

UNCLASSIFIED

**Department of Defense
Fiscal Year (FY) 2020 Budget Estimates**

March 2019



Space Development Agency

Defense-Wide Justification Book Volume 5 of 5

Research, Development, Test & Evaluation, Defense-Wide

UNCLASSIFIED

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

UNCLASSIFIED

Space Development Agency • Budget Estimates FY 2020 • 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 Audit Agency..... | Volume 5 |
| 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 |
| Space Development Agency..... | Volume 5 |
| The Joint Staff..... | Volume 5 |
| United States Special Operations Command..... | Volume 5 |

UNCLASSIFIED

UNCLASSIFIED

Space Development Agency • Budget Estimates FY 2020 • RDT&E Program

Washington Headquarters Service..... Volume 5

Operational Test and Evaluation, Defense..... Volume 5

UNCLASSIFIED

Space Development Agency • Budget Estimates FY 2020 • RDT&E Program

Volume 5 Table of Contents

Comptroller Exhibit R-1..... Volume 5 - v

Program Element Table of Contents (by Budget Activity then Line Item Number).....Volume 5 - xvii

Program Element Table of Contents (Alphabetically by Program Element Title).....Volume 5 - xix

Exhibit R-2s..... Volume 5 - 1

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

UNCLASSIFIED

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

| Appropriation | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|--|-------------------------|-------------------------|------------------------|--------------------------|
| ----- | ----- | ----- | ----- | ----- |
| Research, Development, Test & Eval, DW | | | | |
| Total Research, Development, Test & Evaluation | | | | |

UNCLASSIFIED

Department of Defense
 FY 2020 President's Budget
 Exhibit R-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 Mar 2019

| Appropriation | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|--|-----------------|---|---|-------------------------|----------------------------------|
| Research, Development, Test & Eval, DW | 105,000 | | | | 105,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |

UNCLASSIFIED

Department of Defense
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

| | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|--|-------------------------|-------------------------|------------------------|--------------------------|
| Summary Recap of Budget Activities | | | | |
| ----- | | | | |
| Advanced Technology Development | | | | |
| Advanced Component Development And Prototypes | | | | |
| Total Research, Development, Test & Evaluation | | | | |
| Summary Recap of FYDP Programs | | | | |
| ----- | | | | |
| Space | | | | |
| Total Research, Development, Test & Evaluation | | | | |

UNCLASSIFIED

Department of Defense
 FY 2020 President's Budget
 Exhibit R-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 Mar 2019

| | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|--|-----------------|---|---|-------------------------|----------------------------------|
| Summary Recap of Budget Activities | | | | | |
| Advanced Technology Development | 20,000 | | | | 20,000 |
| Advanced Component Development And Prototypes | 85,000 | | | | 85,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |
| Summary Recap of FYDP Programs | | | | | |
| Space | 105,000 | | | | 105,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |

UNCLASSIFIED

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

| | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|--|-------------------------|-------------------------|------------------------|--------------------------|
| Summary Recap of Budget Activities | | | | |
| Advanced Technology Development | | | | |
| Advanced Component Development And Prototypes | | | | |
| Total Research, Development, Test & Evaluation | | | | |
| Summary Recap of FYDP Programs | | | | |
| Space | | | | |
| Total Research, Development, Test & Evaluation | | | | |

UNCLASSIFIED

UNCLASSIFIED

Defense-Wide
 FY 2020 President's Budget
 Exhibit R-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 Mar 2019

| | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|--|-----------------|---|---|-------------------------|----------------------------------|
| Summary Recap of Budget Activities | | | | | |
| Advanced Technology Development | 20,000 | | | | 20,000 |
| Advanced Component Development And Prototypes | 85,000 | | | | 85,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |
| Summary Recap of FYDP Programs | | | | | |
| Space | 105,000 | | | | 105,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |

UNCLASSIFIED

UNCLASSIFIED

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

| Appropriation | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted |
|--|-------------------------|-------------------------|------------------------|--------------------------|
| ----- | ----- | ----- | ----- | ----- |
| Space Development Agency | | | | |
| Total Research, Development, Test & Evaluation | | | | |

UNCLASSIFIED

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

| Appropriation ----- | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) |
|--|-----------------|---|---|-------------------------|----------------------------------|
| ----- | ----- | ----- | ----- | ----- | ----- |
| Space Development Agency | 105,000 | | | | 105,000 |
| Total Research, Development, Test & Evaluation | 105,000 | | | | 105,000 |

UNCLASSIFIED

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

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

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | S e c |
|--|------------------------|---|-----|-------------------------|-------------------------|------------------------|--------------------------|-------------|
| 69 | 1206310 | SDA Space Science and Technology Research and Development | 03 | | | | | U |
| | | Advanced Technology Development | | | | | | |
| 120 | 1206410 | SDA Space Technology Development and Prototyping | 04 | | | | | U |
| | | Advanced Component Development And Prototypes | | | | | | |
| Total Research, Development, Test & Eval, DW | | | | | | | | |

UNCLASSIFIED

UNCLASSIFIED

Defense-Wide
FY 2020 President's Budget
Exhibit R-1 FY 2020 President's Budget
Total Obligational Authority
(Dollars in Thousands)

05 Mar 2019

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

| Line No | Program Element Number | Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Se e c |
|--|------------------------|---|-----|--------------|-----------------------------------|---|-------------------|----------------------------|--------|
| 69 | 1206310 | SDA Space Science and Technology Research and Development | 03 | 20,000 | | | | 20,000 | U |
| | | Advanced Technology Development | | 20,000 | | | | 20,000 | |
| 120 | 1206410 | SDA Space Technology Development and Prototyping | 04 | 85,000 | | | | 85,000 | U |
| | | Advanced Component Development And Prototypes | | 85,000 | | | | 85,000 | |
| Total Research, Development, Test & Eval, DW | | | | 105,000 | | | | 105,000 | |

R-120PB: FY 2020 President's Budget (Published Version), as of March 5, 2019 at 08:24:53

UNCLASSIFIED

Page D-3A

Volume 5 - xiv

UNCLASSIFIED

Space Development Agency
 FY 2020 President's Budget
 Exhibit R-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 Mar 2019

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

| Line No | Program Element Number | Item | Act | FY 2018 (Base + OCO) | FY 2019 Base Enacted | FY 2019 OCO Enacted | FY 2019 Total Enacted | S e c |
|--------------------------------|------------------------|---|-----|-------------------------|-------------------------|------------------------|--------------------------|-------------|
| 69 | 1206310 | SDA Space Science and Technology Research and Development | 03 | | | | | U |
| | | Advanced Technology Development | | | | | | |
| 120 | 1206410 | SDA Space Technology Development and Prototyping | 04 | | | | | U |
| | | Advanced Component Development And Prototypes | | | | | | |
| Total Space Development Agency | | | | | | | | |

UNCLASSIFIED

Space Development Agency
 FY 2020 President's Budget
 Exhibit R-1 FY 2020 President's Budget
 Total Obligational Authority
 (Dollars in Thousands)

05 Mar 2019

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

| Line No | Element Number | Program Item | Act | FY 2020 Base | FY 2020 OCO for Base Requirements | FY 2020 OCO for Direct War and Enduring Costs | FY 2020 Total OCO | FY 2020 Total (Base + OCO) | Se |
|--------------------------------|----------------|---|-----|--------------|-----------------------------------|---|-------------------|----------------------------|----|
| 69 | 1206310 | SDA Space Science and Technology Research and Development | 03 | 20,000 | | | | 20,000 | U |
| | | Advanced Technology Development | | 20,000 | | | | 20,000 | |
| 120 | 1206410 | SDA Space Technology Development and Prototyping | 04 | 85,000 | | | | 85,000 | U |
| | | Advanced Component Development And Prototypes | | 85,000 | | | | 85,000 | |
| Total Space Development Agency | | | | 105,000 | | | | 105,000 | |

UNCLASSIFIED

Space Development Agency • Budget Estimates FY 2020 • 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 |
|---------------|------------------------|-------------------------------|--|--------------|
| 69 | 03 | 1206310SDA | Space Science and Technology Research and Development..... | Volume 5 - 1 |

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

| Line # | Budget Activity | Program Element Number | Program Element Title | Page |
|---------------|------------------------|-------------------------------|---|--------------|
| 120 | 04 | 1206410SDA | Space Technology Development and Prototyping..... | Volume 5 - 5 |

UNCLASSIFIED

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

UNCLASSIFIED

Space Development Agency • Budget Estimates FY 2020 • RDT&E Program

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

| Program Element Title | Program Element Number | Line # | BA | Page |
|---|-------------------------------|---------------|-----------|--------------|
| Space Science and Technology Research and Development | 1206310SDA | 69 | 03..... | Volume 5 - 1 |
| Space Technology Development and Prototyping | 1206410SDA | 120 | 04..... | Volume 5 - 5 |

UNCLASSIFIED

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED

UNCLASSIFIED

| | |
|---|-------------------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Space Development Agency | Date: March 2019 |
|---|-------------------------|

| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i> | | | | | PE 1206310SDA / <i>Space Science and Technology Research and Development</i> | | | | | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| Total Program Element | - | 0.000 | 0.000 | 20.000 | - | 20.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| 032: <i>Proliferated Low Earth Orbit (pLEO) Sensor Technology</i> | 0.000 | 0.000 | 0.000 | 20.000 | - | 20.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

Note

This is a new program element in FY 2020.

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is established to develop the next generation space architecture to enable U.S. military operations to be responsive to emerging multi-domain threats against our national security. To achieve that goal, the SDA will help inform the Department's decision to develop and implement a proliferated architecture enabled by lower cost, commercially-derived spacecraft and routine space access, shift the Department to a development organization focused on experimentation, prototyping, and accelerated fielding, and change the Department to a concentrated, decoupled structure to generate speed. The SDA will manage, direct, and execute the development of the space capabilities in accordance with DoD's Space Vision and field space capabilities at speed and scale, with the following goals:

- bold breakthroughs designed to obsolesce our competitors,
- technology maturation and systems engineering,
- lean engineering, manufacturing, and support,
- industrial base expansion; streamlined development and acquisition process, and
- increased acquisition cooperation with the National Reconnaissance Office (NRO).

The SDA will rapidly deploy critical elements of the next-generation space capabilities, initially focusing on these essential capabilities:

- Persistent global surveillance for advanced missile targeting,
- Indications, warnings, targeting, and tracking for defense against advanced missile threats,
- Alternate position, navigation, and timing (PNT) for a GPS-denied environment,
- Global and near-real time space situational awareness,
- Development of a deterrent capability,
- Responsive, resilient, common ground-based space support infrastructure (e.g., ground stations and launch capability),
- Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), including nuclear command, control, and communications (NC3), and,
- Highly-scaled, low-latency, persistent, artificial intelligence-enable global surveillance.

The establishment of a communications and data transport layer in Low Earth Orbit (LEO) is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus. The SDA will heavily leverage DARPA's Blackjack program (PE 0603287E) and its plan to demonstrate a 20-satellite constellation to

UNCLASSIFIED

| | |
|---|-------------------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Space Development Agency | Date: March 2019 |
|---|-------------------------|

| | |
|---|--|
| Appropriation/Budget Activity 0400: <i>Research, Development, Test & Evaluation, Defense-Wide / BA 3: Advanced Technology Development (ATD)</i> | R-1 Program Element (Number/Name) PE 1206310SDA / <i>Space Science and Technology Research and Development</i> |
|---|--|

build this transport layer. The SDA will develop an initial wedge of sub-constellations on this transport layer to provide additional capabilities, such as advanced missile warning.

This program element funds efforts to develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations in support of the DoD Space Vision.

| <u>B. Program Change Summary (\$ in Millions)</u> | <u>FY 2018</u> | <u>FY 2019</u> | <u>FY 2020 Base</u> | <u>FY 2020 OCO</u> | <u>FY 2020 Total</u> |
|--|-----------------------|-----------------------|----------------------------|---------------------------|-----------------------------|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | 0.000 | 0.000 | 20.000 | - | 20.000 |
| Total Adjustments | 0.000 | 0.000 | 20.000 | - | 20.000 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | - | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | - | - | | | |
| • FY 2020 Program Start | - | - | 20.000 | - | 20.000 |

Change Summary Explanation

This is a new start in FY 2020.

UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|--|----------------|----------------|----------------|--|-------|---|--------|---|-------|---|--------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | | | | | | | | | | | | | |
| Appropriation/Budget Activity 0400 / 3 | | | | | R-1 Program Element (Number/Name) PE 1206310SDA / <i>Space Science and Technology Research and Development</i> | | | | Project (Number/Name) 032 / <i>Proliferated Low Earth Orbit (pLEO) Sensor Technology</i> | | | | | | | | | | | | | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost | | | | | | | | | | | | |
| 032: <i>Proliferated Low Earth Orbit (pLEO) Sensor Technology</i> | 0.000 | 0.000 | 0.000 | 20.000 | - | 20.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing | | | | | | | | | | | | |
| <p>Note This is a new start in FY 2020.</p> <p>A. Mission Description and Budget Item Justification The Space Science and Technology Research and Development will develop and demonstrate the next generation sensor technologies to support future prototyping efforts to deliver the eight capabilities outlined in the DoD Space Vision. This effort will develop and demonstrate lower size, weight, power, and cost (SWAP-C) sensors for national security space missions.</p> <p>B. Accomplishments/Planned Programs (\$ in Millions)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:75%;"></td> <td style="width:12.5%;">FY 2018</td> <td style="width:12.5%;">FY 2019</td> <td style="width:12.5%;">FY 2020</td> </tr> <tr> <td> Title: Proliferated Low Earth Orbit (pLEO) Sensor Technology Description: This effort will demonstrate LEO sensor technologies on an initial wedge of sub-constellations on the data transport layer architecture to enable other national security space missions such as global surveillance for advanced missile targeting; indications, warnings, targeting, and tracking for defense against advanced missile threats; alternate position, navigation, and timing (PNT) services for Global Positioning System (GPS) denied environments; deterrent capabilities; and other national security space missions. FY 2020 Plans: - Conduct trade studies and feasibility assessments of different sensor modalities to perform national security space missions. - Conduct Preliminary Design Review (PDR) of selected sensor payload(s). FY 2019 to FY 2020 Increase/Decrease Statement: The increase is due to establishment of this line in FY 2020. </td> <td align="right">0.000</td> <td align="center">-</td> <td align="right">20.000</td> </tr> <tr> <td align="right">Accomplishments/Planned Programs Subtotals</td> <td align="right">0.000</td> <td align="center">-</td> <td align="right">20.000</td> </tr> </table> <p>C. Other Program Funding Summary (\$ in Millions) N/A</p> <p>Remarks</p> | | | | | | | | | | | | | | FY 2018 | FY 2019 | FY 2020 | Title: Proliferated Low Earth Orbit (pLEO) Sensor Technology Description: This effort will demonstrate LEO sensor technologies on an initial wedge of sub-constellations on the data transport layer architecture to enable other national security space missions such as global surveillance for advanced missile targeting; indications, warnings, targeting, and tracking for defense against advanced missile threats; alternate position, navigation, and timing (PNT) services for Global Positioning System (GPS) denied environments; deterrent capabilities; and other national security space missions. FY 2020 Plans: - Conduct trade studies and feasibility assessments of different sensor modalities to perform national security space missions. - Conduct Preliminary Design Review (PDR) of selected sensor payload(s). FY 2019 to FY 2020 Increase/Decrease Statement: The increase is due to establishment of this line in FY 2020. | 0.000 | - | 20.000 | Accomplishments/Planned Programs Subtotals | 0.000 | - | 20.000 |
| | FY 2018 | FY 2019 | FY 2020 | | | | | | | | | | | | | | | | | | | | | |
| Title: Proliferated Low Earth Orbit (pLEO) Sensor Technology Description: This effort will demonstrate LEO sensor technologies on an initial wedge of sub-constellations on the data transport layer architecture to enable other national security space missions such as global surveillance for advanced missile targeting; indications, warnings, targeting, and tracking for defense against advanced missile threats; alternate position, navigation, and timing (PNT) services for Global Positioning System (GPS) denied environments; deterrent capabilities; and other national security space missions. FY 2020 Plans: - Conduct trade studies and feasibility assessments of different sensor modalities to perform national security space missions. - Conduct Preliminary Design Review (PDR) of selected sensor payload(s). FY 2019 to FY 2020 Increase/Decrease Statement: The increase is due to establishment of this line in FY 2020. | 0.000 | - | 20.000 | | | | | | | | | | | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | 0.000 | - | 20.000 | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|---|--|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 3 | R-1 Program Element (Number/Name) PE 1206310SDA / <i>Space Science and Technology Research and Development</i> | Project (Number/Name) 032 / <i>Proliferated Low Earth Orbit (pLEO) Sensor Technology</i> |
| D. Acquisition Strategy Partners for these activities may include in-house research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers. | | |
| E. Performance Metrics Performance metrics will be specific to each of the efforts. Each effort will include measures identified in the management approach and Statement of Work (SOW). The activities will be monitored against schedules and deliverables as stated in the initiative's management approach. | | |

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Space Development Agency **Date:** March 2019

| | |
|---|--|
| 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 1206410SDA / Space Technology Development and Prototyping |
|---|--|

| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
|---|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element | - | 0.000 | 0.000 | 85.000 | - | 85.000 | 80.000 | 105.000 | 115.000 | 140.000 | Continuing | Continuing |
| 033: Transport Layer Architecture and Standards | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 15.000 | 15.000 | 15.000 | 15.000 | Continuing | Continuing |
| 034: Space Situational Awareness and Launch | - | 0.000 | 0.000 | 10.000 | - | 10.000 | 25.000 | 50.000 | 50.000 | 50.000 | Continuing | Continuing |
| 039: Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration | - | 0.000 | 0.000 | 30.000 | - | 30.000 | 40.000 | 40.000 | 50.000 | 75.000 | Continuing | Continuing |
| 191: Space-Based Interceptors | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| 193: Space-Based Discrimination | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |

Note

This is a new program element in FY 2020.

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is established to develop the next generation space architecture to enable U.S. military operations to be responsive to emerging multi-domain threats against our national security. To achieve that goal, the SDA will help inform the Department's decision to develop and implement a proliferated architecture enabled by lower-cost, commercially-derived spacecraft and routine space access, shift the Department to a development organization focused on experimentation, prototyping, and accelerated fielding, and change the Department to a concentrated, decoupled structure to generate speed. The SDA will manage, direct, and execute the development of the space capabilities in accordance with DoD's Space Vision and field space capabilities at speed and scale, with the following goals:

- bold breakthroughs designed to obsolesce our competitors,
- technology maturation and systems engineering,
- lean engineering, manufacturing, and support,
- industrial base expansion; streamlined development and acquisition process, and
- increased acquisition cooperation with the National Reconnaissance Office (NRO).

The SDA will rapidly deploy critical elements of the next-generation space capabilities, initially focusing on these essential capabilities:

- Persistent global surveillance for advanced missile targeting,
- Indications, warnings, targeting, and tracking for defense against advanced missile threats,
- Alternate position, navigation, and timing (PNT) for a GPS-denied environment,

UNCLASSIFIED

| | | | | | | |
|---|--|---|---------|------------------|-------------|---------------|
| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Space Development Agency | | | | Date: March 2019 | | |
| 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 1206410SDA I Space Technology Development and Prototyping | | | | |
| <ul style="list-style-type: none">• Global and near-real time space situational awareness,• Development of a deterrent capability• Responsive, resilient, common ground-based space support infrastructure (e.g., ground stations and launch capability),• Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), including nuclear command, control, and communications (NC3), and• Highly-scaled, low-latency, persistent, artificial intelligence-enable global surveillance. <p>The establishment of a communications and data transport layer in Low Earth Orbit (LEO) is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus. The SDA will heavily leverage DARPA's Blackjack program (PE 0603287E) and its plan to demonstrate a 20-satellite constellation to build this transport layer. The SDA will develop an initial wedge of sub-constellations on this transport layer to provide additional capabilities, such as advanced missile warning.</p> <p>This program element funds efforts to develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations in support of the DoD Space Vision.</p> | | | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Previous President's Budget | | 0.000 | 0.000 | 0.000 | - | 0.000 |
| Current President's Budget | | 0.000 | 0.000 | 85.000 | - | 85.000 |
| Total Adjustments | | 0.000 | 0.000 | 85.000 | - | 85.000 |
| • Congressional General Reductions | | - | - | | | |
| • Congressional Directed Reductions | | - | - | | | |
| • Congressional Rescissions | | - | - | | | |
| • Congressional Adds | | - | - | | | |
| • Congressional Directed Transfers | | - | - | | | |
| • Reprogrammings | | - | - | | | |
| • SBIR/STTR Transfer | | - | - | | | |
| • FY 2020 Program Start | | - | - | 85.000 | - | 85.000 |
| Change Summary Explanation | | | | | | |
| This is a new start in FY 2020. | | | | | | |

UNCLASSIFIED

| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | |
|---|-------------|---------|---------|--------------|---|---------------|---------|---------|---|------------------|------------------|------------|
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | Project (Number/Name) 033 / Transport Layer Architecture and Standards | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 033: Transport Layer Architecture and Standards | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 15.000 | 15.000 | 15.000 | 15.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note

This is a new start in FY 2020.

A. Mission Description and Budget Item Justification

The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. The SDA will rapidly develop and field the next generation space architecture that will enable the US to deploy space capabilities that out-pace adversarial threats. This architecture is underpinned by a communications and data transport layer, which will reside on a proliferated small satellite constellation in Low Earth Orbit (LEO). The Transport Layer will support the transfer of data between the space segment of the next generation space architecture, to potentially include payloads co-hosted with the Transport Layer or other non-collocated space elements, and the ground, to include ground support infrastructure and very large numbers of users/subscribers. The Transport Layer will provide the "connective tissue" for the next generation space architecture.

B. Accomplishments/Planned Programs (\$ in Millions)

| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Title: Transport Layer Architecture and Standards | 0.000 | 0.000 | 15.000 | 0.000 | 15.000 |
| Description: Develop and demonstrate a prototype a resilient and unified military communications and data transport layer, enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will demonstrate capability to provide very low latency (low or high bandwidth) communications and data between any two points on the globe to enable mission-agnostic battle management, command, control, and communications (BMC3). This effort will leverage technologies developed under the DARPA Blackjack program and, wherever feasible, leverage commercial industry plans to provide broadband internet access from space to form the foundation of the transport layer architecture. | | | | | |
| FY 2019 Plans: N/A | | | | | |
| FY 2020 Base Plans: - Conduct Preliminary Design Review (PDR) for user terminal system. | | | | | |

UNCLASSIFIED

| | | | | | |
|--|--|---|--|---|--|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | Date: March 2019 | |
| Appropriation/Budget Activity 0400 / 4 | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | Project (Number/Name) 033 / <i>Transport Layer Architecture and Standards</i> | |

| | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| <u>B. Accomplishments/Planned Programs (\$ in Millions)</u> | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| - Develop interface and messaging standards for data transport layer architecture. | | | | | |
| <i>FY 2020 OCO Plans:</i> N/A | | | | | |
| <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> This program is a new start in FY 2020. | | | | | |
| Accomplishments/Planned Programs Subtotals | 0.000 | 0.000 | 15.000 | 0.000 | 15.000 |

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks
N/A

D. Acquisition Strategy
Partners for these activities may include in-house research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

E. Performance Metrics
Performance metrics will be specific to each of the efforts. Each effort will include measures identified in the management approach and Statement of Work (SOW). The activities will be monitored against schedules and deliverables as stated in the initiative's management approach.

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|------------------------|--------------------------------|-------------|---------|------------|---|------------|--------------|------------|-------------|------------|---|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Space Development Agency | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | | | Project (Number/Name) 033 / Transport Layer Architecture and Standards | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | C/TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 12.000 | | 0.000 | | 12.000 | Continuing | Continuing | Continuing |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 12.000 | | 0.000 | | 12.000 | Continuing | Continuing | N/A |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | Various | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 3.000 | | 0.000 | | 3.000 | Continuing | Continuing | - |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 3.000 | | 0.000 | | 3.000 | Continuing | Continuing | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | 0.000 | 0.000 | | 0.000 | | 15.000 | | 0.000 | | 15.000 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity | | | | | R-1 Program Element (Number/Name) | | | | | Project (Number/Name) | | | |
| 0400 / 4 | | | | | PE 1206410SDA / Space Technology Development and Prototyping | | | | | 033 / Transport Layer Architecture and Standards | | | |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Transport Layer Architecture and Standards | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conduct Preliminary Design Review (PDR) for user terminal system. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Develop interface and messaging standards for data transport layer architecture. | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|---|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 033 / <i>Transport Layer Architecture and Standards</i> | |

Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>Transport Layer Architecture and Standards</i> | | | | |
| Conduct Preliminary Design Review (PDR) for user terminal system. | 1 | 2020 | 4 | 2021 |
| Develop interface and messaging standards for data transport layer architecture. | 1 | 2020 | 4 | 2021 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|---|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | Project (Number/Name) 034 / Space Situational Awareness and Launch | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 034: Space Situational Awareness and Launch | - | 0.000 | 0.000 | 10.000 | - | 10.000 | 25.000 | 50.000 | 50.000 | 50.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| Note This is a new start in FY 2020. | | | | | | | | | | | | |
| A. Mission Description and Budget Item Justification The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. The Space Situational Awareness (SSA) and Launch project will further support this vision of enhanced resilience. Global and near real-time SSA will provide a detailed understanding of the space order of battle and a responsive launch capability to enable rapid constitution or replenishment of space capabilities. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: Space Situational Awareness and Launch | | | | | | | | 0.000 | 0.000 | 10.000 | 0.000 | 10.000 |
| Description: Working with commercial providers, develop and demonstrate enhanced space situational awareness (SSA) and small-to-medium launch service access to provide SSA on large numbers of small satellites in LEO, including tracking, orbit determination, orbital state and uncertainty propagation, conjunction prediction, and collision avoidance. This effort will leverage existing Government and commercial tools and approaches to extend capabilities for a pLEO environment. In addition, this effort will identify and contract for launch of small-to-medium size payloads, to demonstrate responsive constitution and replenishment. | | | | | | | | | | | | |
| FY 2019 Plans: N/A | | | | | | | | | | | | |
| FY 2020 Base Plans: - Conduct trade studies of existing space traffic management capabilities and approaches for pLEO applications. - Conduct trade studies of small-to-medium payload launch service providers and ability to responsively support pLEO constitution and replenishment. | | | | | | | | | | | | |
| FY 2020 OCO Plans: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|---|--|---|----------------|---|--------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | Date: March 2019 | |
| Appropriation/Budget Activity 0400 / 4 | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | Project (Number/Name) 034 / <i>Space Situational Awareness and Launch</i> | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO |
| N/A | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: This program is a new start in FY 2020. | | | | | |
| Accomplishments/Planned Programs Subtotals | | 0.000 | 0.000 | 10.000 | 0.000 |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | | |
| Remarks N/A | | | | | |
| D. Acquisition Strategy Partners for these activities may include in-house research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers. | | | | | |
| E. Performance Metrics Performance metrics will be specific to each of the efforts. Each effort will include measures identified in the management approach and Statement of Work (SOW). The activities will be monitored against schedules and deliverables as stated in the initiative's management approach. | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | |
|--|------------------------|--------------------------------|-------------|---------|------------|---|------------|--------------|------------|---|------------|------------------|------------------|------------|--------------------------|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Space Development Agency | | | | | | | | | | | | Date: March 2019 | | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | Project (Number/Name) 034 / Space Situational Awareness and Launch | | | | | |
| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | C/TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 8.000 | | 0.000 | | 8.000 | Continuing | Continuing | Continuing |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 8.000 | | 0.000 | | 8.000 | Continuing | Continuing | N/A |
| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | Various | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 2.000 | | 0.000 | | 2.000 | Continuing | Continuing | - |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 2.000 | | 0.000 | | 2.000 | Continuing | Continuing | N/A |
| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
| Project Cost Totals | | | 0.000 | 0.000 | | 0.000 | | 10.000 | | 0.000 | | 10.000 | Continuing | Continuing | N/A |
| Remarks | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|---|--|--|--|--|--|--|--|---|--|------------------|--|--|--|--|--|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Space Development Agency | | | | | | | | | | | | | | | | | | | | Date: March 2019 | | | | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | | | | | Project (Number/Name) 034 / Space Situational Awareness and Launch | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|---|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 034 / <i>Space Situational Awareness and Launch</i> | |

Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>Space Situational Awareness and Launch</i> | | | | |
| Conduct trade studies of existing space traffic management capabilities and approaches | 1 | 2020 | 4 | 2021 |
| Conduct trade studies of small-to-medium size payload | 1 | 2020 | 4 | 2021 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|---|-------------|---------|---------|--------------|---|---------------|---------|---------|---|------------------|------------------|---------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | | | | Project (Number/Name) 039 / Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 039: Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration | - | 0.000 | 0.000 | 30.000 | - | 30.000 | 40.000 | 40.000 | 50.000 | 75.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| Note This is a new start in FY 2020. | | | | | | | | | | | | |
| A. Mission Description and Budget Item Justification The pLEO Missile Warning (MW) Ground Integration project will enable a persistent global surveillance capability, enabled by a pLEO data communications transport layer, that will provide indications, warnings, targeting, and tracking to support the defeat of advanced missile threats. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Title: pLEO Missile Warning Ground Integration | | | | | | | | 0.000 | 0.000 | 30.000 | 0.000 | 30.000 |
| Description: Develop and demonstrate a prototype MW ground infrastructure compatible with a proliferated Low Earth Orbit (pLEO) sensor infrastructure. This effort will focus on integrating MW technologies and on-orbit residual capability in the form of sensors, command and control software, and data products demonstrated by DARPA's Blackjack program, and any follow-on MW prototyping efforts, into a MW ground support infrastructure. To the maximum extent possible, this effort will leverage commercial approaches for pLEO constellation management while maximizing support for the legacy MW ground segment. The development will be a phased approach to transition current command and control to a new, consolidated Battle Management, Command, Control, and Communications (BMC3) infrastructure consistent with the DoD Space Vision. | | | | | | | | | | | | |
| FY 2019 Plans: N/A | | | | | | | | | | | | |
| FY 2020 Base Plans: - Examine current MW ground segment and conduct trade studies of alternative approaches - Conduct Preliminary Design Review of MW ground infrastructure | | | | | | | | | | | | |
| FY 2020 OCO Plans: | | | | | | | | | | | | |

UNCLASSIFIED

| | | | | | |
|---|---|---|-------------------------|-------------------------|--------------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | Date: March 2019 | |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 039 / <i>Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration</i> | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | |
| | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| N/A | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: This program is a new start in FY 2020. | | | | | |
| Accomplishments/Planned Programs Subtotals | 0.000 | 0.000 | 30.000 | 0.000 | 30.000 |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | | |
| Remarks N/A | | | | | |
| D. Acquisition Strategy Partners for these activities may include in-house research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers. | | | | | |
| E. Performance Metrics Performance metrics will be specific to each of the efforts. Each effort will include measures identified in the management approach and Statement of Work (SOW). The activities will be monitored against schedules and deliverables as stated in the initiative's management approach. | | | | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | |
|---|--|--|--|---|--|--|--|---|--|--|--|-------------------------|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Space Development Agency | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | | | Project (Number/Name) 039 / <i>Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration</i> | | | | | | |

| Product Development (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|--------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | C/TBD | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 24.000 | | 0.000 | | 24.000 | Continuing | Continuing | Continuing |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 24.000 | | 0.000 | | 24.000 | Continuing | Continuing | N/A |

| Management Services (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|--------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| TBD | C/Various | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 6.000 | | - | | 6.000 | Continuing | Continuing | - |
| Subtotal | | | 0.000 | 0.000 | | 0.000 | | 6.000 | | - | | 6.000 | Continuing | Continuing | N/A |

| | | | Prior Years | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|--|--|-------------|---------|--|---------|--|--------------|--|-------------|--|---------------|------------------|------------|--------------------------|
| Project Cost Totals | | | 0.000 | 0.000 | | 0.000 | | 30.000 | | 0.000 | | 30.000 | Continuing | Continuing | N/A |

Remarks

UNCLASSIFIED

| | | | |
|--|---|---|-------------------------|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 039 / <i>Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration</i> | |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| <i>Missile Warning Technology</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Examine current MW ground segment and conduct trade studies of alternative | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Conduct Preliminary Design Review of MW ground infrastructure | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|---|---|---|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Space Development Agency | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 039 / <i>Proliferated Low Earth Orbit (pLEO) Missile Warning Ground Integration</i> |

Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>Missile Warning Technology</i> | | | | |
| Examine current MW ground segment and conduct trade studies of alternative | 1 | 2020 | 4 | 2021 |
| Conduct Preliminary Design Review of MW ground infrastructure | 1 | 2020 | 4 | 2021 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | | | Project (Number/Name) 191 / <i>Space-Based Interceptors</i> | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 191: <i>Space-Based Interceptors</i> | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

Note
This is a new start in FY 2020.

A. Mission Description and Budget Item Justification
The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing a government reference architecture for a space-based kinetic interceptor layer for boost-phase defense.

| | | | | | |
|--|----------------|----------------|---------------------|--------------------|----------------------|
| <u>B. Accomplishments/Planned Programs (\$ in Millions)</u> | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| <i>Title:</i> Space-Based Interceptor Assessment <i>Description:</i> The SDA, under the leadership of the Under Secretary of Defense for Research and Engineering and in coordination with the Missile Defense Agency, Joint Staff, Air Force, and Director, Cost Assessment and Program Evaluation, will execute a Space-Based Interceptor assessment. <i>FY 2020 Base Plans:</i> The space-based interceptor assessment entails developing a government reference architecture for a space-based kinetic interceptor layer for boost-phase defense. These efforts include developing an independent cost estimate and assessment of technical risks, potential countermeasures, and development timelines. <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> This is a new start in FY 2020. | 0.000 | - | 15.000 | - | 15.000 |
| Accomplishments/Planned Programs Subtotals | 0.000 | - | 15.000 | - | 15.000 |

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

UNCLASSIFIED

| | | |
|--|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 191 / <i>Space-Based Interceptors</i> |
| <p><u>D. Acquisition Strategy</u></p> <p>Partners for these activities may include in-house research centers, Federally Funded Research and Development Centers, and University Affiliated Research Centers.</p> <p><u>E. Performance Metrics</u></p> <p>N/A</p> | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | |
|---|--|--|--|--|---|--|--|--|--|---|--|-------------------------|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Space Development Agency | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | | | | Project (Number/Name) 191 / <i>Space-Based Interceptors</i> | | | | |

| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Space-Based Interceptor Assessment | TBD | TBD : TBD | - | - | | - | | 15.000 | | - | | 15.000 | Continuing | Continuing | - |
| Subtotal | | | - | - | | - | | 15.000 | | - | | 15.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | - | - | 0.000 | 15.000 | - | 15.000 | Continuing | Continuing | N/A |

Remarks

UNCLASSIFIED

| | | | |
|---|--|---|------------------|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | Project (Number/Name) 191 / Space-Based Interceptors | |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|------------------------------------|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Space-Based Interceptor | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space-Based Interceptor Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|---|---|---|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Space Development Agency | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 191 / <i>Space-Based Interceptors</i> |

Schedule Details

| Events by Sub Project | Start | | End | |
|---------------------------------------|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>Space-Based Interceptor</i> | | | | |
| Space-Based Interceptor Assessment | 1 | 2020 | 4 | 2021 |

UNCLASSIFIED

| | | | | | | | | | | | | |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | | | Project (Number/Name) 193 / <i>Space-Based Discrimination</i> | | | |
| COST (\$ in Millions) | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | FY 2021 | FY 2022 | FY 2023 | FY 2024 | Cost To Complete | Total Cost |
| 193: <i>Space-Based Discrimination</i> | - | 0.000 | 0.000 | 15.000 | - | 15.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| Note This is a new start in FY 2020. | | | | | | | | | | | | |
| A. Mission Description and Budget Item Justification The Space Technology Development and Prototyping effort will develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations to provide the eight capabilities outlined in the DoD Space Vision. Developing and fielding a pLEO space architecture will significantly improve U.S. resilience posture in space. This effort is focused on developing a government reference architecture for a space-based discrimination layer for missile defense. | | | | | | | | | | | | |
| B. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | | | | | |
| | | | | | | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | |
| Title: Space-Based Discrimination Assessment Description: The SDA, under the leadership of the Under Secretary of Defense for Research and Engineering and in coordination with the Missile Defense Agency, Joint Staff, Air Force, and Director, Cost Assessment and Program Evaluation, will execute a Space-Based Discrimination assessment. | | | | | | | 0.000 | - | 15.000 | - | 15.000 | |
| FY 2020 Base Plans: The Space-Based Discrimination assessment entails developing a government reference architecture for a space-based discrimination layer for missile defense. These efforts include developing an independent cost estimate and assessment of technical risks, potential countermeasures, and development timelines. | | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: This is a new start in FY 2020. | | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | | | | | | | 0.000 | - | 15.000 | - | 15.000 | |
| C. Other Program Funding Summary (\$ in Millions) N/A | | | | | | | | | | | | |
| Remarks | | | | | | | | | | | | |

UNCLASSIFIED

| | | |
|---|---|---|
| Exhibit R-2A, RDT&E Project Justification: PB 2020 Space Development Agency | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 193 / <i>Space-Based Discrimination</i> |
| D. Acquisition Strategy Partners for these activities may include in-house research centers, Federally Funded Research and Development Centers, and University Affiliated Research Centers. | | |
| E. Performance Metrics N/A | | |

UNCLASSIFIED

| | | | | | | | | | | | | | | |
|---|--|--|--|--|--|---|--|--|--|---|--|-------------------------|--|--|
| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Space Development Agency | | | | | | | | | | | | Date: March 2019 | | |
| Appropriation/Budget Activity 0400 / 4 | | | | | | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | | | | Project (Number/Name) 193 / <i>Space-Based Discrimination</i> | | | | |

| Support (\$ in Millions) | | | | FY 2018 | | FY 2019 | | FY 2020 Base | | FY 2020 OCO | | FY 2020 Total | | | |
|---------------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Award Date | Cost | Cost To Complete | Total Cost | Target Value of Contract |
| Space-Based Discrimination Assessment | TBD | TBD : TBD | - | - | | - | | 15.000 | | - | | 15.000 | Continuing | Continuing | - |
| Subtotal | | | - | - | | - | | 15.000 | | - | | 15.000 | Continuing | Continuing | N/A |

| | Prior Years | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total | Cost To Complete | Total Cost | Target Value of Contract |
|----------------------------|-------------|---------|---------|--------------|-------------|---------------|------------------|------------|--------------------------|
| Project Cost Totals | - | - | 0.000 | 15.000 | - | 15.000 | Continuing | Continuing | N/A |

Remarks

UNCLASSIFIED

| | | | |
|---|--|---|------------------|
| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / Space Technology Development and Prototyping | Project (Number/Name) 193 / Space-Based Discrimination | |

| | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | | FY 2023 | | | | FY 2024 | | | |
|---------------------------------------|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| Space-Based Discrimination | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space-Based Discrimination Assessment | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

UNCLASSIFIED

| | | | |
|---|---|---|-------------------------|
| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Space Development Agency | | | Date: March 2019 |
| Appropriation/Budget Activity 0400 / 4 | R-1 Program Element (Number/Name) PE 1206410SDA / <i>Space Technology Development and Prototyping</i> | Project (Number/Name) 193 / <i>Space-Based Discrimination</i> | |

Schedule Details

| Events by Sub Project | Start | | End | |
|--|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>Space-Based Discrimination</i> | | | | |
| Space-Based Discrimination Assessment | 1 | 2020 | 4 | 2021 |

UNCLASSIFIED

THIS PAGE INTENTIONALLY LEFT BLANK

UNCLASSIFIED