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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force | | | | | | | | | | Date: February 2019 | | |
| Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD) | | | | | R-1 Program Element (Number/Name) PE 1206441F I Space Based Infrared System (SBIRS) High EMD | | | | | | | |
| 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 | 10,140.598 | 119.585 | 60.565 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 10,320.749 |
| 653616: SBIRS High Element Emd | 10,140.598 | 119.585 | 60.565 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 10,320.749 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| Program MDAP/MAIS Code: 210 | | | | | | | | | | | | |
| A. Mission Description and Budget Item Justification | | | | | | | | | | | | |
| <p>The SBIRS primary mission is to provide initial warning of a ballistic missile attack on the US, its deployed forces, and its allies. SBIRS enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. SBIRS supports Missile Defense, Battlespace Awareness, and Technical Intelligence missions by providing reliable, accurate, and timely data to Unified Combatant Commanders, Joint Task Force (JTF) Commanders, the intelligence community, and other users. SBIRS provides increased detection and tracking performance over legacy systems in order to meet requirements in Air Force Space Command's (AFSPC) Operational Requirements Document (ORD). The SBIRS system includes both space and ground elements. The space segment consists of Geosynchronous Earth Orbit (GEO) satellites, payloads hosted on satellites in Highly Elliptical Orbit (HEO), and Defense Support Program (DSP) satellites. The ground segment consists of both fixed and mobile data processing elements, communications infrastructure, and relay ground stations serving all SBIRS space elements. Four HEO payloads and four GEO satellites are on-orbit. Three of the four GEO and two of the four HEO satellites have completed AFSPC and USSTRATCOM operational acceptance and are certified for Integrated Tactical Warning/ Attack Assessment (ITW/AA) missile warning operations and technical intelligence operations. HEO-3 and HEO-4 are in a storage/residual operational mode. GEO-3 (Flight 4) is proceeding through on-orbit checkout and infrared sensor tuning following its respective launch in Jan 2018. The program of record (PoR) ground segment development exploits both the new scanner and starer sensor data through software processing and builds user messages for missile warning and missile defense. Also, data exploitation efforts enable access to raw and processed data to expand capabilities for battlespace awareness and other applications. The baseline requirement document is the 1996 SBIRS ORD. Enterprise Systems Engineering and Integration (SE&I) provides intra- and inter-program requirements development, enterprise master planning, validation and verification, specialty engineering, and architecture development.</p> | | | | | | | | | | | | |
| <p>As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.</p> | | | | | | | | | | | | |
| <p>This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.</p> | | | | | | | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force | | | | Date: February 2019 | | |
| Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD) | | R-1 Program Element (Number/Name) PE 1206441F I Space Based Infrared System (SBIRS) High EMD | | | | |
| B. Program Change Summary (\$ in Millions) | | FY 2018 | FY 2019 | FY 2020 Base | FY 2020 OCO | FY 2020 Total |
| Previous President's Budget | | 311.844 | 60.565 | 0.001 | 0.000 | 0.001 |
| Current President's Budget | | 119.585 | 60.565 | 0.000 | 0.000 | 0.000 |
| Total Adjustments | | -192.259 | 0.000 | -0.001 | 0.000 | -0.001 |
| • Congressional General Reductions | | 0.000 | 0.000 | | | |
| • Congressional Directed Reductions | | -18.675 | 0.000 | | | |
| • Congressional Rescissions | | 0.000 | 0.000 | | | |
| • Congressional Adds | | 0.000 | 0.000 | | | |
| • Congressional Directed Transfers | | -173.584 | 0.000 | | | |
| • Reprogrammings | | 0.000 | 0.000 | | | |
| • SBIR/STTR Transfer | | 0.000 | 0.000 | | | |
| • Other Adjustments | | 0.000 | 0.000 | -0.001 | 0.000 | -0.001 |
| Change Summary Explanation FY 2018: SMI and funds originally booked under SV07-08 (effort canceled) transferred to PE 1206442F Next Gen OPIR per Congressional direction. | | | | | | |
| C. Accomplishments/Planned Programs (\$ in Millions) | | | | FY 2018 | FY 2019 | FY 2020 |
| Title: SBIRS EMD | | | | 119.585 | 60.565 | 0.000 |
| Description: Continued EMD contracts for Space and Ground segment development, concept studies/activities for obsolescence issues. | | | | | | |
| FY 2019 Plans: Complete Block 20 Ground System Development, System Engineering and Program Management, HEO host program office support, Technical Intelligence activities, Data Processing/Exploitation/ground integration activities, systems integration and test studies. Execute Block 20 fielding and OA time phased with operational priorities to enable effective fielding of capabilities while minimizing concurrency risks to current ITW/AA operations. Decommissioning of Increment 1 facilities replaced by Block 10 will occur in a time phased manner through O&M efforts. Complete developing and fielding Command & Control, Technical Intelligence, and Battlespace Awareness operations to leverage residual capability for HEO 1/2 post-transition. Continue enterprise SE&I. Complete cyber defense improvements to SBIRS ground system architecture in Block 20 to address identified deficiencies during operational testing. Complete Standard Space Trainer (SST) Phase 3. Phase 3 incorporates the next generation of upgrades to the SBIRS SST to address current system deficiencies. Continue program office support and other related support activities that may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. | | | | | | |
| FY 2020 Plans: | | | | | | |

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| Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force | | | | | | | | Date: February 2019 | | | |
| Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD) | | | | | R-1 Program Element (Number/Name) PE 1206441F I Space Based Infrared System (SBIRS) High EMD | | | | | | |
| C. Accomplishments/Planned Programs (\$ in Millions) | | | | | | | | FY 2018 | FY 2019 | FY 2020 | |
| N/A | | | | | | | | | | | |
| FY 2019 to FY 2020 Increase/Decrease Statement: | | | | | | | | | | | |
| N/A | | | | | | | | | | | |
| Accomplishments/Planned Programs Subtotals | | | | | | | | 119.585 | 60.565 | 0.000 | |
| D. Other Program Funding Summary (\$ in Millions) | | | | | | | | | | | |
| Line Item | 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 |
| • SPAF 01 Line 13, MSSBIR: SBIR High (Space) | 929.058 | 108.397 | 233.952 | - | 233.952 | 176.065 | 55.188 | 8.340 | 8.490 | Continuing | Continuing |
| Remarks | | | | | | | | | | | |
| E. Acquisition Strategy The pre-SDD SBIRS contracts were competed in full and open competition. Two contracts were awarded to Lockheed/Loral/Aerojet and Hughes/TRW in 1995 for the pre-SDD phase. A single contract was awarded to Lockheed Martin in 1996 for the SDD phase. This contract is still ongoing and will incrementally deliver the ground segment. Production contracts are discussed in the procurement budget exhibits. | | | | | | | | | | | |
| F. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission. | | | | | | | | | | | |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force | | | | | | | | | | | | Date: February 2019 | | | |
|--|------------------------|---|-------------|---------|------------|---|------------|--------------|------------|--|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity 3600 / 5 | | | | | | R-1 Program Element (Number/Name) PE 1206441F / Space Based Infrared System (SBIRS) High EMD | | | | Project (Number/Name) 653616 / SBIRS High Element Emd | | | | | |
| 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 |
| Pre-EMD (LMMS & Hughes) | C/CPFF | Hughes Aircraft Company : El Segundo, CA | 159.600 | - | | - | | - | | - | | - | 0.000 | 159.600 | 159.600 |
| SBIRS EMD | Various | Prime: Lockheed MartinSub:Northrop Grumman : Sunnyvale; Azusa, CA | 9,027.090 | 95.636 | Oct 2017 | 42.406 | Jan 2019 | - | | - | | - | 0.000 | 9,165.132 | 9,158.709 |
| Enterprise SE&I | C/CPAF | The Analytical Sciences Corporation : El Segundo, CA | 60.988 | 2.971 | Dec 2017 | - | | - | | - | | - | 0.000 | 63.959 | 64.541 |
| SST Phase 3 | C/CPAF | Not specified. : TBD | 0.000 | 0.382 | | 12.418 | Nov 2018 | - | | - | | - | 0.000 | 12.800 | - |
| Technology | Various | Various : Various | 11.600 | - | | - | | - | | - | | - | 0.000 | 11.600 | 11.600 |
| SBIRS Pre-SDD Contract Adjustment | Various | Various : Various | 4.780 | - | | - | | - | | - | | - | 0.000 | 4.780 | 4.780 |
| Phenomenology | Various | Various : Various | 17.350 | - | | - | | - | | - | | - | 0.000 | 17.350 | 17.350 |
| Technical Mission Analysis | RO | Aerospace Corp. : El Segundo, CA | 10.000 | 5.089 | Oct 2017 | - | | - | | - | | - | 0.000 | 15.089 | 22.794 |
| Sensor Technology | Various | Sandia National Lab : Albuquerque, NM | 13.919 | - | | - | | - | | - | | - | 0.000 | 13.919 | 10.000 |
| HEO Command & Control (C2) Ground Expansion | Various | Lockheed Martin : Sunnyvale, CA | 36.259 | - | | - | | - | | - | | - | 0.000 | 36.259 | 36.259 |
| HEO 1/2 Residual Capability | Various | Various : Various | 14.600 | - | | - | | - | | - | | - | 0.000 | 14.600 | 14.600 |
| Subtotal | | | 9,356.186 | 104.078 | | 54.824 | | - | | - | | - | 0.000 | 9,515.088 | N/A |
| Remarks | | | | | | | | | | | | | | | |
| Award dates represent date of first award of the funds for that fiscal year. | | | | | | | | | | | | | | | |
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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force | | | | | | | | | | | | Date: February 2019 | | | |
|---|------------------------|---|-------------|---------|------------|--|------------|--------------|------------|---|------------|---------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity 3600 / 5 | | | | | | R-1 Program Element (Number/Name) PE 1206441F / <i>Space Based Infrared System (SBIRS) High EMD</i> | | | | Project (Number/Name) 653616 / <i>SBIRS High Element Emd</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 |
| WFOV Testbed Concept Study | MIPR | Millennium Space Systems : El Segundo, CA | 8.000 | - | | - | | - | | - | | - | 0.000 | 8.000 | 8.000 |
| Program Support | Various | Various : Various | 11.942 | - | | - | | - | | - | | - | 0.000 | 11.942 | 11.942 |
| Subtotal | | | 19.942 | - | | - | | - | | - | | - | 0.000 | 19.942 | 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 |
| FFRDC | RO | Aerospace Corp. : El Segundo, CA | 465.225 | 5.589 | Oct 2017 | - | | - | | - | | - | 0.000 | 470.814 | 471.006 |
| A&AS | Various | Various : Various | 168.493 | 2.559 | Dec 2017 | 0.408 | Dec 2018 | - | | - | | - | 0.000 | 171.460 | 174.682 |
| Other Support | Various | Various : Various | 130.752 | 7.359 | Oct 2017 | 5.333 | Nov 2018 | - | | - | | - | 0.000 | 143.444 | 134.510 |
| Subtotal | | | 764.470 | 15.507 | | 5.741 | | - | | - | | - | 0.000 | 785.718 | N/A |
| Remarks | | | | | | | | | | | | | | | |
| Award dates represent date of first award of the fiscal year. | | | | | | | | | | | | | | | |
| | | | 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 | | | 10,140.598 | 119.585 | | 60.565 | | - | | - | | - | 0.000 | 10,320.748 | N/A |
| Remarks | | | | | | | | | | | | | | | |

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| Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force | | | | | | | | | | | | Date: February 2019 | | | | | | | |
| Appropriation/Budget Activity 3600 / 5 | | | | | | | | R-1 Program Element (Number/Name) PE 1206441F / Space Based Infrared System (SBIRS) High EMD | | | | | | | | Project (Number/Name) 653616 / SBIRS High Element Emd | | | |

| | 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 |
| SBIRS High Element EMD | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Block 20 Integration & Test at MCSB | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Block 20 Operational Utility Evaluation and Initial Operational Test & Evaluation with AFOTEC | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B20 Completed and ITW/AA Certified | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force | | | Date: February 2019 |
| Appropriation/Budget Activity 3600 / 5 | R-1 Program Element (Number/Name) PE 1206441F / <i>Space Based Infrared System (SBIRS) High EMD</i> | Project (Number/Name) 653616 / <i>SBIRS High Element Emd</i> | |

Schedule Details

| Events by Sub Project | Start | | End | |
|---|---------|------|---------|------|
| | Quarter | Year | Quarter | Year |
| <i>SBIRS High Element EMD</i> | | | | |
| Block 20 Integration & Test at MCSB | 1 | 2018 | 2 | 2019 |
| Block 20 Operational Utility Evaluation and Initial Operational Test & Evaluation with AFOTEC | 2 | 2019 | 3 | 2019 |
| B20 Completed and ITW/AA Certified | 4 | 2019 | 4 | 2019 |