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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force   |                    |                |                |                     |   |                      |                |                |                |                | <b>Date:</b> April 2022 |                   |
|--|--------------------|----------------|----------------|---------------------|---|----------------------|----------------|----------------|----------------|----------------|-------------------------|-------------------|
| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i> |                    |                |                |                     | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> |                      |                |                |                |                |                         |                   |
| <b>COST (\$ in Millions)</b>   | <b>Prior Years</b> | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023 Base</b> | <b>FY 2023 OCO</b>  | <b>FY 2023 Total</b> | <b>FY 2024</b> | <b>FY 2025</b> | <b>FY 2026</b> | <b>FY 2027</b> | <b>Cost To Complete</b> | <b>Total Cost</b> |
| Total Program Element  | -                  | 5.729          | 15.749         | 8.511               | 0.000   | 8.511                | 7.418          | 7.228          | 7.380          | 7.543          | 0.000                   | 59.558            |
| 673587: <i>Air Traffic Control Systems</i>   | -                  | 5.729          | 15.749         | 8.511               | 0.000   | 8.511                | 7.418          | 7.228          | 7.380          | 7.543          | 0.000                   | 59.558            |
| Quantity of RDT&E Articles   | -                  | -              | -              | -                   | -   | -                    | -              | -              | -              | -              |                         |                   |

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

To support the Air Force worldwide flying mission, this program element funds research, development, and management of fielded and emerging air traffic control communications, surveillance, automation, positioning, and precision approach and landing systems. When applicable, this may include coordination with bodies such as the International Civil Aviation Organization, the North Atlantic Treaty Organization or with the Federal Aviation Administration (FAA).

AFT will utilize the Airfield Operations Accelerator (AO-X) innovation presence at Hanscom Air Force Base to continue driving innovation supporting Airfield Operations' critical role in Agile Combat Employment. AFT projects will focus on identified and/or documented capability gaps and associated mitigating technologies required to ensure interoperability of fielded and planned ATCALs systems with USAF command and control systems such as the Advanced Battle Management System.

These efforts support the 2018 NDAA National Defense Strategy approach to "generate decisive and sustained U.S. military advantages" by enabling "forward force maneuver and posture resilience". Research and development of technology and strategies to support adaptive, agile basing concepts of operations provide ATCALs capabilities necessary to ensure enduring, resilient, efficient and safe air operations. AFT will "evolve innovative operational concepts" by modernizing airfield operations, provide adaptive ATC services and systems appropriate for the current environment, and bolster "Dynamic Force Employment" through scalable employment operations and globally deployable forces for the four layers of the "Global Operating Model: "contact, blunt, surge, and homeland".

FY23 ATCALs development efforts will continue to research and develop new technologies in multiple areas of aircraft launch and recovery for both fixed and expeditionary operations. These may include, but are not limited to: military and civil airspace interoperability; smaller footprint and lightweight expeditionary technology; improved Notice to Operators (NOTAMs) software capabilities; electronically scanned Man-Portable TACAN antenna technology, and evaluation of new civil ATCALs technologies that may have military utility. As these technologies and architectures mature, fixed base and deployable ground system upgrades will be coordinated and fielded concurrently with related manned and unmanned aircraft avionics capabilities that may be required. When implemented, these efforts will enable DoD aircraft to enhance safety, security, efficiency, and affordability of global flight operations.

The total cost of the D-RAPCON Middle Tier of Acquisition effort is \$70.356 million, including RDT&E and procurement of prototype units. The D-RAPCON is fully funded across the Future Years Defense Program

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force | <b>Date:</b> April 2022 |
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| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> |
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver the ATCALs weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY22 0.000M was expended for civilian pay expenses in this program element, and in FY23 0.000M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

| <b>B. Program Change Summary (\$ in Millions)</b> | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023 Base</b> | <b>FY 2023 OCO</b> | <b>FY 2023 Total</b> |
|---|----------------|----------------|---------------------|--------------------|----------------------|
| Previous President's Budget                       | 6.541          | 8.749          | 0.000               | 0.000              | 0.000                |
| Current President's Budget                        | 5.729          | 15.749         | 8.511               | 0.000              | 8.511                |
| Total Adjustments                                 | -0.812         | 7.000          | 8.511               | 0.000              | 8.511                |
| • Congressional General Reductions                | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Directed Reductions               | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Rescissions                       | 0.000          | 0.000          |                     |                    |                      |
| • Congressional Adds                              | 0.000          | 7.000          |                     |                    |                      |
| • Congressional Directed Transfers                | 0.000          | 0.000          |                     |                    |                      |
| • Reprogrammings                                  | -0.589         | 0.000          |                     |                    |                      |
| • SBIR/STTR Transfer                              | -0.223         | 0.000          |                     |                    |                      |
| • Other Adjustments                               | 0.000          | 0.000          | 8.511               | 0.000              | 8.511                |

**Change Summary Explanation**

The FY2022 President's Budget submittal did not reflect FY2023 through FY2026 funding. Therefore, an explanation of the change between the two budget positions for FY2023 cannot be made in a relevant manner.

| <b>C. Accomplishments/Planned Programs (\$ in Millions)</b>   | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023</b> |
|---|----------------|----------------|----------------|
| <b>Title:</b> ATC Future Technology (AFT)   | 5.729          | 13.591         | 6.939          |
| <b>Description:</b> Includes efforts to implement ATC Future Technologies efficiencies and capabilities. Focus is on aircraft launch and recovery, airspace interoperability, expeditionary technology development and prototyping, optimization of flight capability, adherence to mandates, technology research and analysis, and Early Operational Assessment of Remote Virtual Air Traffic Control Tower technology, development of standards for certification of Infill radars to mitigate Windfarm interference to ATC surveillance radars, and evaluation of Unmanned Aeronautical Systems (UAS) negation technology for use in mobile air traffic systems. |                |                |                |
| <b>FY 2022 Plans:</b>   |                |                |                |
| - Continues ATC Future Technology Analysis and Research which will include the following tasks:   |                |                |                |

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force   |  | <b>Date:</b> April 2022   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>   |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F <i>I Air Traffic Control, Approach, and Landing System (ATCALs)</i> |                |                |
| <b>C. Accomplishments/Planned Programs (\$ in Millions)</b>  |  | <b>FY 2021</b>  | <b>FY 2022</b> | <b>FY 2023</b> |
| <ul style="list-style-type: none"> <li>-- Continues development and maturation of technology to support Aircraft Launch and Recovery for both expeditionary and fixed operations, such as the Lightweight Deployable Instrument Landing System, Multi- Function Radar, and Man Portable High Power Beacon Transponder.</li> <li>-- Continues supporting advancement in airspace interoperability between civilian and military fleets in both national and international airspace.</li> <li>-- Continues monitoring of emerging DoD/USAF and civil US and International mandates to ensure compliance of USAF fleets.</li> <li>-- Completes Early Operational Assessment of a Remote Virtual Air Traffic Control Tower capability to assess ability to meet AF flying/ATC missions in lieu of brick and mortar control towers.</li> <li>-- Continues development of Man Portable TACAN High Power Beacon Transponder.</li> <li>-- Continues Multi-Function Radar development including award of Multi-Function Radar Contract</li> <li>-- Completes development of Infill radar requirements and threshold parameters to enable operational validation for use in the National Airspace System.</li> <li>-- Continues monitoring complementary and GPS alternative Position, Navigation, and Timing (PNT) developments to ensure early integration into ATCALs plans and programs.</li> <li>-- Awards contract for Lightweight Deployable Instrument Landing System.</li> <li>-- Begins standup of the Airfield Operations Accelerator/Testbed.</li> <li>-- Continues analysis of wind turbine impact mitigation efforts toward development of a process for Infill Radar certification.</li> <li>-- Begins integration/evaluation of ATC sensors and commercial technologies with the Mobile Air Traffic Surveillance System (MATS) to evaluate UAS negation performance.</li> </ul> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Will continue ATC Future Technology Analysis and Research to drive innovation for the Airfield Operations community, which will include the following tasks: <ul style="list-style-type: none"> <li>-- Will implement analysis in the integration of ATC capabilities into Command and Control environments supporting Agile Combat Employment initiatives.</li> <li>-- Will continue development and maturation of technology to support Aircraft Launch and Recovery for both expeditionary and fixed operations, such as the Lightweight Deployable Instrument Landing System, Multi- Function Radar, Infill Radar, and Man Portable TACAN High Powered Beacon Transponder.</li> <li>-- Will continue supporting advancement in airspace interoperability between civilian and military fleets in both national and international airspace.</li> <li>-- Will continue monitoring emerging DoD/USAF and civil US and International mandates to ensure compliance of USAF fleets.</li> <li>-- Will continue development of the Man Portable TACAN high power beacon transponder.</li> <li>-- Will continue monitoring complementary and GPS alternative PNT developments to ensure early integration into ATCALs plans and programs.</li> </ul> </li> </ul> |  |   |                |                |

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force   |  | <b>Date:</b> April 2022   |                |                |
| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>   |  | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> |                |                |
| <b>C. Accomplishments/Planned Programs (\$ in Millions)</b>  |  | <b>FY 2021</b>  | <b>FY 2022</b> | <b>FY 2023</b> |
| <p>-- Will continue development of threshold parameters and requirements needed for certification of Infill Radar systems in the National Airspace System.</p> <p>-- Will Demonstrate a pre-production MATS capability to visualize an integrated local and Beyond Visual Line of Sight (BVLOS) airspace picture (UAS negation technology).</p> <p>-- Will begin test and evaluation of Lightweight Deployable Instrument Landing System.</p> <p>-- Will continue to mature the Airfield Operations accelerator/Testbed facility.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b><br/>Large decrease related to \$7M in FY22 Congressional Adds.</p>   |  |   |                |                |
| <p><b>Title:</b> Man-Portable Electronically Scanned Antenna</p> <p><b>Description:</b> Develops new electronically scanned antenna to replace the existing Man-Portable Tactical Air Navigation (TACAN) mechanical antenna. The new antenna will reduce system weight, improve reliability, and extend battery life. The Man-Portable TACAN provides aircraft with point-to-point navigating and instrument flight approaches to forward operating sites/landing zones and is critical to mission success in adverse weather conditions. It replaces 40+ year old legacy systems which are no longer supportable. The Man-Portable TACAN also supports the 2018 NDAA National Defense Strategy for rapidly deployable, adaptive, and scalable family of systems. Through FY29, a total of 68 systems will be procured (58 for the Active Duty and 10 for the Air National Guard).</p> <p><b>FY 2022 Plans:</b><br/>- Award contract and begin development of electronically scanned antenna to replace mechanical antenna and reduce weight, improve reliability, and extend battery life.</p> <p><b>FY 2023 Plans:</b><br/>- Continues development of MP-TACAN Electronically Scanned Antenna.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b><br/>Decrease is consistent with cost estimate and contract level of effort.</p> |  | 0.000   | 1.737          | 1.352          |
| <p><b>Title:</b> NOTAMs Software</p> <p><b>Description:</b> The DoD NOTAMs system provides aircrews and airfield operations personnel with airfield conditions, temporary flight restrictions, navigation aid and airfield lighting outages, and special instructions for departing or landing at DoD airfields. Funding continues NOTAMs software development to incorporate International Civil Aviation Organization (ICAO) required digital codes, formats, and queries which enhance flight safety.</p> <p><b>FY 2022 Plans:</b></p>  |  | 0.000   | 0.421          | 0.220          |

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| <b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force | <b>Date:</b> April 2022 |
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| <b>Appropriation/Budget Activity</b><br>3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i> | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> |
|--|---|

| <b>C. Accomplishments/Planned Programs (\$ in Millions)</b>  | <b>FY 2021</b> | <b>FY 2022</b> | <b>FY 2023</b> |
|--|----------------|----------------|----------------|
| - Will continue NOTAMs software development.   |                |                |                |
| <b>FY 2023 Plans:</b><br>- Will complete NOTAMS software development.  |                |                |                |
| <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b><br>Funding decrease reflects reduced effort during last year of NOTAMs software development effort. |                |                |                |
| <b>Accomplishments/Planned Programs Subtotals</b>  | 5.729          | 15.749         | 8.511          |

| <b>D. Other Program Funding Summary (\$ in Millions)</b>                        |                |                |                               |                              |                                |                |                |                |                |                                   |                   |
|---|----------------|----------------|-------------------------------|------------------------------|--------------------------------|----------------|----------------|----------------|----------------|-----------------------------------|-------------------|
| <u>Line Item</u>  | <u>FY 2021</u> | <u>FY 2022</u> | <u>FY 2023</u><br><u>Base</u> | <u>FY 2023</u><br><u>OCO</u> | <u>FY 2023</u><br><u>Total</u> | <u>FY 2024</u> | <u>FY 2025</u> | <u>FY 2026</u> | <u>FY 2027</u> | <u>Cost To</u><br><u>Complete</u> | <u>Total Cost</u> |
| • OPAF 03 0305114F: <i>Air Traffic Control/Approach/Landing System (ATCALs)</i> | 0.000          | 6.024          | 6.309                         | 0.000                        | 6.309                          | 12.339         | 11.108         | 11.349         | 11.579         | Continuing                        | Continuing        |

**Remarks**

**E. Acquisition Strategy**  
ATCALs is a basket program element with multiple programs in various stages of acquisition which provide the air traffic control infrastructure to support peacetime and wartime missions. The overall strategy for ATC Future Technology is focused on developing a long-term execution strategy for the development of lightweight, scalable, readily deployable ATC equipment in order to support the National Defense Strategy.

Current contracting efforts include, but are not limited to, Early Operational Assessment (EOA) of Remote Virtual ATC Control Tower technology, Man-Portable TACAN high power beacon transponder, Lightweight Deployable Instrument Landing System, Multi-Function Tactical Radar Prototyping, NOTAMs software upgrades, and Man-Portable TACAN Electronically Scanned Antenna development, Infill Radar certification and demonstration of UAS negation technology.

The Remote Virtual ATC Control Tower EOA, Expeditionary Technology Development and Prototyping efforts will use full and open competition and OTA procedures. The Infill Radar certification, UAS Negation, and various research analysis efforts, are being executed via Military Inter-Departmental Purchase Requests, and Project Orders with various organizations (FAA, MITRE, Army, and the Air Force Flight Standards Agency).

The Air Force Program Executive Officer (PEO) Digital is the PEO for ATCALs and is also the delegated milestone decision authority. Program support cost contracts, logistics, and financial management support is provided by the Air Force Life Cycle Management Center Aerospace Management Systems Division (AFLCMC/HBA).

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force** **Date:** April 2022

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| <b>Appropriation/Budget Activity</b><br>3600 / 7 | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCALs) | <b>Project (Number/Name)</b><br>673587 / Air Traffic Control Systems |
|--|--|--|

| <b>Product Development (\$ in Millions)</b>              |                        |                                |             | FY 2021 |            | FY 2022 |            | FY 2023 Base |            | FY 2023 OCO |            | FY 2023 Total | Cost To Complete | Total Cost | Target Value of Contract |
|--|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                                       | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| AFT Expeditionary Technology Development and Prototyping | C/FFP                  | AFLCMC/HBA : Hanscom AFB, MA   | -           | 2.326   | May 2021   | 3.297   | Mar 2022   | 4.919        | Mar 2023   | -           |            | 4.919         | Continuing       | Continuing | -                        |
| Man-Portable TACAN Electronically Scanned Antenna        | C/CPFF                 | AFLCMC/HBAA : Tinker AFB, OK   | -           | -       |            | 1.512   | Jul 2022   | 1.051        | Jan 2023   | -           |            | 1.051         | Continuing       | Continuing | -                        |
| NOTAM Software   | C/FFP                  | AFDW/PK : JB Andrews, MD       | -           | 0.424   | Jun 2021   | 0.417   | May 2022   | 0.220        | May 2023   | -           |            | 0.220         | 0.000            | 1.061      | -                        |
| <b>Subtotal</b>  |                        |                                | -           | 2.750   |            | 5.226   |            | 6.190        |            | -           |            | 6.190         | Continuing       | Continuing | N/A                      |

| <b>Support (\$ in Millions)</b> |                        |                                |             | FY 2021 |            | FY 2022 |            | FY 2023 Base |            | FY 2023 OCO |            | FY 2023 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---------------------------------|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item              | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| AFT Research/Analysis           | MIPR                   | FAA : Washington, DC           | -           | 1.546   | Feb 2021   | 2.188   | Mar 2022   | 1.516        | Oct 2022   | -           |            | 1.516         | Continuing       | Continuing | -                        |
| Travel                          | Various                | Not specified. : TBD           | -           | 0.058   | May 2021   | 0.090   | Mar 2022   | 0.030        | Jan 2023   | -           |            | 0.030         | Continuing       | Continuing | -                        |
| <b>Subtotal</b>                 |                        |                                | -           | 1.604   |            | 2.278   |            | 1.546        |            | -           |            | 1.546         | Continuing       | Continuing | N/A                      |

**Remarks**  
 Various contract types, performing activity and city/states are result of the use of Military Interdepartmental Purchase Requests (MIPR), Work Request (WR), Purchase Requests (PR), Project Orders (PO), etc. that are sent to multiple agencies in support of some tasks.

| <b>Test and Evaluation (\$ in Millions)</b>         |                        |                                |             | FY 2021 |            | FY 2022 |            | FY 2023 Base |            | FY 2023 OCO |            | FY 2023 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|------------------------|--------------------------------|-------------|---------|------------|---------|------------|--------------|------------|-------------|------------|---------------|------------------|------------|--------------------------|
| Cost Category Item                                  | Contract Method & Type | Performing Activity & Location | Prior Years | Cost    | Award Date | Cost    | Award Date | Cost         | Award Date | Cost        | Award Date | Cost          |                  |            |                          |
| AFT Remote Air Traffic Control Tower Capability EOA | WR                     | Various : Various              | -           | 0.850   | Apr 2021   | 0.500   | Mar 2022   | -            |            | -           |            | -             | 0.000            | 1.350      | -                        |
| AFT ATCALs Operational Test & Evaluation (OT&E)     | WR                     | Various : Various              | -           | 0.225   | Jun 2021   | 0.250   | Jul 2022   | 0.250        | Jul 2023   | -           |            | 0.250         | Continuing       | Continuing | -                        |

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| Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force   |                        |                                       |             |   |            |         |            |                                      |            |             |            | Date: April 2022 |                  |            |                          |
|---|------------------------|---------------------------------------|-------------|---|------------|---------|------------|--------------------------------------|------------|-------------|------------|------------------|------------------|------------|--------------------------|
| Appropriation/Budget Activity   |                        |                                       |             | R-1 Program Element (Number/Name)                                       |            |         |            | Project (Number/Name)                |            |             |            |                  |                  |            |                          |
| 3600 / 7  |                        |                                       |             | PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCAL) |            |         |            | 673587 / Air Traffic Control Systems |            |             |            |                  |                  |            |                          |
| Test and Evaluation (\$ in Millions)  |                        |                                       |             | FY 2021   |            | FY 2022 |            | FY 2023 Base                         |            | FY 2023 OCO |            | FY 2023 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 |
| Infill Radar Wind Turbine Radar Interference Mitigation   | MIPR                   | FAA, AFRL : Washngtn DC/ Griffiss, NY | -           | -   |            | 2.000   | Apr 2022   | -                                    |            | -           |            | -                | Continuing       | Continuing | -                        |
| Mobile Air Traffic Surveillance System (MATS) - UAS Negation Evaluation   | MIPR                   | Various : Various                     | -           | -   |            | 5.000   | Jun 2022   | -                                    |            | -           |            | -                | Continuing       | Continuing | -                        |
| <b>Subtotal</b>   |                        |                                       | -           | 1.075   |            | 7.750   |            | 0.250                                |            | -           |            | 0.250            | Continuing       | Continuing | N/A                      |
| Management Services (\$ in Millions)  |                        |                                       |             | FY 2021   |            | FY 2022 |            | FY 2023 Base                         |            | FY 2023 OCO |            | FY 2023 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 |
| Man-Portable TACAN Electronically Scanned Antenna Program Support Cost (PSC) Contractor Services (AFLCMC/HBAA, Hanscom AFB) | C/CPAF                 | Various : OK City, Tinker AFB         | -           | -   |            | 0.225   | Jul 2022   | 0.255                                | Jul 2023   | -           |            | 0.255            | Continuing       | Continuing | -                        |
| AFT Program Support Cost (PSC) Contractor Services AFLCMC (AFLCMC/HBAG, Hanscom AFB)  | C/CPFF                 | Various : Hanscom AFB, MA             | -           | 0.300   | Dec 2020   | 0.270   | Jul 2022   | 0.270                                | Jul 2023   | -           |            | 0.270            | Continuing       | Continuing | -                        |
| <b>Subtotal</b>   |                        |                                       | -           | 0.300   |            | 0.495   |            | 0.525                                |            | -           |            | 0.525            | Continuing       | Continuing | N/A                      |
| <b>Project Cost Totals</b>  |                        |                                       | -           | 5.729   |            | 15.749  |            | 8.511                                |            | -           |            | 8.511            | Continuing       | Continuing | N/A                      |
| <b>Remarks</b>  |                        |                                       |             |   |            |         |            |                                      |            |             |            |                  |                  |            |                          |

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| <b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force |  | <b>Date:</b> April 2022  |
| <b>Appropriation/Budget Activity</b><br>3600 / 7                  | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCALs) | <b>Project (Number/Name)</b><br>673587 / Air Traffic Control Systems |

|  | FY 2021 |   |   |   | FY 2022 |   |   |   | FY 2023 |   |   |   | FY 2024 |   |   |   | FY 2025 |   |   |   | FY 2026 |   |   |   | FY 2027 |   |   |   |
|--|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|---------|---|---|---|
|  | 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 |
| <b>Air Traffic Control Future Technology (AFT)</b>                           |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Expeditionary Launch and Recovery Technology Development and Prototyping     |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Man Portable High Power Beacon Transponder Contract Award Jul 21             |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Man Portable High Power Beacon incremental Development/Test                  |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Man Portable High Power Beacon Transponder Authorization to Proceed          |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Multi Function Radar Development (Prior Year Contract Award Mar 20)          |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Multi Function Radar Incremental Integration/Simulation/Demonstration        |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Lightweight Deployable Instrument Landing System (LD-ILS) RFP Release Jan 22 |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| LD-ILS Contract Award Jun 22   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| LD-ILS Glide-Slope/Localizer Development/Test                                |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| LD-ILS System Demonstration and Validation                                   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Monitoring Emerging Mandates   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Optimizing Flight Operations   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Airspace Interoperability/Operations in GPS Denied Environments              |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Notice to Airmen (NOTAMs) Software Development                               |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |
| Fixed Remote Virtual ATC Tower EOA Installation/Integration/Site Prep        |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |         |   |   |   |



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| <b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force |   | <b>Date:</b> April 2022   |
| <b>Appropriation/Budget Activity</b><br>3600 / 7                   | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> | <b>Project (Number/Name)</b><br>673587 / <i>Air Traffic Control Systems</i> |

Schedule Details

| Events by Sub Project  | Start   |      | End     |      |
|--|---------|------|---------|------|
|  | Quarter | Year | Quarter | Year |
| <b><i>Air Traffic Control Future Technology (AFT)</i></b>                    |         |      |         |      |
| Expeditionary Launch and Recovery Technology Development and Prototyping     | 1       | 2021 | 4       | 2027 |
| Man Portable High Power Beacon Transponder Contract Award Jul 21             | 4       | 2021 | 4       | 2021 |
| Man Portable High Power Beacon incremental Development/Test                  | 4       | 2021 | 4       | 2025 |
| Man Portable High Power Beacon Transponder Authorization to Proceed          | 1       | 2026 | 1       | 2026 |
| Multi Function Radar Development (Prior Year Contract Award Mar 20)          | 1       | 2021 | 2       | 2023 |
| Multi Function Radar Incremental Integration/Simulation/Demonstration        | 4       | 2021 | 3       | 2023 |
| Lightweight Deployable Instrument Landing System (LD-ILS) RFP Release Jan 22 | 2       | 2022 | 2       | 2022 |
| LD-ILS Contract Award Jun 22   | 3       | 2022 | 3       | 2022 |
| LD-ILS Glide-Slope/Localizer Development/Test                                | 3       | 2022 | 2       | 2025 |
| LD-ILS System Demonstration and Validation                                   | 2       | 2025 | 2       | 2026 |
| Monitoring Emerging Mandates   | 1       | 2021 | 4       | 2027 |
| Optimizing Flight Operations   | 1       | 2021 | 4       | 2027 |
| Airspace Interoperability/Operations in GPS Denied Environments              | 1       | 2021 | 4       | 2027 |
| Notice to Airmen (NOTAMs) Software Development                               | 2       | 2021 | 4       | 2021 |
| Fixed Remote Virtual ATC Tower EOA Installation/Integration/Site Prep        | 1       | 2021 | 1       | 2021 |
| Fixed Remote Virtual ATC Tower EOA   | 1       | 2021 | 3       | 2021 |
| Fixed Remote Virtual ATC Tower EOA Final Report (Apr 22)                     | 3       | 2021 | 3       | 2021 |
| Mobile Remote Virtual ATC Tower EOA/Site Prep/Equip Integration/Optimization | 3       | 2021 | 1       | 2022 |
| Mobile Remote Virtual ATC Tower EOA  | 1       | 2022 | 3       | 2022 |
| Mobile Remote Virtual ATC Tower Report (Jun 22)                              | 3       | 2022 | 3       | 2022 |
| ATCALs Operational Test and Evaluation                                       | 1       | 2021 | 4       | 2027 |

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2023 Air Force **Date:** April 2022

|  |   |   |
|--|---|---|
| <b>Appropriation/Budget Activity</b><br>3600 / 7 | <b>R-1 Program Element (Number/Name)</b><br>PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i> | <b>Project (Number/Name)</b><br>673587 / <i>Air Traffic Control Systems</i> |
|--|---|---|

| <b>Events by Sub Project</b>  | <b>Start</b>   |             | <b>End</b>     |             |
|---|----------------|-------------|----------------|-------------|
|   | <b>Quarter</b> | <b>Year</b> | <b>Quarter</b> | <b>Year</b> |
| Infill Radar Windfarm Mitigation Criteria Development                   | 1              | 2021        | 4              | 2021        |
| Infill Radar Trial Validation   | 4              | 2021        | 2              | 2022        |
| Infill Radar Wind Turbine Radar Interference Mitigation                 | 3              | 2022        | 3              | 2025        |
| Mobile Air Traffic Surveillance System (MATS) - UAS Negation Evaluation | 3              | 2022        | 3              | 2023        |
| <b><i>Man-Portable TACAN Electronically Scanned Antenna</i></b>         |                |             |                |             |
| Man-Portable TACAN Electronically Scanned Antenna Development/Test      | 2              | 2022        | 4              | 2024        |
| <b><i>NOTAMs Software</i></b>   |                |             |                |             |
| Software Development/Test   | 1              | 2022        | 3              | 2023        |