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**Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force** **Date:** March 2023

|   |  |
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| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 2: Applied Research</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |
|---|--|

| COST (\$ in Millions)                                | Prior Years | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total | FY 2025 | FY 2026 | FY 2027 | FY 2028 | Cost To Complete | Total Cost |
|--|-------------|---------|---------|--------------|-------------|---------------|---------|---------|---------|---------|------------------|------------|
| Total Program Element                                | -           | 244.612 | 260.833 | 216.269      | 0.000       | 216.269       | 209.316 | 203.739 | 198.776 | 217.708 | Continuing       | Continuing |
| 622002: <i>Electronic Component Technology</i>       | -           | 167.937 | 75.159  | 50.368       | 0.000       | 50.368        | 49.327  | 40.020  | 32.953  | 36.649  | Continuing       | Continuing |
| 622003: <i>EO Sensors &amp; Countermeasures Tech</i> | -           | 10.712  | 28.120  | 26.838       | 0.000       | 26.838        | 25.428  | 26.035  | 26.235  | 28.757  | Continuing       | Continuing |
| 622005: <i>Cyber Technology</i>                      | -           | 3.607   | 12.566  | 15.075       | 0.000       | 15.075        | 15.000  | 15.328  | 15.527  | 16.587  | Continuing       | Continuing |
| 624920: <i>Electronic Warfare Technology</i>         | -           | 18.866  | 45.410  | 41.944       | 0.000       | 41.944        | 40.247  | 41.205  | 41.536  | 45.600  | Continuing       | Continuing |
| 626095: <i>Sensor Fusion Technology</i>              | -           | 24.742  | 63.577  | 37.642       | 0.000       | 37.642        | 36.846  | 37.717  | 38.536  | 41.956  | Continuing       | Continuing |
| 627622: <i>RF Sensors and Countermeasures Tech</i>   | -           | 18.748  | 36.001  | 44.402       | 0.000       | 44.402        | 42.468  | 43.434  | 43.989  | 48.159  | Continuing       | Continuing |

**A. Mission Description and Budget Item Justification**

This program develops the technology base for Air Force aerospace sensors and electronic combat. Advances in aerospace sensors are required to increase combat effectiveness by providing anytime, anywhere surveillance, reconnaissance, precision targeting, and electronic warfare (EW) capabilities. To achieve this progress, this program pursues simultaneous advances in: 1) generating, controlling, receiving, and processing electronic and photonic signals for radio frequency (RF) sensor aerospace applications; 2) electro-optical (EO) and infrared (IR) aerospace sensor technologies for a variety of offensive and defensive uses; 3) radio frequency antennas and associated electronics for airborne and space surveillance, together with active and passive electro-optical/infrared sensors; 4) technologies to manage and fuse on-board sensor information for timely, comprehensive situational awareness; 5) technology for affordable, trusted, and reliable, all-weather surveillance, reconnaissance, and precision strike radio frequency sensors and electronic combat systems; and 6) technologies that aid in the development of agile and resilient mission systems. This program has been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

Funds in this program element may be used to investigate specified technology advancements in air, space and/or cyber domains.

This program element may include necessary expenses to support the operation and maintenance of facilities to manage, execute, and deliver science and technology capabilities

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| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 2: Applied Research</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver science and technology capabilities. The use of program funds in this PE would be in addition to the civilian pay expenses budgeted in program elements 0601102F, 0602020F, 0602102F, 0602201F, 0602202F, 0602203F, 0602602F, 0602605F, 0602788F, 1206601SF, and 0602298F.

This program is in Budget Activity 2, Applied Research because this budget activity includes studies, investigations, and non-system specific technology efforts directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters.

| <b>B. Program Change Summary (\$ in Millions)</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b> | <b>FY 2024 Total</b> |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget                       | 255.918        | 192.733        | 197.998             | 0.000              | 197.998              |
| Current President's Budget                        | 244.612        | 260.833        | 216.269             | 0.000              | 216.269              |
| Total Adjustments                                 | -11.306        | 68.100         | 18.271              | 0.000              | 18.271               |
| • Congressional General Reductions                | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Directed Reductions               | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Rescissions                       | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Adds                              | 0.000          | 68.100         |                     |                    |                      |
| • Congressional Directed Transfers                | 0.000          | 0.000          |                     |                    |                      |
| • Reprogrammings                                  | 0.000          | 0.000          |                     |                    |                      |
| • SBIR/STTR Transfer                              | -11.306        | 0.000          |                     |                    |                      |
| • Other Adjustments                               | 0.000          | 0.000          | 18.271              | 0.000              | 18.271               |

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 622002: *Electronic Component Technology*

- Congressional Add: *Program increase - exploitation detection for flexible combat avionics*
- Congressional Add: *Program increase: enhanced security sensors to detect threats in near and far field emissions*
- Congressional Add: *Program increase: hardware-based oversight system for microelectronics endpoints*
- Congressional Add: *Program increase: low cost sensors for UAVs*
- Congressional Add: *Program increase: Zero-trust environment for semiconductor technology*
- Congressional Add: *Program increase: Extreme wideband RF sensor*
- Congressional Add: *Heterogeneous integration of microelectronics*
- Congressional Add: *Field programmable gate arrays*
- Congressional Add: *Reliability of combat cloud communications systems*

Congressional Add Subtotals for Project: 622002

|  | <b>FY 2022</b> | <b>FY 2023</b> |
|--|----------------|----------------|
|  | 4.930          | -              |
|  | 4.930          | -              |
|  | 5.916          | -              |
|  | 4.930          | 5.000          |
|  | 9.860          | 10.000         |
|  | 18.735         | -              |
|  | -              | 5.000          |
|  | -              | 7.000          |
|  | -              | 7.000          |
| <b>Congressional Add Subtotals for Project: 622002</b> | <b>49.301</b>  | <b>34.000</b>  |

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2024 Air Force | <b>Date:</b> March 2023 |
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| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 2: Applied Research</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |
|---|--|

| <b>Congressional Add Details (\$ in Millions, and Includes General Reductions)</b>             | <b>FY 2022</b> | <b>FY 2023</b> |
|--|----------------|----------------|
| <b>Project: 622005: <i>Cyber Technology</i></b>  |                |                |
| <i>Congressional Add: Automated legacy code modernization</i>                                  | -              | 4.100          |
| <b>Congressional Add Subtotals for Project: 622005</b>   |                |                |
|  | -              | 4.100          |
| <b>Project: 626095: <i>Sensor Fusion Technology</i></b>  |                |                |
| <i>Congressional Add: Program increase: Reliability of combat cloud communications systems</i> | 6.902          | -              |
| <i>Congressional Add: Cyber kinetic combat environment</i>                                     | -              | 30.000         |
| <b>Congressional Add Subtotals for Project: 626095</b>   |                |                |
|  | 6.902          | 30.000         |
| <b>Congressional Add Totals for all Projects</b>   |                |                |
|  | 56.203         | 68.100         |

**Change Summary Explanation**

In 2024, funding for Aerospace Sensors (PE 0602204F) increased to emphasize science and technology investments necessary to maintain superiority over potential near-peer adversaries in key technology areas including communication, navigation, intelligence, surveillance, and reconnaissance, multi-domain/multi-dimensional sensor systems, and multi-source data collaboration.

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |   |                      |                |                |  | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / Aerospace Sensors |                      |                |                | <b>Project (Number/Name)</b><br>622002 / Electronic Component Technology |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>  | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>   | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 622002: <i>Electronic Component Technology</i>                          | -                  | 167.937        | 75.159         | 50.368              | 0.000   | 50.368               | 49.327         | 40.020         | 32.953   | 36.649                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project focuses on electronics and optoelectronics technologies that generate, control, receive, and process electromagnetic spectrum for aerospace sensor and electronic warfare applications. The enabling technologies developed under this project will be used for intelligence, surveillance, reconnaissance, electronic warfare, battlespace access, and precision engagement capabilities. The technologies developed include exploratory electronic and optoelectronic devices, components, microsystems and subsystems.

This project also assesses designs, develops, fabricates, and demonstrates the associated technologies for integrating combinations of these component technologies. The project demonstrates significantly smaller size, lower weight, lower cost, lower power dissipation, higher reliability, trustworthiness and improved performance. The device and subsystem technology developments under this project are military unique; they are based on Air Force and other Department of Defense weapon systems requirements in the areas of radar, communications, electronic warfare, positioning, navigation, timing, and smart weapons.

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

|  |                |                |                |
|--|----------------|----------------|----------------|
|  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
| <b>Title:</b> Sensor Subsystems  | 22.796         | 7.475          | 8.631          |
| <b>Description:</b> Develop, analyze, demonstrate, and perform engineering trade studies for technologies for compact, affordable, multi-function subsystems for aerospace sensors.  |                |                |                |
| <b>FY 2023 Plans:</b><br>Continue research into autonomous low size, weight and power sensor processing. Continue research into digital at every element technology for multifunction microwave and millimeter wave arrays. Continue development of low size weight and power wideband multifunction radio frequency sensor subsystem suitable for Group 4 unmanned aircraft system operation. Initiate millimeter wave digital array demonstrations. Initiate wideband phased array emulation utilizing digital beamforming demonstrator.   |                |                |                |
| <b>FY 2024 Plans:</b><br>Continue research into autonomous low size, weight and power sensor processing. Continue research into digital at every element technology for multifunction microwave and millimeter wave arrays. Continue development of low size weight and power wideband multifunction radio frequency sensor subsystem suitable for Group 4 unmanned aircraft system operation. Continue millimeter wave digital array demonstrations. Continue wideband phased array emulation utilizing digital beamforming demonstrator. Initiate system build phase for multifunction wideband digital active electronically scanned array. |                |                |                |
| <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>   |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force  |  | <b>Date:</b> March 2023   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600 / 2   | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622002 / <i>Electronic Component Technology</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>  |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| FY 2024 increased compared to FY 2023 by \$1.156 million. Funding increase is a result of increased emphasis in multi-function sensor systems.   |  |   |                |                |
| <p><b>Title:</b> Electronic Devices</p> <p><b>Description:</b> Assess, research, develop, demonstrate and transition revolutionary and evolutionary electronic devices and their associate technologies.</p> <p><b>FY 2023 Plans:</b><br/>Complete initial demonstration of wide bandgap device and power conversion integration. Continue development of integrated chip-level radio frequency device and power conversion modeling. Continue development of wide bandgap device and power conversion integration technologies. Continue demonstration of high efficiency microwave power modules with integrated high speed power conversion switching. Initiate next generation predictive analysis using higher order harmonics. Initiate wide bandgap W-band device and circuit optimization. Initiate evaluation of next generation wide bandgap radio frequency materials.</p> <p><b>FY 2024 Plans:</b><br/>Continue modeling efforts on integrated chip-level radio frequency device, power conversion modeling, and predictive analysis using higher order harmonics. Continue development of wide bandgap device and power conversion integration technologies. Continue demonstration of high efficiency microwave power modules with integrated high speed power conversion switching. Continue development of high frequency characterization capability and evaluation of next generation wide bandgap radio frequency materials.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$1.649 million. Funding increase is a result of increased emphasis in wide bandgap devices</p> |  | 19.572  | 6.762          | 8.411          |
| <p><b>Title:</b> Electro-Optical/Infrared (EO/IR) Components</p> <p><b>Description:</b> Research, develop, demonstrate and transition electro-optical/infrared components for next generation intelligence, surveillance, reconnaissance and countermeasures.</p> <p><b>FY 2023 Plans:</b><br/>Continue photonic and quantum substructure technology development. Continue research into non-linear devices for tunability and power scaling. Continue development of high power, narrow line width lasers sources for advanced sensing and countermeasure applications. Initiate laser component packaging for laser detection and ranging.</p> <p><b>FY 2024 Plans:</b></p>  |  | 20.079  | 7.288          | 9.550          |

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| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / Aerospace Sensors | <b>Project (Number/Name)</b><br>622002 / Electronic Component Technology |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |   | <b>FY 2022</b>   | <b>FY 2023</b> | <b>FY 2024</b> |
| <p>Continue photonic and quantum substructure technology development. Continue research into non-linear devices for tunability and power scaling. Continue development of high power, narrow line width lasers sources for advanced sensing and countermeasure applications. Continue laser component packaging for laser detection and ranging.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$2.262 million. Funding increase is a result of increased emphasis in multi-function laser system devices.</p>   |   |  |                |                |
| <p><b>Title:</b> Trusted and Assured Electronics</p> <p><b>Description:</b> Investigate and develop designs of trusted electronic and optoelectronic systems when integrating commercially available solutions with emerging government-off-the-shelf advanced technologies. Areas of development include: multi-function radio frequency and electro-optical subsystems, advanced electronic and optoelectronic materials, on-board sensor processing, high-frequency power modules, electro-optical/infrared sources, electro-optical/infrared detectors, beam control and waveguides, and trusted and reliable electronics.</p> <p><b>FY 2023 Plans:</b><br/>Complete initial investigation of trust in design and trust in fabrication methodologies. Complete studies of modeling and simulation capability to improve predictive capability of mission assurance for highly integrated microsystems, devices, and materials. Complete the initial development of processes and techniques for trust through design. Continue development of prototype trustworthiness assessment capability. Continue reliability assessments of advanced heterogeneously integrated microsystems. Continue verification and validation of security techniques and methodologies for integrated circuit designs. Initiate disaggregated multi chip System in Package demonstration using fine pitch for assurance.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of prototype trustworthiness assessment capability. Continue reliability assessments of advanced heterogeneously integrated microsystems. Continue verification and validation of security techniques and methodologies for integrated circuit designs. Continue disaggregated multi chip System in Package demonstration using fine pitch for assurance. Initiate application of trust in design to digital engineering and virtual prototyping for assured design.</p> <p>In FY 2024 this effort was renamed from Trusted Electronics for Intelligence, Surveillance, Reconnaissance and Avionics Mission Systems to Trusted and Assured Electronics.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$1.895 million. Funding increase is a result of increased emphasis implementing trust in design methods.</p> |   | 22.894   | 8.886          | 10.781         |
| <p><b>Title:</b> Advanced Highly Integrated Microsystems for Intelligence, Surveillance, Reconnaissance and Electronic Warfare</p>  |   | 18.705   | 6.218          | 7.773          |

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| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622002 / <i>Electronic Component Technology</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| <p><b>Description:</b> Perform research and development of electronic and photonic circuit and microsystem technologies focused on miniaturization, power reduction, reconfigurability and reduced cost.</p> <p><b>FY 2023 Plans:</b><br/>Continue development of next generation reconfigurable transceivers. Continue development of microsystem integration solutions that integrate advanced components and thermal management technologies for cost, size, weight and power constrained microwave and millimeter wave applications. Continue development of chip-scale photonic/electronic wideband transceiver components. Initiate development of high-Q passive components for heterogeneous integration. Initiate identification of application areas and development of heterogeneous integration concepts.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of next generation reconfigurable transceiver. Continue development of microsystem integration solutions that integrate advanced components and thermal management technologies for cost, size, weight and power constrained microwave and millimeter wave applications. Continue development of chip-scale photonic/electronic wideband transceiver components. Continue development of high-Q passive components for heterogeneous integration. Continue identification of application areas and development of heterogeneous integration concepts.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$1.555 million. Funding increase is a result of increased emphasis in the heterogeneous integration of electronic and photonic devices.</p> |  |   |                |                |
| <p><b>Title:</b> Microelectronics &amp; Embedded System Assurance</p> <p><b>Description:</b> Investigate and develop microelectronics security technologies to impede unwanted technology transfer and enable timely adoption of commercial and government-off-the-shelf microelectronic technologies that enable revolutionary capabilities for the Air Force.</p> <p><b>FY 2023 Plans:</b><br/>Complete investigation of trust technologies and techniques in sensors and sensor systems. Continue development of techniques to deter reverse engineering and exploitation of critical program information. Initiate advanced exploitation tool development to assess modern threat capability.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of techniques to deter reverse engineering and exploitation of critical program information. Continue advanced exploitation tool development to assess modern threat capability. Initiate protective technology development for</p>   |  | 14.590  | 4.530          | 5.222          |

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| <b>Appropriation/Budget Activity</b><br>3600 / 2                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622002 / <i>Electronic Component Technology</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|---|----------------|----------------|----------------|
| sensors and sensor systems. This may involve commercial and government technologies to deter reverse engineering and unwanted technology transfer, alteration of system capability, and prevent development of countermeasures. |                |                |                |
| <b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b><br>FY 2024 increased compared to FY 2023 by \$0.692 million. Justification for this increase is described in plans above.   |                |                |                |
| <b>Accomplishments/Planned Programs Subtotals</b>   | 118.636        | 41.159         | 50.368         |

|  | <b>FY 2022</b> | <b>FY 2023</b> |
|--|----------------|----------------|
| <b><i>Congressional Add:</i></b> Program increase - exploitation detection for flexible combat avionics<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts   | 4.930          | -              |
| <b><i>Congressional Add:</i></b> Program increase: enhanced security sensors to detect threats in near and far field emissions<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts  | 4.930          | -              |
| <b><i>Congressional Add:</i></b> Program increase: hardware-based oversight system for microelectronics endpoints<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts   | 5.916          | -              |
| <b><i>Congressional Add:</i></b> Program increase: low cost sensors for UAVs<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts<br><b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts                           | 4.930          | 5.000          |
| <b><i>Congressional Add:</i></b> Program increase: Zero-trust environment for semiconductor technology<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts<br><b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts | 9.860          | 10.000         |
| <b><i>Congressional Add:</i></b> Program increase: Extreme wideband RF sensor<br><b><i>FY 2022 Accomplishments:</i></b> Conduct Congressional directed efforts   | 18.735         | -              |
| <b><i>Congressional Add:</i></b> Heterogeneous integration of microelectronics<br><b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts  | -              | 5.000          |
| <b><i>Congressional Add:</i></b> Field programmable gate arrays<br><b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts   | -              | 7.000          |
| <b><i>Congressional Add:</i></b> Reliability of combat cloud communications systems  | -              | 7.000          |

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| <b>Appropriation/Budget Activity</b><br>3600 / 2 | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622002 / <i>Electronic Component Technology</i> |
|--|--|---|

|   | FY 2022 | FY 2023 |
|---|---------|---------|
| <b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts |         |         |
| <b>Congressional Adds Subtotals</b>                                 | 49.301  | 34.000  |

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable

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|   |                    |                |                |                     |  |                      |                |                |   |                         |                         |                   |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |  |                      |                |                |   | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |                      |                |                | <b>Project (Number/Name)</b><br>622003 / <i>EO Sensors &amp; Countermeasures Tech</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>   | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>  | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 622003: <i>EO Sensors &amp; Countermeasures Tech</i>                    | -                  | 10.712         | 28.120         | 26.838              | 0.000  | 26.838               | 25.428         | 26.035         | 26.235  | 28.757                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project determines the technical feasibility of advanced electro-optical aerospace sensor technologies for a variety of offensive and defensive uses. The sensor technologies under development range from the ultraviolet through the infrared portion of the spectrum. Related efforts include improvements in avionics integration, digital processing, analysis tools, and sensor architectures. One of the project's goals is to improve electro-optical and related technologies for the detection, tracking, and identification of non-cooperative and difficult targets, such as those obscured by camouflage or acquired at great range. This project also develops the passive and active imaging sensors and algorithms needed to enable precision targeting in severe weather. These technologies are critical to future aerospace surveillance and targeting. Other project goals include advanced electro-optical threat warning and countermeasures.

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

|  |                |                |                |
|--|----------------|----------------|----------------|
|  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
| <b>Title:</b> Passive Electro-Optical/Infrared Sensing in Contested Environments   | 5.377          | 13.765         | 12.960         |
| <b>Description:</b> Develop innovative passive optical sensing technology to support surveillance and reconnaissance in contested environments. Develop high performance focal planes, aperture technologies, sensing architectures, and imaging techniques capable of long range target detection and characterization for intelligence, surveillance, reconnaissance and air-to-air sensing.   |                |                |                |
| <b>FY 2023 Plans:</b><br>Continue refinement of advanced processing algorithms for hyperspectral imaging. Complete demonstration of low-cost, compact hyperspectral imaging sensor with on-board, near real time processing software that utilizes advanced processing algorithms under development. Perform testing of new multi-spectral cameras and filters that allow more compact designs. Continue development of low-earth orbit sensing systems for critical Air Force needs, including event-based sensors and passive interferometry. Perform a field demonstration and evaluation of an event based/neuromorphic sensing system. Initiate development of large format, long wave infrared detector array for infrared search and track in preparation for future testing. Initiate development of low size, weight and power processor for infrared search and track. |                |                |                |
| <b>FY 2024 Plans:</b><br>Continue development of advanced processing algorithms for hyperspectral imaging. Continue development of low-earth orbit sensing systems for critical Department of the Air Force needs, including event-based sensors and passive interferometry. Continue development of large format, long wave infrared detector array for infrared search and track in preparation for future testing. Continue development of low size, weight and power processor for infrared search and track.  |                |                |                |
| <b>FY 2023 to FY 2024 Increase/Decrease Statement:</b>   |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force   |  | <b>Date:</b> March 2023   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622003 / <i>EO Sensors &amp; Countermeasures Tech</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| FY 2024 decreased compared to FY 2023 by \$0.805 million. Justification for this decrease is described in plans above.  |  |   |                |                |
| <p><b>Title:</b> Laser Radar Sensing in Contested Environments</p> <p><b>Description:</b> Develop innovative laser sensing technology for non-cooperative identification of airborne and ground-based targets in contested environments. Develop optical spectrum transmitters, detectors and agile aperture technologies capable of sensing multiple target characteristics for robust non-cooperative target identification.</p> <p><b>FY 2023 Plans:</b><br/>Complete designing multi-mode laser radar system for attritable platforms. Continue evaluation of modeling and simulation software by using data collected from airborne laser radar programs. Complete initial development of processing software for multi-mode laser radar collecting vibration and synthetic aperture data. Initiate investigation to feasibility of multi-static laser radar concepts. Continue designing large aperture laser radar for high-resolution imaging needs, with a focus on improving performance post demonstration, while working with customers to investigate transition potential of existing designs.</p> <p><b>FY 2024 Plans:</b><br/>Initiate multi-mode laser radar system demonstration for attritable platforms and benchmark model with collected data, including validation of data processing algorithms. Initiate effort to reduce size, weight, and power of laser radar systems. Continue development of processing software for multi-mode laser radar with a focus on processing efficiency. Initiate work on non-mechanical beam steering methods for optical apertures. Continue designing large aperture laser radar for high-resolution imaging needs, with a focus on improving performance post demonstration, while working with customers to investigate transition potential of existing designs.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 decreased compared to FY 2023 by \$0.477 million. Justification for this decrease is described in plans above.</p> |  | 5.335   | 14.355         | 13.878         |
| <b>Accomplishments/Planned Programs Subtotals</b>   |  | 10.712  | 28.120         | 26.838         |
| <b>C. Other Program Funding Summary (\$ in Millions)</b>  |  |   |                |                |
| N/A   |  |   |                |                |
| <b>Remarks</b>  |  |   |                |                |
| <b>D. Acquisition Strategy</b>  |  |   |                |                |
| Not applicable  |  |   |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |  |                      |                |                |  | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |                      |                |                | <b>Project (Number/Name)</b><br>622005 / <i>Cyber Technology</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>   | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>   | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 622005: <i>Cyber Technology</i>   | -                  | 3.607          | 12.566         | 15.075              | 0.000  | 15.075               | 15.000         | 15.328         | 15.527   | 16.587                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project focuses on technologies for enabling agile and resilient Air Force mission systems. This project improves our understanding of cyber vulnerabilities of mission systems by investigating the fundamental nature of those vulnerabilities including: how they come about, how they can be discovered, how they can be quantified and categorized, how they can be exploited, and how they can be removed or mitigated to secure the system. This project develops adaptable and resilient hardware/software for real-time avionics cyber-attack pattern recognition and develop a protection system with the capability for autonomous learning, adaptation, and self-protection. This project investigates open architecture concepts and technologies to deliver capability flexibility to Air Force mission systems. These technologies are matured via integrated capability demonstrations.

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

|  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|--|----------------|----------------|----------------|
| <b>Title:</b> Flexible and Secure Avionics   | 3.607          | 8.466          | 15.075         |
| <b>Description:</b> Develop avionics protection tools and capabilities to enable manned and unmanned aircraft, avionics, and related support equipment to automatically adapt to and withstand cyber attacks. Research and develop tools, methodologies and architecture guidelines that enable the design of avionics systems with sense, learn and adapt capabilities. Support test, maintenance, and acquisition communities with cyber subject matter expertise and techniques through consultation and technical interchange. Support other Services with cyber resiliency capabilities for air, ground and sea platforms and develop Open Mission Systems architectures incorporating cyber protections and resilience technologies. |                |                |                |
| <b>FY 2023 Plans:</b><br>Continue investigation and development of techniques to enable resilient cyber protections for avionics systems. Continue laboratory demonstrations on flight worthy hardware. Share expertise with other Services and Test, Maintenance, and Acquisition communities. Initiate investigating protection technologies applied to open system architectures to enable resilience in next-generation mission systems and facilitate agility in mission system capability. Initiate development of advanced modular architecture for agile avionics.   |                |                |                |
| <b>FY 2024 Plans:</b><br>Continue investigation and development of techniques to enable resilient cyber protections for mission systems. Continue laboratory demonstrations on flight worthy hardware. Share expertise with other services and test, maintenance, and acquisition communities. Continue investigating protection technologies applied to open system architectures to enable resilience in next-generation mission systems and facilitate agility in mission system capability. Continue development of advanced modular architecture for agile avionics mission systems. Initiate investigation of model-based systems engineering applications to improve  |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force | <b>Date:</b> March 2023 |
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| <b>Appropriation/Budget Activity</b><br>3600 / 2 | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>622005 / <i>Cyber Technology</i> |
|--|--|--|

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   | FY 2022 | FY 2023 | FY 2024 |
|---|---------|---------|---------|
| agility and resiliency of legacy and next-generation avionics mission systems architectures. Leverage models and open system architecture standards to quicken integration and transition of critical sensors technology.                               |         |         |         |
| <b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b><br>FY 2024 increased compared to FY 2023 by \$6.609 million. Funding increase is a result of the increased emphasis in cyber resiliency in next-generation mission systems architectures. |         |         |         |
| <b>Accomplishments/Planned Programs Subtotals</b>   | 3.607   | 8.466   | 15.075  |

|  | FY 2022 | FY 2023 |
|--|---------|---------|
| <b><i>Congressional Add:</i></b> Automated legacy code modernization | -       | 4.100   |
| <b><i>FY 2023 Plans:</i></b> Conduct Congressional directed efforts  |         |         |
| <b>Congressional Adds Subtotals</b>                                  | -       | 4.100   |

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable

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|   |                    |                |                |                     |  |                      |                |                |   |                         |                         |                   |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |  |                      |                |                |   | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |                      |                |                | <b>Project (Number/Name)</b><br>624920 / <i>Electronic Warfare Technology</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>   | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>  | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 624920: <i>Electronic Warfare Technology</i>                            | -                  | 18.866         | 45.410         | 41.944              | 0.000  | 41.944               | 40.247         | 41.205         | 41.536  | 45.600                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project develops and assesses affordable, reliable, all weather radio frequency countermeasure concepts for aerospace applications covering the range of radio frequency sensors including communications, navigation, intelligence, surveillance and reconnaissance (ISR), and radar, both active and passive, across the air, land, sea, space and cyber domains. It develops and evaluates technology for electronic warfare, integrated radar and electronic warfare systems, and electro-optical/infrared seeker defeat. This project develops the radio frequency warning and countermeasure technology for advanced electronic warfare and information operations applications. The project also explores technologies to maintain a military advantage in positioning, navigation and timing integrity, accuracy, and resiliency as well as on aircraft mission assurance - the protection of airborne platforms, manned and unmanned, in contested environments. The ultimate goal of the project is to ensure unrestricted access to the airspace and the electromagnetic spectrum in contested and congested environments.

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

|  |                |                |                |
|--|----------------|----------------|----------------|
|  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
| <b>Title:</b> Positioning, Navigation and Timing in Contested/Denied Environments  | 5.997          | 13.778         | 13.204         |
| <b>Description:</b> Develop resilient position, navigation and timing sensors. Explore position, navigation and timing solutions to enable novel distributed radio frequency sensing and countermeasure techniques. Develop technology base to provide solutions addressing navigation and timing threats.   |                |                |                |
| <b>FY 2023 Plans:</b><br>Continue research and demonstrations of integrated position, navigation and timing alternatives to satellite navigation, such as radio frequency signals of opportunity, magnetic, and vision aiding of inertial navigation systems. Continue demonstrating technologies to support airborne precise time, frequency, velocity and position as well as transfer between platforms to enable coherent sensing (intelligence, surveillance, reconnaissance) and effects (electromagnetic warfare). Continue developing and demonstrate trust techniques to enable military use of foreign satellite navigation signals. Continue developing software defined antenna electronics to complement software defined navigation receiver efforts, and explore advanced algorithms for software defined navigation. Initiate and complete development of requirements for a communications receiver to provide a connected solution for time, frequency, velocity and position data transfer. |                |                |                |
| <b>FY 2024 Plans:</b><br>Continue research and demonstrations of integrated positioning, navigation and timing alternatives to satellite navigation aiding of inertial measurement units. Such environmentally sensed alternatives include radio frequency signals of opportunity, magnetic gradient sensing, and sensor derived vision aiding. Continue developing technologies to support airborne precise time and frequency transfer in contested environments, to enable missions such as coherent sensing (intelligence, surveillance, reconnaissance), coherent effects (electromagnetic warfare), and operational concepts such as the Air Battle Management   |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force   |  | <b>Date:</b> March 2023   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>624920 / <i>Electronic Warfare Technology</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| <p>System. Continue developing and demonstrating trust techniques and operational concepts such as distribution of trusted satellite trajectories/information to enable blue force use of foreign satellite navigation signals. Continue research of software defined antenna electronics to complement software defined navigation receiver efforts. Continue to explore advanced algorithms for software defined navigation.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 decreased compared to FY 2023 by \$0.574 million. Justification for this decrease is described in plans above.</p>   |  |   |                |                |
| <p><b>Title:</b> Radio Frequency Electronic Warfare Technologies</p> <p><b>Description:</b> This project develops the radio frequency warning and countermeasure technology for advanced electronic warfare and information operations applications. This project develops techniques and technologies to detect and counter the communications links and sensors of threat integrated air defense systems and hostile command and control networks.</p> <p><b>FY 2023 Plans:</b><br/>Continue research to develop electromagnetic warfare technologies that operate in a contested electromagnetic environment to reason about complex threat capabilities/intentions. Technologies must understand the electromagnetic environment to synthesize an optimized response in a time frame to support aircraft survivability against adaptive and agile threats. Continue integration of electro-optical and radio frequency engagement model development and experimentation to develop strategies to counter multi-spectral threats to airborne platforms. Continue robust modeling, simulation, and assessment capability to include multi-spectral components to determine the efficiency versus effectiveness of emerging electronic support and electronic attack technologies. Continue to enhance hardware in the loop assessment capabilities to keep pace with complex electromagnetic spectrum background environments and emerging threats. Continue developing and demonstrating distributed electronic warfare techniques to defeat integrated air defense systems.</p> <p><b>FY 2024 Plans:</b><br/>Continue to develop, assess and mature radio frequency electromagnetic warfare technologies to identify, address, and reason about capabilities and intentions of complex emitters in contested environments. Expand specific threat identification to generalized techniques and logic, evolving traditional strategies towards adaptive capabilities that lead towards autonomous implementation for optimized response at tactically relevant timescale. Continue to develop and mature capabilities to defeat advanced radio frequency and multi-spectrum (integrated electro-optical and radio frequency) threats utilizing a common architecture that will feed into multiple advanced technology development programs. Initiate development of radio frequency environment signal based simulations that are moving towards a modular open systems approach. Continue to enhance and upgrade hardware in the loop assessment capabilities to keep pace with complex electromagnetic spectrum background environments and emerging threats. Continue robust modeling, simulation, and assessment capability, completing an effort looking at a particular advanced threat kill chain defeat concept.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b></p> |  | 8.629   | 24.650         | 22.089         |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force   |  | <b>Date:</b> March 2023   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>624920 / <i>Electronic Warfare Technology</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| FY 2024 decreased compared to FY 2023 by \$2.561 million. Funding decrease is a result of the decreased emphasis of single-use modeling and simulation efforts.   |  |   |                |                |
| <p><b>Title:</b> Electro-Optical/Infrared Threat Warning and Countermeasures Technologies</p> <p><b>Description:</b> Develop electro-optical/infrared sensor countermeasure technologies. Explore novel concepts to enable electro-optical/infrared threat seeker exploitation and surrogate modeling. Conduct fundamental research in countermeasures to defeat electro-optical/infrared threat seekers. Conduct fundamental research on integrated electro-optical/infrared threat warning systems.</p> <p><b>FY 2023 Plans:</b><br/>Continue threat characterization and development of countermeasures techniques to defeat emerging advanced electro-optical/infrared guided threats to airborne platforms. Continue investigating long-range missile warning and develop laser warning technology concepts to improve aircraft and aircrew survivability. Continue development of advanced threat surrogates and conduct infrared countermeasure testing at test ranges. Continue development of an advanced framework for modeling and simulation and hardware in the loop assessment with scene generation of engagements and techniques to defeat electro-optical and infrared guided threats to airborne platforms. Continue validating results using data collected in live fire tests. Continue development of electro-optical/infrared models and scenes to transition to multi-spectral threat assessment.</p> <p><b>FY 2024 Plans:</b><br/>Continue protection of aircraft and aircrew against advanced electro-optical/infrared guided threats by developing new or improved threat detection and countermeasure techniques. Continue investigate long-range missile warning and develop laser warning technology concepts to improve aircraft and aircrew survivability. Continue to validate threat warning results and missile signature modeling using data collected in live fire tests. Continue developing the digital engineering ecosystem to create/improve countermeasure techniques and evaluate novel infrared countermeasures system concepts. Continue the perform verification and validation activities on digital twin models within this digital ecosystem by collecting data in static flight tests, laboratory measurement, and peer assessments. Continue development and usage of threat surrogates to gain technical knowledge of future and emerging threats. Continue development of digital engineering components for electro-optical/infrared/radio frequency multi-spectrum threat assessment.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 decreased compared to FY 2023 by \$0.331 million. Justification for this decrease is described in plans above.</p> |  | 4.240   | 6.982          | 6.651          |
| <b>Accomplishments/Planned Programs Subtotals</b>   |  | 18.866  | 45.410         | 41.944         |
| <b>C. Other Program Funding Summary (\$ in Millions)</b>  |  |   |                |                |
| N/A   |  |   |                |                |

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Air Force **Date:** March 2023

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| <b>Appropriation/Budget Activity</b><br>3600 / 2 | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>624920 / <i>Electronic Warfare Technology</i> |
|--|--|---|

**C. Other Program Funding Summary (\$ in Millions)**

**Remarks**

**D. Acquisition Strategy**

Not applicable

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|   |                    |                |                |                     |  |                      |                |                |  |                         |                         |                   |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|--|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |  |                      |                |                |  | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |                      |                |                | <b>Project (Number/Name)</b><br>626095 / <i>Sensor Fusion Technology</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>   | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>   | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 626095: <i>Sensor Fusion Technology</i>                                 | -                  | 24.742         | 63.577         | 37.642              | 0.000  | 37.642               | 36.846         | 37.717         | 38.536   | 41.956                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project develops foundational and applied technologies required for closed-loop autonomous sensing employing multiple information domains, diverse sensor phenomena, and multiple platform types to provide intelligence, surveillance, and reconnaissance; target recognition; situational awareness and battlespace visualization; fire control; and battle damage assessment capabilities against a wide variety of air and ground based targets engaged in multitudes of behaviors in a broad range of operational environments. This project conducts exploratory and applied investigations to determine technology feasibility and estimate operational capability constraints associated with missions in future contested and highly contested operating environments, using cooperative and non-cooperative sensing sources. This project develops techniques to automate multi-sensor exploitation and information processing which leverage data fusion, adaptive signal processing, sensor and platform orchestration, leveraging artificial intelligence / machine learning research communities. This project develops concepts and algorithms for efficient processing at the edge, parallel processing, distributed processing, and high-performance computing in sensor data processing and synthetic data generation.

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

|  |                |                |                |
|--|----------------|----------------|----------------|
|  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
| <b>Title:</b> Battlespace Awareness Sensing Fusion   | 7.225          | 15.883         | 18.912         |
| <p><b>Description:</b> Developing novel techniques for behavioral and physical knowledge generation from multiple sensors, intelligence sources, domains (Air, Space, Cyber) and sources to include algorithm development, assessment, and experiments across multiple distributed, homogeneous and heterogeneous sensors and platforms. This effort will focus on technology areas of data association, entity detect/track/identification, information fusion, training with limited data, and data/performance modeling. The application of machine learning techniques to address technical challenges in contested environments is a particular emphasis.</p> <p><b>FY 2023 Plans:</b><br/>Continue generating knowledge through fusion of multiple spatial and temporal sensors, improving the state of the art in fusion exploitation. Continue providing solutions for contested environments wherein data is extremely limited. Continue applying deep and machine learning techniques to the detection/ tracking/targeting, recognition of stationary and moving objects and ground-based systems, pattern of life understanding, applying advanced information understanding tools and emerging techniques, over a broad set of sensing operating conditions. Initiate research applying techniques learned in air/space to ground application, applying those techniques, where applicable to the air/space to air problem. Continue investigating fusion of hard and soft information sources for military relevant applications. Continue improving the time between development and demonstration of integration capabilities with a development, secure, operations and algorithm containerization.</p> <p><b>FY 2024 Plans:</b><br/>Initiate a system of systems construct, bringing opportunistic sensing capabilities to tactical edge information integration. Continue generating knowledge through fusion of multiple spatial and temporal sensors, improving the state of the art in fusion exploitation.</p> |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force | <b>Date:</b> March 2023 |
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| <b>Appropriation/Budget Activity</b><br>3600 / 2 | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>626095 / <i>Sensor Fusion Technology</i> |
|--|--|--|

|   |                |                |  |                |
|---|----------------|----------------|--|----------------|
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b> | <b>FY 2022</b> | <b>FY 2023</b> |  | <b>FY 2024</b> |
|---|----------------|----------------|--|----------------|

|  |  |  |  |  |
|--|--|--|--|--|
| <p>Continue to provide solutions for contested environments wherein data is extremely limited. Continue to apply novel state of the art deep and machine learning techniques to the recognition of stationary and moving objects in air/ground/surface based systems, pattern of life understanding, applying advanced information understanding tools and emerging techniques, over a broad set of sensing operating conditions. Continue advancing research techniques learned in air/space to ground application; where applicable expand sensing domain to include surface. Continue investigating fusion of hard and soft information sources for military relevant applications. Continue improving the time between development and demonstration of integration capabilities with a development, secure, operations and algorithm containerization. Initiate a research and development push to standardized integration environments and expand simulation capabilities to estimate performance across a wide spectrum of operating conditions.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$3.029 million. Increase is a result of new emphasis on surface-based systems recognition research.</p> |  |  |  |  |
|--|--|--|--|--|

|   |       |       |  |       |
|---|-------|-------|--|-------|
| <p><b>Title:</b> Multi-Domain Sensing Effects and Analysis</p> <p><b>Description:</b> This effort focuses on two primary areas: (1) Multi domain sensing and effects mission analysis and (2) performance understanding and assessments. It develops methodologies and modeling, simulation, and analysis tools to enable multi domain analysis and technology development, informing other efforts and projects across the directorate. Investments in modeling, simulation and analysis represent current and next generation sensing platforms to include air, space, and cyber to include fusion of information, battlespace understanding, and the ability to simulate sensor and platform performance at the mission level, engagement level, and physics level, to understand performance and trade space amongst these domains.</p> <p><b>FY 2023 Plans:</b><br/>Continue development of autonomy performance evaluation techniques adapted to specific artificial intelligence and machine learning challenges. Continue performing empirical performance estimation for intelligence, surveillance, and reconnaissance automated sensing exploitation of military-critical targets with limited training data. Continue data as-a-service research environment by extending from unclassified to classified networks, leveraging research cloud environments, further enabling sensing autonomy developers and warfighting analysts. Initiate defense applications for the ability to perform new data tagging and automated data availability architecture to a service-wide application along with our intelligence community partners. Continue the transition of test and evaluation harness software to department-wide performance analysis community, leveraging standardize test metrics and performance measurement understanding.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of autonomy performance evaluation techniques adapted to specific artificial intelligence and machine learning challenges. Continue to perform empirical performance estimation for intelligence, surveillance, and reconnaissance automated sensing exploitation of military-critical targets with limited training data. Continue the employment of data as-a-service</p> | 3.721 | 3.436 |  | 3.948 |
|---|-------|-------|--|-------|

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |  | <b>Date:</b> March 2023  |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>626095 / <i>Sensor Fusion Technology</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|---|----------------|----------------|----------------|
| <p>research environment across unclassified to classified networks, leveraging research cluster compute, cloud environments and high-performance compute facilities, further enabling sensing autonomy developers and warfighting analysts. Continue the transition to defense applications data tagging and automated data availability architecture to a service-wide application along with our intelligence community partners. Continue the transition of test and evaluation harness software to department-wide performance analysis community, leveraging standardize test metrics and performance measurement understanding.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$0.512 million. Justification for this increase is described in plans above.</p>  |                |                |                |
| <p><b>Title:</b> Knowledge and Execution Management</p> <p><b>Description:</b> Develop, evaluate, and demonstrate models for sensing and for adversary behavior that support anticipatory asset tasking, characterization of latencies and related uncertainties, and joint inference and control. Develop multisource sensing techniques to include sensor and platform optimization and control, providing environment characterization consistent with the needs of automated and autonomous systems. This research and development investment allows for the automation of closed-loop intelligence, surveillance and reconnaissance.</p> <p><b>FY 2023 Plans:</b><br/>Continue improving and integrate onboard mission resource management techniques for distributed sensing/effects capabilities via open autonomy architectures and continue evaluation. Continue to accomplish performance understanding through simulation, demonstration, and blended sim/live testing (multiple aircraft &amp; sensors). Continue improving representational and computational efficiency of on-board reasoning about ground targets and target groupings, and target behaviors. Initiate new research in foundational knowledge of emerging management algorithms for battlespace awareness incorporating interacting air/ground targets, air/air targets, environments, and operationally representative contingencies. Continue the development of emerging algorithms to perform information reasoning and continue to evolve forms of representations and combined representations and reasoning approaches such as self-querying synergistic knowledge graph / machine learning world models, more diverse state representations in reinforcement learning, and spiking neural network reinforcement learning.</p> <p><b>FY 2024 Plans:</b><br/>Continue improving mission resource management techniques for distributed sensing/effects capabilities through open autonomy architectures and state of the art AI/ML techniques. Initiate applied research in direct support of systems of systems programs. Continue to accomplish performance understanding through simulation, demonstration, and blended simulation/live testing (multiple vehicles &amp; sensors). Continue improving representational and computational efficiency of on-board reasoning about ground/surface targets and target groupings, and target behaviors. Continue research in foundational knowledge of emerging management algorithms for battlespace awareness incorporating interacting air/ground targets, air/air targets, and air/surface</p> | 4.247          | 11.216         | 10.371         |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |  | <b>Date:</b> March 2023  |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>626095 / <i>Sensor Fusion Technology</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|---|----------------|----------------|----------------|
| environments, and operationally representative contingencies. Continue the development of emerging algorithms to perform information reasoning and continue to evolve forms of representations and combined representations and reasoning approaches.<br><br><b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b><br>FY 2024 decreased compared to FY 2023 by \$0.845 million. Justification for this decrease is described in the plans above.  |                |                |                |
| <b><i>Title:</i></b> Cyber Physical Sensing<br><br><b><i>Description:</i></b> Cyber Physical Sensing is the opportunity to exploit the internet of things and other non-traditional intelligence, surveillance and reconnaissance sensing systems in a way other than what they were designed to do. This additional source of information closes the gap between current intelligence, surveillance and reconnaissance collection capabilities and the vision of all intelligence, surveillance and reconnaissance, all the time. This technology investment looks at the sensing opportunities which exist at the point where physics meets the cyber domain. This effort focuses on the proliferated sensing devices, extracting information from multi-intelligence sensors and translating that information into detection, tracking and identification by use of multi-intelligence fusion. This effort leverages processing at-the-edge and distributed processing, exploited using new-generation machine learning, artificial intelligence and deep learning techniques.<br><br><b><i>FY 2023 Plans:</i></b><br>Initiate non-traditional intelligence, surveillance and reconnaissance collection opportunities, associate opportunities to intelligence, surveillance and reconnaissance collection capabilities, and invest appropriately in research and development of techniques to improve collection, processing, and dissemination of information, allowing for automation and autonomy in intelligence, surveillance and reconnaissance. Continue research and development in edge to core/cloud information processing and how these capabilities can best be utilized to get within the adversaries observe, orient, decide, act loop. Initiate research in novel techniques to exploit unforeseen information from these non-traditional ISR information sources. Continue research which advances tactics, techniques and procedures by way of new exploitation techniques of cyber physical modalities.<br><br><b><i>FY 2024 Plans:</i></b><br>Continue research of non-traditional intelligence, surveillance and reconnaissance collection opportunities, associate opportunities to intelligence, surveillance and reconnaissance collection capabilities, and invest appropriately in research and development of techniques to improve collection, processing, and dissemination of information, allowing for automation and autonomy. Continue research and development in edge to core/cloud. Initiate science and technology investment of cyber physical sensing capabilities into systems of systems information flows, bringing opportunistic/non-traditional/proliferated sensing products into Air Force integrated capability intelligence, surveillance and reconnaissance exploitation programs. Continue research in new novel techniques to exploit unforeseen information from these non-traditional ISR information sources. Continue research which advances tactics, techniques, and procedures by way of new exploitation techniques of cyber physical modalities.<br><br><b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b> | 2.647          | 3.042          | 4.411          |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force | <b>Date:</b> March 2023 |
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| <b>Appropriation/Budget Activity</b><br>3600 / 2 | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>626095 / <i>Sensor Fusion Technology</i> |
|--|--|--|

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>  | FY 2022 | FY 2023 | FY 2024 |
|--|---------|---------|---------|
| FY 2024 increased compared to FY 2023 by \$1.369 million. Increase is a result of new emphasis on systems of systems research. |         |         |         |
| <b>Accomplishments/Planned Programs Subtotals</b>  | 17.840  | 33.577  | 37.642  |

|  | FY 2022 | FY 2023 |
|--|---------|---------|
| <b>Congressional Add:</b> Program increase: Reliability of combat cloud communications systems | 6.902   | -       |
| <b>FY 2022 Accomplishments:</b> Conduct Congressional directed efforts                         |         |         |
| <b>Congressional Add:</b> Cyber kinetic combat environment                                     | -       | 30.000  |
| <b>FY 2023 Plans:</b> Conduct Congressional directed efforts                                   |         |         |
| <b>Congressional Adds Subtotals</b>  | 6.902   | 30.000  |

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

**Remarks**

**D. Acquisition Strategy**  
Not applicable

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|   |                    |                |                |                     |  |                      |                |                |   |                         |                         |                   |
|---|--------------------|----------------|----------------|---------------------|--|----------------------|----------------|----------------|---|-------------------------|-------------------------|-------------------|
| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |                    |                |                |                     |  |                      |                |                |   | <b>Date:</b> March 2023 |                         |                   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> |                      |                |                | <b>Project (Number/Name)</b><br>627622 / <i>RF Sensors and Countermeasures Tech</i> |                         |                         |                   |
| <b>COST (\$ in Millions)</b>  | <b>Prior Years</b> | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024 Base</b> | <b>FY 2024 OCO</b>   | <b>FY 2024 Total</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b>  | <b>FY 2028</b>          | <b>Cost To Complete</b> | <b>Total Cost</b> |
| 627622: <i>RF Sensors and Countermeasures Tech</i>                      | -                  | 18.748         | 36.001         | 44.402              | 0.000  | 44.402               | 42.468         | 43.434         | 43.989  | 48.159                  | Continuing              | Continuing        |

**A. Mission Description and Budget Item Justification**

This project develops and assesses affordable, reliable all weather radio frequency sensing and countermeasure concepts for aerospace applications covering the range of radio frequency sensors including communications, navigation, intelligence, surveillance and reconnaissance (ISR), and radar, both active and passive, across the air, land, sea, space and cyber domains. This project also develops and evaluates technology for intelligence, surveillance and reconnaissance sensors, fire control radars, electronic warfare, integrated radar and electronic warfare systems, and offensive information operations systems. It emphasizes the detection and tracking of surface and airborne targets with radio frequency signatures that are difficult to detect due to reduced radar cross sections, concealment and camouflage measures, severe clutter, or heavy jamming. Techniques exploited include the use of multiple radio frequency phenomenologies, multi-dimensional adaptive processing, advanced waveforms and knowledge-aided processing techniques. This project also develops concepts to counter threats to our aerospace systems. It develops and evaluates technology for electronic warfare, integrated radar and electronic warfare systems, and electro-optical/infrared seeker defeat. This project develops the radio frequency warning and countermeasure technology for advanced electronic warfare and information operations applications. The project also explores technologies to maintain a military advantage in positioning, navigation and timing integrity, accuracy, and resiliency.

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

|   |                |                |                |
|---|----------------|----------------|----------------|
|   | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
| <b>Title:</b> Multiband Multifunction Radio Frequency Sensing   | 7.344          | 14.295         | 14.976         |
| <b>Description:</b> Develop multi-band and multi-beam forming technologies. Address technologies for antenna array operations in dynamic sensor networks.   |                |                |                |
| <b>FY 2023 Plans:</b><br>Continue demonstrating integrated electronic support measure/airborne moving target indicator/ground moving target indicator modes for passive multi-mode radar using ultra high frequency to S-band digital array system. Continue advanced mode development for multi-beam and multi-function digital arrays, implementing more complex modes and advanced waveforms with applications for Advanced Early Warning radar. Initiate transition of ground-based modes to airborne digital array demonstrator. Continue integration of additively manufactured antennas and radar backend components to demonstrate low-cost, wide bandwidth, scalable, and conformal phased array antennas for unmanned sensing platforms. Complete bi-static flight data collection using low cost digital beamforming receiver. Continue development of techniques for analysis of complex active electronically scanned arrays on large platforms. |                |                |                |
| <b>FY 2024 Plans:</b><br>Complete demonstrations of integrated electronic support measure/airborne moving target indicator/ground moving target indicator modes for passive multi-mode radar using ultra high frequency to S-band digital array demonstrator. Continue advanced   |                |                |                |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |  | <b>Date:</b> March 2023   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>627622 / <i>RF Sensors and Countermeasures Tech</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>  | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|--|----------------|----------------|----------------|
| <p>mode development for multi-beam and multi-function digital arrays, implementing more complex modes and advanced waveforms with applications for Advanced Early Warning radar. Complete transition of ground-based modes to laboratory experimental airborne digital array system. Initiate migration of mode implementation from custom interfaces to Department of Defense and Department of the Air Force standardized interfaces. Continue integration of additively manufactured antennas and radar backend components to demonstrate low-cost, wide bandwidth, scalable, and conformal phased array antennas for unmanned sensing platforms. Initiate analysis identifying performance bounds and requirements for low-cost radio frequency sensors in selected mission scenarios. Continue development of techniques for analysis of complex active electronically scanned arrays on large platforms.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$0.681 million. Justification for this increase is described in plans above.</p>  |                |                |                |
| <p><b>Title:</b> Passive Radio Frequency Sensing</p> <p><b>Description:</b> Develop a system that performs traditional radar sensing modes through passive means. The research plan is designed to continue the development of the subsystems which make up the passive radar and to follow a spiral development path that involves the integration and testing of various technology instantiations to produce alternate versions of a full passive multi-mode system. Includes the development of low size-weight-and-power radio frequency signal detection and geolocation payloads for small unmanned air systems and the integration of advanced receiver subsystems to meet a particular need of the Air Force. Explore combat identification technologies, modeling and simulation enhancements, and technologies supporting passive radar, electronic support, and signals intelligence.</p> <p><b>FY 2023 Plans:</b><br/>Continue development of small low cost direction finding payloads and advanced processing techniques for onboard signal characterization, geolocation/track, and signals pattern-of-life analysis. Initiate demonstration of distributed multi-ship geolocation aboard small unmanned aircraft systems. Continue development of enhanced radio frequency modeling and simulation tools for evaluation of passive radar performance in complex environments. Complete integration of bi- and multi-static radar clutter models into modeling and simulation tools. Continue integrating high fidelity modeling and simulation with mission level modeling to demonstrate operational utility of passive radar concepts. Continue analysis of bi-static target/ground scattering phenomenology and bi-static high resolution radar data in conjunction with advanced automated target recognition algorithms to demonstrate improved accuracy and timeliness for combat identification of complex targets. Initiate investigation of advanced processing techniques to enhance passive radar performance.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of small low cost direction finding payloads and advanced processing techniques for onboard signal characterization, geolocation/track, and signals pattern-of-life analysis. Continue demonstrating distributed multi-ship geolocation</p> | 4.186          | 9.081          | 15.071         |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force   |  | <b>Date:</b> March 2023   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600 / 2  | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>627622 / <i>RF Sensors and Countermeasures Tech</i> |                |                |
| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   |  | <b>FY 2022</b>  | <b>FY 2023</b> | <b>FY 2024</b> |
| <p>aboard an expanded set of small unmanned aircraft systems responsive to user requirements. Continue development of enhanced radio frequency modeling and simulation tools for evaluation of passive radar performance in complex environments. Expand clutter modelling capability by incorporating sea clutter models from the Navy into the Air Force analysis tools to support performance and mission modeling including maritime targets. Continue integrating high fidelity modeling and simulation with mission level modeling to demonstrate operational utility of passive radar concepts. Continue analysis of bi-static target/ground scattering phenomenology and bi-static high resolution radar data in conjunction with advanced automated target recognition algorithms to demonstrate improved accuracy and timeliness for combat identification of complex targets. Continue the investigation of advanced processing techniques to enhance passive radar performance and enhance target ID performance. Initiate investigation of emerging receiver technology such as quantum enabled receivers.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b><br/>FY 2024 increased compared to FY 2023 by \$5.990 million. Increase is a result of realignment of funding from Program Aerospace Sensors, 0602204F; Project RF Sensors and Countermeasures Tech, 627622; Multiband Multifunction Radio Frequency Sensing and Distributed Radio Frequency Sensing efforts.</p>  |  |   |                |                |
| <p><b>Title:</b> Distributed Radio Frequency Sensing</p> <p><b>Description:</b> Develop innovative, timely, and affordable target detection, tracking, and characterization (namely imaging/identification) capabilities that leverage two or more spatially-distributed receivers and transmitters that use cooperative radio frequency transmitters (illuminators), namely those radio frequency sources that have a common objective to the receiver systems being used.</p> <p><b>FY 2023 Plans:</b><br/>Continue development of robust non-traditional multi-static transmit waveforms and receive processing chains for operationally relevant multi-static ground moving target indicator systems. Initiate investigation of platform constraints and implementation of near real-time processing. Define requirements for capstone flight experiment demonstrating multi-static detection and tracking of ground targets. Continue enhancements of multi-static synthetic aperture radar algorithms to support combat identification and automatic target recognition requirements on tactical timelines. Continue implementation and evaluation of multi-static synthetic aperture radar algorithms on cost and size constrained platforms. Initiate development/maturation of distributed 3-dimensional imaging algorithms that are scalable to a multi-domain approach. Continue data collection and analysis to assess performance of distributed radar systems for ground moving target indicator and synthetic aperture radar. Continue to explore multi- and cross-domain applications.</p> <p><b>FY 2024 Plans:</b><br/>Continue development of robust non-traditional multi-static transmit waveforms and receive processing chains for operationally relevant multi-static ground moving target indicator systems. Continue investigation of platform constraints and implementations</p> |  | 7.218   | 12.625         | 14.355         |

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| <b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force |  | <b>Date:</b> March 2023   |
| <b>Appropriation/Budget Activity</b><br>3600 / 2                        | <b>R-1 Program Element (Number/Name)</b><br>PE 0602204F / <i>Aerospace Sensors</i> | <b>Project (Number/Name)</b><br>627622 / <i>RF Sensors and Countermeasures Tech</i> |

| <b>B. Accomplishments/Planned Programs (\$ in Millions)</b>   | <b>FY 2022</b> | <b>FY 2023</b> | <b>FY 2024</b> |
|---|----------------|----------------|----------------|
| <p>of near real-time processing. Provide required technology enhancements to capstone flight experiment demonstrating multi-static detection and tracking of ground targets. Continue enhancements of multi-static synthetic aperture radar algorithms to support combat identification and automatic target recognition requirements on tactical timelines. Continue implementation and demonstration of multi-static synthetic aperture radar algorithms on cost and size constrained platforms. Continue development/ maturation of distributed 3-dimensional imaging algorithms that are scalable to a multi-domain approach. Continue data collection and analysis to assess performance of distributed radar systems for ground moving target indicator and synthetic aperture radar. Continue to explore multi- and cross-domain applications.</p> <p><b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b><br/> FY 2024 increased compared to FY 2023 by \$1.730 million. Funding increase is a result of an increased emphasis in the processing timelines of the algorithms supporting distributed sensing.</p> |                |                |                |
| <b>Accomplishments/Planned Programs Subtotals</b>   | 18.748         | 36.001         | 44.402         |

**C. Other Program Funding Summary (\$ in Millions)**

N/A

**Remarks**

**D. Acquisition Strategy**

Not applicable