

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Army **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 6: RDT&amp;E Management Support</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605602A / <i>Army Technical Test Instrumentation and Targets</i>
--	--

COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	60.170	81.829	49.253	-	49.253	-	-	-	-	-	-
628: <i>Developmental Test Technology &amp; Sustainment</i>	-	46.977	38.124	34.739	-	34.739	-	-	-	-	-	-
62C: <i>Modeling and Simulation Instrumentation</i>	-	13.193	43.705	14.514	-	14.514	-	-	-	-	-	-

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

This Program Element (PE) provides critical front-end investments for development of: new test methodologies; test standards; advanced test technology concepts for long range requirements; future test capabilities; advanced development of Modeling and Simulation and Instrumentation (MS&I) prototypes; and the full development of test instrumentation for the United States (U.S) Army Test and Evaluation Command (ATEC), which includes the Operational Test Command (OTC) at Ft Hood, Texas; Aberdeen Test Center (ATC), Aberdeen Proving Ground, Maryland; White Sands Test Center (WSTC) at White Sands Missile Range (WSMR), New Mexico; Electronic Proving Ground (EPG), Fort Huachuca, Arizona; Yuma Test Center (YTC) at Yuma Proving Grounds (YPG), Arizona (including the Cold Regions Test Center (CRTC), Fort Greely, Alaska and the Tropics Regions Test Center (TRTC), at various locations); and Redstone Test Center (RTC), Redstone Arsenal, Alabama. OTC consists of four forward Test Directorates (Airborne and Special Operations Test Directorate, Fort Bragg, North Carolina; Air and Missile Defense Test Directorate, Fort Bliss, Texas; Fires Test Directorate, Fort Sill, Oklahoma; and the Intelligence Electronic Warfare Test Directorate, Fort Huachuca, Arizona) together with four other Test Directorates (Aviation; Maneuver; Mission Command; Maneuver Support and Sustainment) at Ft Hood, Texas. These activities enable Army Futures Command (AFC) modernization efforts and readiness and support the development and fielding cycle of all Army acquisition programs including rapid fielding initiatives and programs of record. Sustainment funding maintains existing testing capabilities at all locations by replacing unreliable, uneconomical, and irreparable instrumentation, as well as incremental upgrades of hardware and software for MS&I systems to assure adequate test data collection capabilities. This data supports acquisition milestone decisions for all test mission areas throughout the Army including programs such as the 105-mm Mobile Howitzer, 30mm/40mm ammunition, Active Protection System (APS), AH-64 Block III, APR-39C(V)1 Radar, Armored Multi-Purpose Vehicle (AMPV), Army Integrated Air-Missile Defense (AIAMD), Army Tactical Missile System (ATACMS), CH-47F Chinook, Command Post Computing Environment (CPCE), Common Infrared Counter Measures (CIRCM), Counter Unmanned Aircraft System (c-UAS), Counter Rocket Artillery Mortar (C-RAM), Dismounted Assured PNT System (DAPS), Distributed Common Ground System - Army (DCGS-A), Enhanced Night Vision Goggle- Binocular (ENVG-B), Expedient Leader Follower, Extended Range Cannon Artillery (ERCA), Family of Medium Tactical Vehicles (FMTV), Guided Multiple Launch Rocket System (GMLRS), Integrated Tactical Network (ITN), Javelin, Joint Air-to- Ground Missile (JAGM) for US Navy, Joint Assault Bridge (JAB), Joint Light Tactical Vehicle (JLTV), Leader Radio, M109A7 Paladin/M992A3, M1A2 Abrams, M-2/3 Bradley Expedited Active Protection System (ExAPS), M-2/3 Bradley Fist, M776 Chrome Tube, M777 Long Range Cannon, Maneuver Short Range Air Defense (M-SHORAD), ManPack (MP), Mounted Assured PNT System (MAPS), Mobile Protected Firepower (MPF), Optionally Manned Fighting Vehicle, Patriot 3 (PAC-3), Precision Guidance Kit (PGK), Precision Strike Missile (PrSM), Robotic Combat Vehicle (RCV), Shadow Tactical Unmanned Aircraft System (TUAS), Stinger Shelf life Extension Program (SLEP), Stryker, Systems for Assured Position, Navigation and Timing (PNT), Terminal High-Altitude Area Defense (THAAD), UH-60M Black Hawk, and XM113. Also supports AFC and Army Modernization events to include Project Convergence and PNTAX.

**UNCLASSIFIED**

**Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Army** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 2040: <i>Research, Development, Test &amp; Evaluation, Army / BA 6: RDT&amp;E Management Support</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605602A / <i>Army Technical Test Instrumentation and Targets</i>
--	--

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	61.974	48.475	49.774	-	49.774
Current President's Budget	60.170	81.829	49.253	-	49.253
Total Adjustments	-1.804	33.354	-0.521	-	-0.521
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	35.000			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.804	-1.646			
• Adjustments to Budget Years	-	-	-0.521	-	-0.521

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

**Project: 628: *Developmental Test Technology & Sustainment***

    Congressional Add: *Developmental Test Technology & Sustainment*

    Congressional Add: *Cyber Space Threats*

Congressional Add Subtotals for Project: 628

**Project: 62C: *Modeling and Simulation Instrumentation***

    Congressional Add: *Space and Missile Cyber Security*

Congressional Add Subtotals for Project: 62C

Congressional Add Totals for all Projects

<b>FY 2020</b>	<b>FY 2021</b>
15.000	-
-	5.000
15.000	5.000
-	30.000
-	30.000
15.000	35.000

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605602A / Army Technical Test Instrumentation and Targets				<b>Project (Number/Name)</b> 628 / Developmental Test Technology & Sustainment			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
628: Developmental Test Technology & Sustainment	-	46.977	38.124	34.739	-	34.739	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

This Project provides critical front-end investments for development of new test methodologies, test standards, advanced test technology concepts for long range requirements, future test capabilities, and advanced instrumentation prototypes for subordinate commands of the Army Test and Evaluation Command (ATEC). These capabilities are required to support developmental testing requirements of high priority Army systems supporting Army modernization efforts. Where practical, efficiencies will be gained through the common use of developmental instrumentation in operational testing. A key element is sustaining aging instrumentation which maintains existing capabilities at test facilities by replacing unreliable, uneconomical and irreparable instrumentation, as well as lifecycle replacement and incremental upgrades of instrumentation and software, reducing their average age to assure adequate testing capabilities. This Project develops and sustains developmental test instrumentation and capabilities that provide the data necessary to support acquisition milestone decisions for all test mission areas throughout the Army. Significant examples include new instrumentation for the testing of Command, Control, Communication and Computer (C4) systems, upgrades to existing radars to extend their economic life, common data collection and analysis tools, non-intrusive instrumentation to test Unmanned Ground Vehicles and sensors, high speed - high definition digital imaging systems to capture missile flight events, and automation software to improve data collection of reliability, availability, and maintainability (RAM) testing.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> Developmental Test Technology Investment	31.977	33.124	34.739
<b>Description:</b> Develops, acquires, and sustains critical test technology and instrumentation. Provides the necessary test instrumentation, computer and communications systems, data collection, analysis and reporting equipment, and other special test capabilities to successfully develop and test Army weapons and equipment. Provides the necessary live, virtual and constructive environment, hardware-in-the-loop capabilities, and modeling and simulation (M&S) needed for testing Army materiel solutions. Acquires instrumentation to measure performance of Command, Control, Communication and Computer (C4) systems; reliability, availability, and maintainability (RAM) data collection on tracked and wheeled vehicles; ballistic transducers for measuring chamber pressures during ammunition and barrel tests; supports development of common data collection instrumentation and data management systems used in testing across all test commodity areas and lifecycles; continues replacement and upgrade of range control instrumentation, radar, optics and telemetry used in missile testing; acquires data recorders, signal conditioning equipment, data processing equipment and other instrumentation for various aircraft tests; upgrades natural environments test instrumentation used for testing weapon systems, vehicles, munitions and support equipment in extreme hot desert environments as well as extreme cold conditions; continues upgrade of survivability/vulnerability test capabilities in support of live fire testing; upgrades and replaces mobile range communications equipment and digital end devices; and improves test efficiency through the use of smart devices as data collectors.			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605602A / Army Technical Test Instrumentation and Targets	<b>Project (Number/Name)</b> 628 / Developmental Test Technology & Sustainment

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<p><b>FY 2021 Plans:</b> Test centers will continue to provide, acquire, and upgrade instrumentation for Command, Control, Communications, and Computers Intelligence, Surveillance and Reconnaissance (C4ISR), RAM, automotive, ballistics, missile, aviation and environmental testing across all test commodity areas and enhance/expand the use of common data collectors, smart devices, and enterprise data management tools. Examples include ATC Crew Survivability Instrumentation during LFT&amp;E; EPG Phoenix Architecture project for future data demand; RTC ASE Data Processing and Analysis; WSMR Long Range Precision Fires (LRPF) and Air Missile Defense (AMD) test support equipment; and YTC test capability for cUAS which can detect, track, identify and collect data on hostile UAS.</p> <p><b>FY 2022 Plans:</b> Test centers will continue to provide, acquire, and upgrade instrumentation for C4ISR, RAM, automotive, ballistics, missile, aviation and environmental testing across all test commodity areas and enhance/expand the use of common data collectors, smart devices, and enterprise data management tools. Examples include Aberdeen Test Center (ATC) Crew Survivability Instrumentation during Live Fire Test and Evaluation (LFT&amp;E) to support NGCV; Electronic Proving Ground (EPG) Phoenix Architecture project for support to C4 network systems; Yuma Proving Ground (YPG) Long Range Precision Fires (LRPF) test support equipment; White Sands Missile Range (WSMR) Directed Energy Laser test modernization, and Redstone Test Center's (RTC) Modular Open System Architecture (MOSA) for supporting Future Vertical Lift (FVL) testing.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase is due to inflation.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	31.977	33.124	34.739

	<b>FY 2020</b>	<b>FY 2021</b>
<b>Congressional Add:</b> Developmental Test Technology & Sustainment	15.000	-
<b>FY 2020 Accomplishments:</b> Congressional Add funding		
<b>Congressional Add:</b> Cyber Space Threats	-	5.000
<b>FY 2021 Plans:</b> Congressional Add for Cyber Space Threats.		
<b>Congressional Adds Subtotals</b>	15.000	5.000

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

N/A  
**Remarks**

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605602A / <i>Army Technical Test Instrumentation and Targets</i>	<b>Project (Number/Name)</b> 628 / <i>Developmental Test Technology &amp; Sustainment</i>

**D. Acquisition Strategy**  
N/A

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 2040 / 6					<b>R-1 Program Element (Number/Name)</b> PE 0605602A / Army Technical Test Instrumentation and Targets				<b>Project (Number/Name)</b> 62C / Modeling and Simulation Instrumentation			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
62C: Modeling and Simulation Instrumentation	-	13.193	43.705	14.514	-	14.514	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The United States Army Test and Evaluation Command (U.S. ATEC) plans, executes, and reports on operational tests, assessments and experiments in order to provide essential information for the acquisition and fielding of Army systems. A subordinate unit of ATEC, the Operational Test Command (OTC) provides support to Army Future Command (AFC), Cross Functional Teams (CFT), and Programs of Record. OTC employs Modeling, Simulation, and Instrumentation (MS&I) to provide a realistic multi-domain operational (MDO) test environment with modern threat effects, conduct test monitoring and control, and perform data analysis. OTC performs Risk Management Framework (RMF) functions on all technology tools across OTC and develops and adapts Army training simulations (such as Multiple Integrated Laser Engagement System (MILES) Real Time Casualty Assessment (RTCA), One Semi-Automated Forces (OneSAF) Live-Virtual-Constructive (LVC), Extensible Command, Control, Communications, and Computers Intelligence (C4I) Instrumentation Suite (ExCIS), and others for use in Operational Tests (OTs). By using MS&I tools, OTC reduces test cost and the demand for Army test units by simulating tactical engagements, adjacent and higher headquarters units, mission command message traffic, and battlefield kinetic and non-kinetic effects. OTC provides test monitoring and control through video monitoring, Global Positioning System (GPS)-enabled networks, and integration with Army mission command systems to collect real-time position location and status tracking to ensure test safety and provide status of data collection devices. OTC uses video equipment, appended data collection devices, and embedded software to collect and analyze system performance during test. MS&I funding is used to adapt/integrate current Army training simulation capabilities to function with new Army systems, purchase commercial off-the-shelf systems, and develop and sustain OT-unique simulation and instrumentation systems. The MS&I program also funds the technical expertise and hardware to sustain cyber security of OTC's technology capabilities, and provides for minor data collection device development and sustainment to support systems undergoing OT.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>
<b>Title:</b> MS&I	13.193	13.705	14.514
<b>Description:</b> Develops and enhances ATEC's simulation/stimulation of Mission Command; Fire Support; Air Defense; Command, Control, Communications, and Computers Intelligence, Surveillance and Reconnaissance (C4ISR); and Network systems. Improves and sustains Real-Time Casualty Assessment (RTCA). Develops, enhances, and sustains Performance Instrumentation Systems, Time Space Positioning Information (TSPI), Telemetry Systems, and Imaging Systems together with their associated data management enabling capabilities.			
<b>FY 2021 Plans:</b> Continue to sustain and invest in ATEC's Fire Support, Air and Missile Defense, C4ISR, and Network OT tools to support Army Modernization. Will improve OTC's RTCA secure network and tactical engagement simulation system capabilities to support future Mobile Protected Firepower (MPF), Infantry Squad Vehicle (ISV), Command Post Computing Environment (CPCE),			

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Army	<b>Date:</b> May 2021
--	-----------------------

<b>Appropriation/Budget Activity</b> 2040 / 6	<b>R-1 Program Element (Number/Name)</b> PE 0605602A / Army Technical Test Instrumentation and Targets	<b>Project (Number/Name)</b> 62C / Modeling and Simulation Instrumentation
--	---	---

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

	FY 2020	FY 2021	FY 2022
<p>Integrated Visual Augmentation System (IVAS), Joint Assault Bridge (JAB), Leader Radio/Manpack (LR/MP), Joint Light Tactical Vehicle (JLTV), 120mm Advanced Multi-Purpose (AMP), and Bradley OTs. Will also support the Army Integrated Air and Missile Defense (AIAMD), Extended Range Cannon Artillery (ERCA), Positioning, Navigation, and Timing Assessment Exercise (PNTAX), Distributed Common Ground System-Army (DCGS-A), Shadow (RQ-7BVN), Chinook (CH-47F), and Soldier-Centered Design Events. Will sustain Performance Instrumentation Systems, TSPI, and Telemetry and Imaging Systems and associated data management (e.g. collection, reduction, analysis, and visualization) enabling capabilities. Will execute life cycle replacement of legacy MS&amp;I systems which have reached end of useful life. Will sustain and upgrade MS&amp;I systems used for operational tests.</p> <p><b>FY 2022 Plans:</b> Plan is to sustain and invest in ATEC's test capabilities to provide operationally realistic multi-domain operations with modern kinetic and non-kinetic threat effects during test events for the following Army modernization efforts: Extended Range Cannon Artillery, Armored Multi-Purpose Vehicle, Patriot, Lower Tier Air Missile Defense Sensor/Radar Set, Assured Position Navigation and Timing, Guided Multiple Launch Rocket System - Extended Range (GMLRS-ER), Next Generation Squad Weapons, Synthetic Training Environment, Command Post Integrated Infrastructure, Blackhawk (UH-60V), Global Combat Support System, Distributed Common Ground System - Army (DCGS-A), Nuclear Biological Chemical Reconnaissance Vehicle Sensor Suite Upgrade Chemical Surface Detector, and Cross-Functional Team Soldier-Centered Design events. Program will align requirements with Army modernization priorities in support of the National Defense Strategy.</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase was due to: new mandated cybersecurity requirements, life cycle replacements that have been previously deferred, and minor upgrades to test capabilities.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	13.193	13.705	14.514

	FY 2020	FY 2021
<b>Congressional Add:</b> Space and Missile Cyber Security	-	30.000
<b>FY 2021 Plans:</b> Congressional Add for Space and Missile Cyber Security.		
<b>Congressional Adds Subtotals</b>	-	30.000

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A