) as well as additional funding to continue the RKV Alternative Seeker development effort.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$8.000 million was required to address emergency warfighting requirements in support accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900 million is required to address emergency warfighting requirements in support of 20 additional GBIs in a new missile field (Missile Field #4) and risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

A. Mission Description and Budget Item Justification

The Ground-based Midcourse Defense (GMD) element of the Ballistic Missile Defense System (BMDS) provides combatant commanders with a continuously available (24 hours a day, 365 days a year) capability to defend the Homeland against limited Intercontinental Ballistic Missile (ICBM) attacks. The improved Homeland Defense interceptor includes a Redesigned Kill Vehicle (RKV), an improved booster (C3), and All Up Round (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 C3 booster improves survivability against lightning and threat environments. AUR engineering enables an initial operational capability of RKV integration with existing C1 and C2 boosters and flight testing. When C3 development completes, AUR engineering enables full operational capability of RKV integration with the C3 booster.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$8.000M was required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$8.000M Project MD97 Improved HD Interceptors: required to accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0604874C <i>I Improved Homeland Defense (HLD) Interceptors</i> |
|---|---|

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+ \$75.000M Project MD97 Improved HD Interceptors: required to accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

+ \$95.900M Project MD97 Improved HD Interceptors: required for risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 278.944 | 274.148 | 321.441 | - | 321.441 |
| Current President's Budget | 282.864 | 219.346 | 636.430 | - | 636.430 |
| Total Adjustments | 3.920 | -54.802 | 314.989 | - | 314.989 |
| • Congressional General Reductions | 0.000 | -51.781 | | | |
| • 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 | 9.999 | 0.000 | | | |
| • SBIR/STTR Transfer | -6.079 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancements | 0.000 | 0.000 | 170.900 | - | 170.900 |
| • Other Adjustment | 0.000 | -3.021 | 144.089 | - | 144.089 |

Change Summary Explanation

The increase in FY2018 from PB17 to PB18 reflects a buildup of RKV components and extensive testing in support of component level and system level Critical Design Reviews (CDR), additional funding to continue the RKV Alternative Seeker development effort and to begin work to ensure no fewer than 44 GBIs are deployed through the FYDP.

FY 2017 MISSILE DEFEAT ENHANCEMENTS REPROGRAMMING (FY17-26 PA): +\$8.000 million was required to address emergency warfighting requirements in support accelerate Redesigned Kill Vehicle (RKV) efforts to support 20 additional GBIs in a new missile field (Missile Field #4) to defeat developing threats in terms of number of threat missiles and complexity of threat payloads. This is a base budget requirement.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$170.900 million is required to address emergency warfighting requirements in support of 20 additional GBIs in a new missile field (Missile Field #4) and risk reduction for 20 additional GBIs, including addition of a non-intercept target for CTV-03 in FY20 and acceleration of software builds and component qualification prior to critical design review.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0604878C / <i>Aegis BMD Test</i> |
|---|---|

| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|-----------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 88.041 | 78.468 | 95.012 | 137.783 | - | 137.783 | 73.059 | 82.570 | 113.856 | 97.660 | Continuing | Continuing |
| MT09: <i>AEGIS BMD Test</i> | 88.041 | 76.043 | 90.953 | 132.091 | - | 132.091 | 69.548 | 78.734 | 108.359 | 92.987 | Continuing | Continuing |
| MD40: <i>Program Wide Support</i> | - | 2.425 | 4.059 | 5.692 | - | 5.692 | 3.511 | 3.836 | 5.497 | 4.673 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY 2018 increase provides additional flight tests consistent with the Integrated Master Test Plan (IMTP) and increased Aegis BMD Hardware-In-The-Loop (HWIL) lab participation to reduce risk during integration for runs for the record.

FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$46.0 million was required to address emergency warfighting requirements in support additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$3.315 million is required to address emergency warfighting requirements in support of Aegis SM-3 Block IIA Missile Test.

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 the 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 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.

Proving Missile Defense:

- Working with the Services' Agency level BMDS 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 Agency'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.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | Date: November 2017 | | |
| 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 | | | | |
| - The IMTP is event-oriented and extends until the collection of all identified data is completed to ensure adequate test investments. | | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$46.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS. +\$46.000M Project MT09 Aegis BMD Test funds are required for additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover. This is a base budget requirement. | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: \$3.315M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS. +\$3.315M Project MT09 Aegis BMD Test: Test funds are required for additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover. This is a base budget requirement. | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
| Previous President's Budget | | 78.468 | 95.012 | 127.720 | - | 127.720 |
| Current President's Budget | | 78.468 | 95.012 | 137.783 | - | 137.783 |
| Total Adjustments | | 0.000 | 0.000 | 10.063 | - | 10.063 |
| • 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 | | | |
| • FY 2018 Missile Defeat and Defense Enhancements | | 0.000 | 0.000 | 3.315 | - | 3.315 |
| • Other Adjustment | | 0.000 | 0.000 | 6.748 | - | 6.748 |
| Change Summary Explanation | | | | | | |
| The increase in FY2018 from PB17 to PB18 is in support of flight test schedule in IMTP. | | | | | | |
| FY 2017 MISSILE DEFEAT ENHANCEMENT REPROGRAMMING (FY17-26 PA): +\$46.000 million was required to address emergency warfighting requirements in support additional SM-3 IIA missile testing. Additional classified details will be provided under a separate cover. | | | | | | |
| FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$3.315 million is required to address emergency warfighting requirements in support of Aegis SM-3 Block IIA Missile Test. | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i> |
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| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|-----------------------------------|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | 60.048 | 83.597 | 88.150 | 101.839 | - | 101.839 | 65.886 | 76.218 | 68.231 | 56.579 | Continuing | Continuing |
| MT11: <i>BMDS Radars Test</i> | 60.048 | 79.839 | 83.330 | 98.437 | - | 98.437 | 62.719 | 72.677 | 64.937 | 53.872 | Continuing | Continuing |
| MD40: <i>Program Wide Support</i> | - | 3.758 | 4.820 | 3.402 | - | 3.402 | 3.167 | 3.541 | 3.294 | 2.707 | Continuing | Continuing |

Program MDAP/MAIS Code: 362

Note

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600 million is required to address emergency warfighting requirements in support of SM-3 Block IIA Missile Test.

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 BMDS capabilities against medium- and long-range threats. The Sensors elements of the Ballistic Missile Defense System (BMDS) 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 and the associated infrastructure.

The Sensors test program (FY 2016-2018) provides data required for the Technical Capability Declaration for EPAA Phase III Robust Intermediate Range Ballistic Missile (IRBM) Defense, Enhanced Homeland Defense, and Mid-term discrimination improvements. It also supports Operational Test and Evaluation of the regional and strategic BMDS architecture that will be fielded at the end of Calendar Year 2018 (CY 2018).

The Sensors test program (FY 2019-2021) will support Long Range Discrimination Radar (LRDR) integration into BMDS, GMD Redesigned Kill Vehicle (RKV) developmental testing, Mid- and Far-term discrimination improvements, and Operational Test and Evaluation of the theater/regional and strategic BMDS architecture that will be fielded at the end of Calendar Year 2021 (CY 2021).

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$17.600M Project MT11 BMDS Radars Test: required to fund a SM-3 IIA flight test, in FY19, to demonstrate a capability against threat target in support of homeland defense.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | Date: November 2017 |
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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 0604879C / <i>Ballistic Missile Defense Sensor Test</i> |
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| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 83.597 | 83.250 | 87.346 | - | 87.346 |
| Current President's Budget | 83.597 | 88.150 | 101.839 | - | 101.839 |
| Total Adjustments | 0.000 | 4.900 | 14.493 | - | 14.493 |
| • Congressional General Reductions | 0.000 | 0.000 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 4.900 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | 0.000 | 0.000 | | | |
| • SBIR/STTR Transfer | 0.000 | 0.000 | | | |
| • FY 2018 Missile Defeat and Defense Enhancements | 0.000 | 0.000 | 17.600 | - | 17.600 |
| • Other Adjustment | 0.000 | 0.000 | -3.107 | - | -3.107 |

Change Summary Explanation

The decrease in FY2018 from PB17 to PB18 reflects a schedule change to align with the Integrated Master Test Plan (IMTP).

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$17.600 million is required to address emergency warfighting requirements in support of SM-3 Block IIA Missile Test.

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| Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency | | | | | | | | | | Date: November 2017 | | |
|--|-------------|---------|---------|--------------|---|---------------|---------|---------|---------|---------------------|------------------|------------|
| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | | | |
| 0400: Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P) | | | | | PE 1206895C I Ballistic Missile Defense System Space Programs | | | | | | | |
| COST (\$ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
| Total Program Element | - | 0.000 | 0.000 | 30.994 | - | 30.994 | 13.348 | 14.395 | 17.278 | 17.726 | Continuing | Continuing |
| MD33: MD Space Exp Center (MDSEC) | - | 0.000 | 0.000 | 30.233 | - | 30.233 | 12.706 | 13.726 | 16.444 | 16.878 | Continuing | Continuing |
| MD40: Program-Wide Support | - | 0.000 | 0.000 | 0.761 | - | 0.761 | 0.642 | 0.669 | 0.834 | 0.848 | 0 | 3.754 |
| Program MDAP/MAIS Code: 362 | | | | | | | | | | | | |

Note

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security. FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000 million is required to address warfighting requirements in support of continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system.

A. Mission Description and Budget Item Justification

This program element primarily funds the Spacebased Kill Assessment (SKA) project, a Missile Defense Agency (MDA) experiment to demonstrate kill assessment from space. MDA experience with intercept testing on the Aegis BMD program provided solid understanding of the physics of kill assessment.

Several events set the stage for the kill assessment experiment that later became known as SKA:

- Section 237 in the FY 2014 National Defense Authorization Act directed MDA to improve kill assessment for the GMD program with an initial kill assessment capability by December 31, 2019
- An MDA study called the Space Layer Option Study found that disaggregated systems could provide sensor capabilities at lower costs
- A once in a decade opportunity became available when the commercial sector offered hosted payload services at costs far below what MDA could expect if it used traditional DOD space acquisition models

One feature of the SKA acquisition plays a crucial role in the execution of the experiment: schedule discipline. Since MDA cannot impact the schedule of the commercial host, maintaining schedule pace is priority #1 on the program. If SKA payloads are delivered late to the commercial host, they miss their opportunity to be launched into space.

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 SKA experiment will utilize a network of small IR sensors integrated onto commercial host satellites which, while on orbit, will observe missile defense intercepts and

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Exhibit R-2, RDT&E Budget Item Justification: PB Amended 2018 Missile Defense Agency **Date:** November 2017

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| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide I BA 4: Advanced Component Development & Prototypes (ACD&P)</i> | R-1 Program Element (Number/Name) PE 1206895C / <i>Ballistic Missile Defense System Space Programs</i> |
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deliver a kill assessment declaration to the BMDS. SKA has the opportunity to change the economics of the defense of the American homeland from enemy ballistic missiles.

This program element also funds engineering trade studies and concept evaluations for current and future space based sensors.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

+\$14.000M Project MD33 - MD Space Exp Center (MDSEC): required to continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system. This is a base budget requirement.

| B. Program Change Summary (\$ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 0.000 | 0.000 | 30.994 | - | 30.994 |
| Total Adjustments | 0.000 | 0.000 | 30.994 | - | 30.994 |
| • 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 | | | |
| • FY 2018 Missile Defeat and Defense Enhancement | 0.000 | 0.000 | 14.000 | - | 14.000 |
| • Other Adjustment | 0.000 | 0.000 | 16.994 | - | 16.994 |

Change Summary Explanation

In accordance with the 2016 National Defense Authorization Act, Section 1601-Major Force Program and Budget for National Security Space Programs, funding for FY2018 and beyond for PE 0603895C is transferred to PE 1206895C. This move aligns funding to the newly established unified major force program for national security space programs to prioritize national security space activities in accordance with the requirements of the Department of Defense and national security.

FY 2018 MISSILE DEFEAT AND DEFENSE ENHANCEMENTS (MDDE) BUDGET AMENDMENT: +\$14.000 million is required to address warfighting requirements in support of continued trade studies, system engineering, modeling and simulations, and a prototype design for a potential missile tracking sensor/system.