| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force | | | | | | | | | | | Date: March 2024 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support* | | | | | R-1 Program Element (Number/Name)<br>PE 0604759F / *Major T&E Investment* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** | **FY 2026** | **FY 2027** | **FY 2028** | **FY 2029** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 169.432 | 31.143 | 74.228 | 0.000 | 74.228 | 208.911 | 282.949 | 278.682 | 274.774 | Continuing | Continuing |
| 664597: *AF Test Investments* | - | 169.432 | 31.143 | 74.228 | 0.000 | 74.228 | 208.911 | 282.949 | 278.682 | 274.774 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

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

This PE provides planning, improvements, and modernization for test capabilities within Air Force Test Center (AFTC) Major Range and Test Facility Base organizations: 96 Test Wing at Eglin AFB FL, the 412 Test Wing at Edwards AFB CA, and Arnold Engineering Development Complex (AEDC) at Arnold AFB TN. The 704th Test Group at Holloman AFB NM is aligned under AEDC as part of the management consolidation of Ground test capabilities. Finally, in FY20 and FY21 this PE provided funds to Air Force Space Command (AFSPC) now United States Space Force (USSF) for space threat testing. In FY22, Space threat funding was transferred to USSF.

The improvement and modernization (I&M) requirements are defined through the AF Test Investment Planning & Programming (TIPP) Process. All projects have been reviewed through the Tri-Service Reliance Process (to communicate AF efforts to the other services and avoid unwarranted duplication of effort) and are documented in the Technology Development Acquisition Program (TDAP) database. Each project has its own planning, development, equipment acquisition, equipment installation, and checkout phases which often require significant differences in funding from one year to the next. As such, the changes in category funding from year to year does not necessarily indicate program growth, but rather a planned phasing of I&M efforts. The test capabilities at these locations enable testing through all phases of weapon system acquisition, from system concept exploration through component and full-scale integrated weapon system test to operational test.

The 96 TW, at Eglin AFB FL, conducts and supports Developmental Test and Evaluation (DT&E) of non-nuclear air armaments; Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance, Reconnaissance (C5ISR) systems; target acquisition and weapon delivery systems; determines target/test item spectral signatures; and provides cyber testing capabilities as part of the Avionics Cyber Range (ACR).

The 412 Test Wing, at Edwards AFB CA, conducts and supports DT&E and Operational Test and Evaluation (OT&E) of aircraft and aircraft systems, aerospace research vehicles, unmanned aerial vehicles, cruise missiles, parachute delivery/recovery/systems, and cargo handling systems.

AEDC, at Arnold AFB TN, provides pre-flight reliability environmental test support for DoD aeropropulsion, flight systems, and space and missile programs. The center has 53 test facilities providing: aerodynamic testing of scale model aircraft, missiles, and space systems; testing of large and full-scale satellites, sensors, and space vehicles in a simulated space environment; altitude environmental testing for aircraft, missile, and spacecraft propulsion systems; testing of large-scale models such as space boosters together with their propulsion systems. The 704th TG at Holloman AFB, NM provides flight test and test support for joint, international and commercial customers in advanced avionics and weapons, inertial navigation systems, Global Positioning System (GPS) and other integrated aircraft and missile navigation systems. They test subsonic through hypersonic ground performance of aircraft and missiles in a flight-representative, highly instrumented environment while also coordinating and scheduling all US Air Force test operations at White Sands Missile Range. The 704 TG OL-AC at Wright-Patterson AFB, OH provides independent

developmental T&E in support of aircraft survivability and evaluation of full-scale aircraft landing gear, tires and brakes. They also provide an independent capability for component qualification.

In order to align the strategic capability goals set forth in the National Defense Strategy and the mission of the AFTC, program element funding has been assigned to these six mission area categories: T&E Range Asset Modernization, Hypersonics, Directed Energy, Cyberspace and Avionics Cyber, Autonomy, and Space Test Infrastructure.

1) T&E Range and Test Asset Modernization refers to those capabilities required to acquire the ability to test long range, high-speed, highly-instrumented, high-data rate weapons in a crowded and restricted spectrum, while operating at multiple classification and cybersecurity levels. Also included in this mission area is the ability to collect, analyze and store big data and the ability to do multi-domain testing across the enterprise with realistic threat scenarios at multiple classification level up to Special Access Program (SAP).

2) Hypersonics refers to the ability to test and evaluate flight-representative hypersonic engines, materials, warheads and fuzes in all portions of the employment envelope and conduct flight testing both in simulation and open-air ranges with sufficient space, telemetry, photo-optics and Time Space Position Information (TSPI) to appropriately inform decision-makers fielding such systems.

3) Directed Energy/Electronic Combat acquires the ability to characterize irradiance and beam properties on aircraft, small UAVs and ground targets and create realistic environments to simulate adversary air defense capabilities in the year 2030. Enables 5th-6th generation weapon testing/tactics development in a threat-realistic Anti-Access Area Denial (A2AD) environment using a combination of indoor and open-air ranges.

4) Cyberspace and Avionics Cyber is the advancement of cybersecurity/resiliency test capability for network, C5ISR, and airborne weapon platforms and includes development of tools, techniques and hardware-in-the-loop capabilities focused on cybersecurity and cyber-resiliency.

5) Autonomy refers to the ability to test autonomous aerial and ground systems with hundreds of independent vehicles. Must be able to monitor system-under-test locations and states with the ability for soft and hard termination. Must develop techniques and processes to test systems with artificial intelligence.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force | | | | | Date: March 2024 |
|---|---|---|---|---|---|
| **Appropriation/Budget Activity**<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support* | | **R-1 Program Element (Number/Name)**<br>PE 0604759F / *Major T&E Investment* | | | |
| **B. Program Change Summary ($ in Millions)** | **FY 2023** | **FY 2024** | **FY 2025 Base** | **FY 2025 OCO** | **FY 2025 Total** |
| Previous President's Budget | 171.314 | 31.143 | 74.096 | 0.000 | 74.096 |
| Current President's Budget | 169.432 | 31.143 | 74.228 | 0.000 | 74.228 |
| Total Adjustments | -1.882 | 0.000 | 0.132 | 0.000 | 0.132 |
| • Congressional General Reductions | 0.000 | 0.000 | | | |
| • Congressional Directed Reductions | 0.000 | 0.000 | | | |
| • Congressional Rescissions | 0.000 | 0.000 | | | |
| • Congressional Adds | 0.000 | 0.000 | | | |
| • Congressional Directed Transfers | 0.000 | 0.000 | | | |
| • Reprogrammings | 0.000 | 0.000 | | | |
| • SBIR/STTR Transfer | -1.882 | 0.000 | | | |
| • Other Adjustments | 0.000 | 0.000 | 0.132 | 0.000 | 0.132 |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| ***Title:*** T&E Range and Test Asset Modernization | 24.401 | 17.313 | 31.945 |

***Description:*** Description: T&E Range and Test Asset Modernization refers to those capabilities required to acquire the ability to test long range, high-speed, highly-instrumented, high-data rate weapons in a crowded and restricted spectrum, while operating at multiple classification and cybersecurity levels. Ability to collect, analyze and store big data and ability to do multi-domain testing across the enterprise with realistic threat scenarios at multiple classification level up to Special Access Program (SAP).

***FY 2024 Plans:***
Continue building Modular Mission Control Room Upgrade (MMCRU). Continue planning/execution for Gulf Range Enhancement (GRE), Next Generation Thrust Management (NGTM), and the Low Observability (RCS) Engine Test Stand. Start planning the Multi-Object Tracking Radar (EMOTOR) project and build on the 96TW Imaging Improvement Modernization Project (IIMP). Add on to the High-Pressure Air Additional Capability (HPAAC) Congressional Add by building another AEDC bottle farm. Close out Improve Plant Reliability and Efficiency/Transonic Aero Test Capability (IMTPC), Improve Large Model Supersonic Aerodynamic Ground T&E Capability (ILMSC) [formerly Tunnel 16S Reactivation].

***FY 2025 Plans:***
Continue building Modular Mission Control Room Upgrade (MMCRU). Continue execution for Gulf Range Enhancement (GRE), Next Generation Thrust Management (NGTM), and the Low Observability (RCS) Engine Test Stand. Continue execution the Multi-Object Tracking Radar (EMOTOR) project and build on the 96TW Imaging Improvement Modernization Project (IIMP). Add on to the High-Pressure Air Additional Capability (HPAAC) Congressional Add by building another AEDC bottle farm. Improve Large Model Supersonic Aerodynamic Ground T&E Capability (ILMSC) [formerly Tunnel 16S Reactivation].

***FY 2024 to FY 2025 Increase/Decrease Statement:***

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0604759F / *Major T&E Investment* |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| The increase from FY24 to FY25 is due to a reduction to the FY24 funding request by $14.6 million to account for the availability of prior year execution balances. | | | |
| ***Title:*** Hypersonics<br><br>***Description:*** Hypersonics refers to the ability to T&E flight-representative hypersonic engines, materials, warheads and fuzes in all portions of the employment envelope and conduct flight testing both in simulation and open-air ranges with sufficient space, telemetry, photo-optics and Time Space Position Information (TSPI) to appropriately inform decision-makers fielding such systems.<br><br>The Department of Defense Test Resource Management Center (TRMC) oversees and manages all hypersonic test investment.<br><br>***FY 2024 Plans:***<br>Begin Planning the GWEF Hypersonic Hardware in the Loop (GWEF HS HITL) project. Continue planning the following Ground Test projects: Turbine Base Combined Cycle (TBCC), Mach 5 Continuous Flow Test Capability (M5CFTC), True Temperature Mach 7 (TTM7), Integrated Scramjet Direct Connect Diagnostics (ISDCD).<br><br>***FY 2025 Plans:***<br>Continue planning and execution of the GWEF Hypersonic Hardware in the Loop (GWEF HS HITL) project. Execute the following Ground Test projects: Turbine Base Combined Cycle (TBCC), Mach 5 Continuous Flow Test Capability (M5CFTC), True Temperature Mach 7 (TTM7), Integrated Scramjet Direct Connect Diagnostics (ISDCD).<br><br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The increase from FY24 to FY25 is due to a reduction to the FY24 funding request by $16.6 million to account for the availability of prior year execution balances. | 134.639 | 1.500 | 18.090 |
| ***Title:*** Directed Energy/Electronic Combat<br><br>***Description:*** Directed Energy/Electronic Combat acquires the ability to characterize irradiance and beam properties on aircraft, small Unmanned Aerial Vehicles (UAV) and ground targets and create realistic environments to simulate adversary air defense capabilities in the year 2030. Enables 5th-6th generation weapon testing/tactics development in a threat-realistic Anti-Access Area Denial (A2AD) environment using a combination of indoor and open-air ranges.<br><br>***FY 2024 Plans:***<br>Continue Planning/Executing of the Advanced Multispectral Development - Phase I (AMD-I). Execute the plan for Next Generation Engineering Targets (OPTICAMS).<br><br>***FY 2025 Plans:*** | 0.700 | 4.000 | 8.293 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0604759F / *Major T&E Investment* |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Continue Execution of the Advanced Multispectral Development - Phase I (AMD-I) and Next Generation Engineering Targets (OPTICAMS). Start executing the DIADS Hypersonic Air Defense Effectiveness and Survivability (HADES) project.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The increase from FY24 to FY25 is due to a reduction to the FY24 funding request by $4.3 million to account for the availability of prior year execution balances. | | | |
| ***Title:*** Cyberspace and Avionics Cyber<br>***Description:*** Cyberspace and Avionics Cyber is the advancement of cybersecurity/resiliency test capability for network, C41SR and airborne weapon platforms and includes development of tools, techniques and hardware in the loop capabilities focused on cybersecurity and cyber-resiliency.<br>***FY 2024 Plans:***<br>Close out Weapon System Cyber Security Tools/Facility (WSCS) project. Continue developing an Enterprise Cross Platform Data Center. Start planning and potentially executing the War-fighter Data Links Test Capability (WDLTC) across the Enterprise (96TW & 412TW) to support next generation aircraft and UAVs. WDLTC was previously 6th Gen Data Links. Enterprise funding for MLS-JCE and ABMS-JADC2 type of work has dropped off due to unknown and ever-changing requirements, studies have been completed in both of these subject areas that have resulted in non-starts for projects. It is still on the Test Center radar and is developing a plan.<br>***FY 2025 Plans:***<br>Continue developing an Enterprise Cross Platform Data Center. Start executing the War-fighter Data Links Test Capability (WDLTC) across the Enterprise (96TW & 412TW) to support next generation aircraft and UAVs. WDLTC was previously 6th Gen Data Links.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The increase from FY24 to FY25 is due to a reduction to the FY24 funding request by $6.3 million to account for the availability of prior year execution balances. | 9.492 | 6.830 | 13.150 |
| ***Title:*** Autonomy<br>***Description:*** Autonomy refers to the ability to test autonomous aerial and ground systems with hundreds of independent vehicles. Must be able to monitor system-under-test locations and states with the ability for soft and hard termination. Must develop techniques and processes to test systems with artificial intelligence.<br>***FY 2024 Plans:*** | 0.200 | 1.500 | 2.750 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force | Date: March 2024 |
|---|---|
| **Appropriation/Budget Activity**<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support* | **R-1 Program Element (Number/Name)**<br>PE 0604759F / *Major T&E Investment* |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2023 | FY 2024 | FY 2025 |
|---|---|---|---|
| Start Executing the Non-Cooperative Tracking/Multi-Object Tracking phase I (NCT-1) project at the 412TW. This capability will track non-instrumented small scale UAV's/drones.<br>***FY 2025 Plans:***<br>Continue Executing the Non-Cooperative Tracking/Multi-Object Tracking Phase I (NCT-1) project at the 412TW. This capability will track non-instrumented small-scale UAVs/drones.<br>***FY 2024 to FY 2025 Increase/Decrease Statement:***<br>The increase from FY24 to FY25 is due to a reduction to the FY24 funding request by $1.3 million to account for the availability of prior year execution balances. | | | |
| **Accomplishments/Planned Programs Subtotals** | 169.432 | 31.143 | 74.228 |

**D. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2023 | FY 2024 | FY 2025 Base | FY 2025 OCO | FY 2025 Total | FY 2026 | FY 2027 | FY 2028 | FY 2029 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • RDTE 06 0605807F: *Test and Evaluation Support* | 842.401 | 913.213 | 936.913 | - | 936.913 | 1,088.746 | 1,273.317 | 1,316.674 | 1,368.799 | Continuing | Continuing |
| • RDTE 06 0605976F: *Facilities Restoration and Modernization - Test and Evaluation Support* | 133.420 | 87.889 | 94.828 | - | 94.828 | 218.485 | 211.294 | 250.223 | 237.553 | Continuing | Continuing |
| • RDTE 06 0605978F: *Facilities Sustainment - Test and Evaluation Support* | 31.561 | 35.065 | 63.579 | - | 63.579 | 92.273 | 173.434 | 176.909 | 180.417 | Continuing | Continuing |
| • RDTE 06 0604256F: *Threat Simulator Development* | 20.835 | 16.626 | 19.927 | - | 19.927 | 43.055 | 49.189 | 50.969 | 51.974 | Continuing | Continuing |
| • RDTE 06 0606398F: *Management HQ - T&E* | 7.535 | 7.453 | 7.647 | - | 7.647 | 7.788 | 7.950 | 8.297 | 8.457 | Continuing | Continuing |

**Remarks**

**E. Acquisition Strategy**

N/A