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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army **Date:** March 2019

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	96.586	101.438	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	198.024
T08: <i>Combat Eng Systems</i>	-	31.386	25.838	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	57.224
T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>	-	65.200	75.600	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	140.800

Note

In Fiscal Year (FY) 2020 this Program Element (PE) is being realigned, with continuity of effort realigned to the following PEs:

- * PE 0603119A Ground Advanced Technology Projects
- * PE 0603462A Next Generation Combat Vehicle Advanced Technology
- * PE 0603463A Network C3I Advanced Technology
- * PE 0603465A Future Vertical Lift Advanced Technology
- * PE 0603466A Air and Missile Defense Advanced Technology

A. Mission Description and Budget Item Justification

This Program Element (PE) demonstrates data and information architectures and software applications, as well as sensing systems, that can be used to provide Warfighters with timely, accurate, easily interpretable data and information for the operational and tactical mission environments, focusing on physical and human terrain and weather; methodologies, software applications, and hardware for improving ground vehicle mobility and countermobility to support ground force operations including manned-unmanned teaming; demonstrates material technologies and tools for force projection, and sustainment. This PE also demonstrates subsystems and systems to increase the survivability of personnel, critical assets, and facilities through structures, shields, and barriers to combat highly adaptive and increasingly severe threats; and systems and interoperable systems of systems for detecting threats, assessing situations, defending against threats, and communicating information and warnings for force protection.

This work is fully coordinated with and complementary to PE 0602784A (Military Engineering Technology).

FY20 realignments are due to financial restructuring in support of Army Modernization Priorities.

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this PE is led by the Army Engineering Research and Development Center (ERDC)

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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>
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B. Program Change Summary (\$ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	32.448	25.864	26.236	-	26.236
Current President's Budget	96.586	101.438	0.000	-	0.000
Total Adjustments	64.138	75.574	-26.236	-	-26.236
• Congressional General Reductions	-0.022	-0.026			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	65.200	75.600			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.040	-			
• Adjustments to Budget Years	-	-	-26.236	-	-26.236

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

Project: T15: *MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)*

- Congressional Add: *Resilient Energy Systems*
- Congressional Add: *Visualization Research and Asset Characterization*
- Congressional Add: *Remote Soil Analysis*
- Congressional Add: *Passive Remote Sensing from Underground Threats*
- Congressional Add: *Novel Technologies*
- Congressional Add: *Additive Manufacturing/3D Printing*
- Congressional Add: *Advanced Polymer Development*
- Congressional Add: *Bathymetric-topographic LIDAR Research*
- Congressional Add: *Demonstration of Ultra-high Efficiency Natural Gas Technologies*
- Congressional Add: *Emerging Natural Gas Technologies*
- Congressional Add: *Energy Efficient Window Insulation Research*
- Congressional Add: *Heavy Vehicle Simulator Research*
- Congressional Add: *Inferential Sensing on Tactical Wheeled Vehicles*
- Congressional Add: *Reliable Distributed Generation in Austere Environments*
- Congressional Add: *Sensor Protection from Underground Threats*

	FY 2018	FY 2019
	1.000	1.000
	2.000	-
	2.000	-
	3.000	-
	2.000	-
	2.000	2.000
	5.000	20.000
	8.000	8.200
	4.000	-
	10.000	-
	5.000	-
	8.200	-
	5.000	-
	3.000	-
	5.000	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army	Date: March 2019
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Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 3: Advanced Technology Development (ATD)</i>	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Congressional Add: <i>Extreme Terrain Research</i>	-	4.000
Congressional Add: <i>Secure Management of energy generation and storage</i>	-	3.000
Congressional Add: <i>Rapid low energy mobile manufacturing</i>	-	3.000
Congressional Add: <i>Centrifuge Enabled Research</i>	-	2.500
Congressional Add: <i>Energy and technology research in cold and arctic regions</i>	-	4.000
Congressional Add: <i>ERDC Collaboration (Transportation System Assessment Technologies)</i>	-	2.000
Congressional Add: <i>Natural Gas technology</i>	-	4.000
Congressional Add: <i>Reliable Distributed Energy in Austere Environments</i>	-	3.000
Congressional Add: <i>Research Facility Modernization</i>	-	2.000
Congressional Add: <i>Research in the Permafrost environment</i>	-	4.000
Congressional Add: <i>Secure and resilient power generation in cold region environments</i>	-	5.000
Congressional Add: <i>Silicone anode technology</i>	-	4.000
Congressional Add: <i>Transportation infrastructure evaluation system</i>	-	3.900
Congressional Add Subtotals for Project: T15	65.200	75.600
Congressional Add Totals for all Projects	65.200	75.600

Change Summary Explanation

FY18 congressional adds for: Additive Manufacturing/3D Printing; Advanced Polymer Development; Bathymetric-topographic LIDAR Research; demo of ultra-high efficiency natural gas techniques; emerging natural gas techniques; energy efficient window insulation research; heavy vehicle simulator research; inferential sensing on tactical wheeled vehicles; reliable distributed generation in austere environments; and sensor protection from underground threats.

FY19 congressional adds for: secure management of energy generation and storage; rapid low energy mobile manufacturing; additive manufacturing/3-D printing; advanced polymer development; bathymetric-topographic LiDAR research; centrifuge enabled research; energy technology research in cold and arctic regions; ERDC collaboration; extreme terrain research; natural gas technology; reliable distributed energy in austere environments; research facility modernization; research in the permafrost environment; resilient energy systems; secure and resilient power generation in cold region environments; silicon anode technology; and transportation infrastructure evaluation system.

FY20 reduction - PE eliminated due to Science and Technology portfolio Financial Restructuring.

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Exhibit R-2A, RDT&E Project Justification: PB 2020 Army										Date: March 2019		
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>				Project (Number/Name) T08 / <i>Combat Eng Systems</i>			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
T08: <i>Combat Eng Systems</i>	-	31.386	25.838	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	57.224

Note

In FY20 this Project is being realigned to:
 Program Element (PE) 0603119A Ground Advanced Technology, Projects:
 * BL6 Expedient Passive Protection for Critical Assets Advanced Technology
 * BL8 Power Projection in A2/AD Environments Advanced Technology
 * BM1 Protection from Advanced Weapon Effects Advanced Technology
 PE 0603462A Next Generation Combat Vehicle Advanced Technology, Projects:
 * BF2 Autonomous Ground Resupply (AGR) Advanced Technology
 * BG3 Modeling & Simulation for MUMT Advanced Technology
 PE 0603463A Network C3I Advanced Technology, Projects:
 * AO9 Information Trust Advanced Technology
 * AS9 Asymmetric Vision by Persistent Geophysical Sensing and Infrasound Advanced Technology
 * AT3 Subterranean Detection and Monitoring Advanced Technology
 * AU4 Geospatially Enabled Operational Design (GEOD) Advanced Technology
 * AT8 Network-Enabled GeoSpatial and GEOINT Services Advanced Technology
 * AU6 Automated Analytics for Understanding the Operational Environment Advanced Technology
 * AU1 Tactical GeoSpatial Information Capabilities Advanced Technology
 PE 0603465A Future Vertical Lift Advanced Technology, Project:
 * AL3 High Performance Computing for Rotorcraft Applications Advanced Technology
 PE 0603466A Air and Missile Defense Advanced Technology, Project:
 * AE3 Unconventional Countermeasures & Survivability Advanced Technology

A. Mission Description and Budget Item Justification

This Project matures and demonstrates software and architectures for geospatial mapping applications and decision aids for the Warfighter. Project components, systems, system of systems, and decision aids enable ground vehicle mobility (freedom of movement), including force projection, and counter-mobility to impede movement of threat forces. Additional components, systems, system of systems for survivability support protection of personnel, facilities, and assets through design and reinforcement of structures, and for force protection to detect, assess, and defend against threats for troops and critical fixed and semi-fixed assets. Protection measures support force projection in areas such as air and sea ports of debarkation, dispersed small units, and units operating in complex and urban environments, which may include subterranean challenges. Work is in support of current and future ground force operations and future vertical lift. Software and architectures for geospatial projects mature and validate geospatial decision tools in support of operations planning and decision making to advance utility of geospatial capability and techniques across the Army, services, and coalition, and to advance and mature the information architecture that supports the total Army's discovery and access to data, geospatial

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T08 / <i>Combat Eng Systems</i>
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information, and analytical tool suites. Methods to characterize and visualize behavior and population dynamics mature and validate efforts to portray the operational environment including culture, demographics, terrain, climate, and infrastructure, into geospatial frameworks. Force protection activities are focused on filling critical gaps in protecting forces operating in disbursed small units over complex and urban terrain and include maturation, integration, and demonstration of components, systems, and systems of systems for rapidly deployable threat detection in direct line-of-site and nonline-of-site environments; situation assessment to help reduce false alarms and decrease manpower required to monitor the environment; and passive protection to mitigate blast and weapon effects from advanced and emerging threats. Work in survivability and force protection also includes maturing and demonstrating software to characterize blast effects generated from explosive events, such as improvised explosive device detonation in soils, and supports design and decision aids. Force protection activities are also focused on protection of critical assets and infrastructure required to project forces into denied access areas. Work in mobility and force projection includes maturing and demonstrating software and hardware to assess and improve freedom of movement for ground forces, including autonomous ground resupply and manned-unmanned teaming and demonstrates infrastructure health monitoring assessment technologies to support emerging projection challenges in complex, contested environments such as distributed sustainment over large distances. Engineered Resilient Systems (ERS) activities focus on developing capabilities for "upfront engineering" that will result in more operationally efficient and resilient systems that are more affordable in a more rapid fashion. This effort develops and demonstrates an end-to-end thread involving analysis to inform requirements, reduce risk, and assess lifecycle cost pre-milestone A through tradespace analytics for selected systems of interest.

This work is being fully coordinated and is complementary to the ERS work described in the Office of the Secretary of Defense (OSD) Program Element (PE) 0603832/ Project D8Z.

This work is fully coordinated with and complementary to PE 0602784A (Military Engineering Technology). Geospatial activities are coordinated with the National Geospatial Intelligence Agency (NGA). Autonomous ground resupply activities are coordinated with PEs 0603005A (Combat Vehicle and Automotive Advanced Tech) / Project 515 (Robotic Ground Systems), and PE 0602601A (Combat Vehicle and Automotive Technology) / Project H77 (National Automotive Center), and 0602601A (Combat Vehicle and Automotive Technology) / H91 (Ground Vehicle Technology) in collaboration with the Tank and Automotive Research, Development and Engineering Center (TARDEC). Autonomous ground resupply activities are also coordinated with PEs 0603001A (Warfighter Advanced Technology) / Project 543 (Ammunition Logistics), PE 0604639A (Weapons and Munitions - Advanced Development) / EC3 (Ammunition Logistics Prototyping), and 0605805A (Munitions Standardization, Effectiveness and Safety) / Project 297 (Mun Survivability & Log). Unconventional Countermeasure activities are coordinated with PE 0602720A (Environmental Quality Technology) / Project 835 (Mil Med Environ Crit) and PE 0603728 (Environmental Quality Technology Demonstrations) / Project 03E (Environmental Restoration Technology).

FY20 realignments are due to financial restructuring in support of Army Modernization Priorities.

The work cited is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Work in this Project is led by the Army Engineering Research and Development Center (ERDC).

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019	FY 2020
Title: Geo-Enabled Mission Command Enterprise	-	2.832	-

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T08 / <i>Combat Eng Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
<p>Description: This effort matures methods and demonstrates data, information, and software tools and architectures to bring physical and human terrain and effects data into decision frameworks for consistent and accurate implementation in the Army Geospatial Enterprise (AGE). This provides ready-access of low-overhead, light-weight, analytic tools to other Services and the Department of Defense (DoD) and increases situational awareness of the operational environment in support of mission planning and operations.</p> <p>FY 2019 Plans: Mature a flexible Army geospatially-enabled planning environment that enables mission analysis and development of staff estimates (such as Intelligence Preparation of the Battlefield) at the tactical level that enables data synchronization with the Command Post Computing Environment systems.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: In FY20, this effort is realigned to PE0603463A, Project AU4, (Geospatially Enabled Operational Design (GEOD) Advanced Technology).</p>				
<p>Title: Map-Based Planning Services (MBPS)</p> <p>Description: This effort matures geospatially enabled, collaborative mission planning capabilities providing services, data, and information to Army planners, staffs, and leaders. These mission planning capabilities will allow collecting, processing, storing, displaying, and sharing of authoritative data and information in a geo-temporal context. Work will leverage a Standard Shareable Geospatial Foundation provided by the AGE and incorporate Geo-Enabled Mission Command tools and analytical capabilities. This effort continues work that was part of Geo-Enabled Mission Command Enterprise and matures work in PE 0602784A/Project 855.</p>		8.568	-	-
<p>Title: GeoIntelligence - Enabling Technology Demonstration</p> <p>Description: This effort provides demonstration of analytic tools and algorithms that use multi-source (e.g. optical, Light detection and ranging (LiDAR)), multiplatform (e.g. satellite, light Unmanned Aerial Vehicle (UAV)), multi-temporal image sources to build urban tactical decision aids suitable for use on mobile devices to provide geospatial analysis to the Army, other Services, and DoD, in support of mission planning and operations (such as small units in an urban setting). This effort continues work that was part of Geo-Enabled Mission Command Enterprise.</p> <p>FY 2019 Plans:</p>		2.000	1.938	-

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T08 / <i>Combat Eng Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
<p>Develop man/machine learning algorithms to automate production processes, to enable change detection, and to support learning by manned and autonomous systems with the capability to collect and/or complete 3D high-resolution common operating picture of complex and urban terrain.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: In FY20, this effort is realigned to PE0603463 Project AU1 (Tactical GeoSpatial Information Capabilities Advanced Technology), and Project AT8 (Network-Enabled GeoSpatial and GEOINT Services Advanced Technology).</p>				
<p>Title: Human Geography Demonstration</p> <p>Description: This effort matures and demonstrates the integration of behavior and population dynamics research and analysis into geospatial frameworks to depict aspects of the operational environment including culture, demographics, terrain, climate, and infrastructure for mission planning and awareness. Efforts include exploitation of existing open source text, leveraging multi-media and cartographic materials, and data collection methods from the tactical edge to characterize parameters of social, cultural, and economic geography of special interest to the Warfighter.</p> <p>FY 2019 Plans: Demonstrate methods for military assessment of population vulnerability and resilience disruptors as a result of combat, disasters, disease, etc., within dense urban and complex environments; demonstrate computational models to support a federated model approach for complex urban systems; and will develop methodologies to support the military decision making process addressing the impacts of the physical, ecological, and sociocultural environments relative to contingency base site selection, design, operations and maintenance.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: Effort ends in FY19.</p>		1.000	0.969	-
<p>Title: Austere Entry and Maneuver Support Demonstrations</p> <p>Description: This effort matures and demonstrates improved means for achieving force projection in austere and complex environments and integrated sensing and simulation systems for predicting physical conditions in these operational environments. This effort matures and demonstrates technologies to assess, construct, or repair infrastructure required to support entry, sustainment, and maneuver operations in complex and contested battlespaces. This effort matures and demonstrates simulation technology for manned-unmanned teaming maneuver.</p> <p>FY 2019 Plans: Mature real-time hardware-in-the-loop simulator to validate autonomous vehicle maneuver configurations and will demonstrate performance through field experiments. Demonstrate obstacle detection software to support real-time mobility decisions in urban environments. Mature and demonstrate near-real time infrastructure monitoring technology that automates analyses of seismic-</p>		6.889	6.682	-

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T08 / <i>Combat Eng Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
<p>infrasound-acoustic-meteorological (SIAM) data to eliminate subject matter expert requirement and will mature toolkits to support littoral zone maneuver and vehicle operating surfaces assessment. Mature all-season austere entry and sustainment node decision support tools for site selection.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: In FY20, this effort is realigned to PE0603463 Project AS9 (Asymmetric Vision by Persistent Geophysical Sensing and Infrasound Advanced Technology); and PE0603462 Project BG3 (Modeling & Simulation for MUMT Advanced Technology), and Project BF2 (Autonomous Ground Resupply (AGR) Advanced Technology); and PE0603119A Project BL8 (Power Projection in A2/AD Environments Advanced Technology).</p>				
<p>Title: Adaptive Protection Demonstrations</p> <p>Description: This effort validates protection solutions for facilities and critical assets, including fixed and semi-fixed. A focus will be on technologies to defeat new and emerging advanced weapons threats. Technologies include: low-logistics protective construction and facility protection, use of indigenous materials, innovative structural hardening and retrofit, and the synergistic use of unconventional countermeasures to increase the effectiveness of protection to critical assets. This effort also demonstrates rapidly deployable protective measures and retrofit technologies for use in urban environments.</p> <p>FY 2019 Plans: Mature and demonstrate urban building assessment tool and mature retrofit technologies to ensure safe building occupation decisions for dismounted soldiers in urban environments. Mature and demonstrate rapid signature reduction methods to increase critical asset survivability. Mature perimeter security and surveillance monitoring and detection systems to detect, track, and classify subterranean and other threat activities. Mature and demonstrate new protective technologies to defeat future near-peer adversarial threats.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: In FY20, this effort is realigned to PE0603463 Project AT3 (Subterranean Detection and Monitoring Advanced Technology); PE0603466 Project AE3 (Unconventional Countermeasures & Survivability Advanced Technology); and PE0603119A Project BL6 (Expedient Passive Protection for Critical Assets Advanced Technology), and Project BM1 (Protection from Advanced Weapon Effects Advanced Technology).</p>		7.929	7.794	-
<p>Title: Engineered Resilient Systems</p> <p>Description: This effort matures and demonstrates capabilities (tools and methodologies) to rapidly create high-fidelity environmental data to support the simulation of system performance for different Army missions in various geographic settings worldwide; provide input to and obtain output from combat simulations for different echelons pertaining to system performance; and conduct system trades that consider system performance in different operational environments and mission contexts. The</p>		5.000	4.844	-

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Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T08 / <i>Combat Eng Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020
<p>Engineered Resilient Systems (ERS) initiative has been identified as a Science and Technology emphasis area by the Assistant Secretary of Defense for Research and Engineering, ASD(R&E). This effort focuses on Army systems of interest and on high-fidelity environmental data for the associated battlespace, on linkages to force-on-force combat simulations representing the systems of interest, and on tools to explore trades in order to help inform requirements, reduce risk, and assess lifecycle cost pre-milestone A.</p> <p>FY 2019 Plans: Validate environmental effects as they relate to the acquisition of Army aviation, ground vehicle, and sensor platforms; develop workflow automation processes for these platforms; integrate mission effectiveness into the resulting tradespaces; leverage emerging data analytics techniques and machine learning algorithms to optimizes insight prior to acquisition decision points; develop novel methodologies through the use of environmental simulation, tradespace analytics, and computational prototyping of Army systems.</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: In FY20, this effort is realigned to PE0603465 / Project AL3 (High Performance Computing for Rotorcraft Applications Advanced Technology).</p>				
<p>Title: FY 2019 SBIR / STTR Transfer</p> <p>Description: FY 2019 SBIR / STTR Transfer</p> <p>FY 2019 Plans: FY 2019 SBIR / STTR Transfer</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: FY 2019 SBIR / STTR Transfer</p>		-	0.779	-
Accomplishments/Planned Programs Subtotals		31.386	25.838	-
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
N/A				

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E. Performance Metrics

N/A

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Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>				Project (Number/Name) T15 / <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>			
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
T15: <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>	-	65.200	75.600	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	140.800

A. Mission Description and Budget Item Justification

This is a Congressional Interest Item for Military Engineering Technology Demonstrations.

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

	FY 2018	FY 2019
Congressional Add: Resilient Energy Systems	1.000	1.000
FY 2018 Accomplishments: Resilient Energy Systems		
FY 2019 Plans: Resilient Energy Systems		
Congressional Add: Visualization Research and Asset Characterization	2.000	-
FY 2018 Accomplishments: Visualization Research and Asset Characterization		
Congressional Add: Remote Soil Analysis	2.000	-
FY 2018 Accomplishments: Remote Soil Analysis		
Congressional Add: Passive Remote Sensing from Underground Threats	3.000	-
FY 2018 Accomplishments: Passive Remote Sensing from Underground Threats		
Congressional Add: Novel Technologies	2.000	-
FY 2018 Accomplishments: Novel Technologies		
Congressional Add: Additive Manufacturing/3D Printing	2.000	2.000
FY 2018 Accomplishments: Additive Manufacturing/3D Printing		
FY 2019 Plans: Additive Manufacturing/3D Printing		
Congressional Add: Advanced Polymer Development	5.000	20.000
FY 2018 Accomplishments: Advanced Polymer Development		
FY 2019 Plans: Advanced Polymer Development		
Congressional Add: Bathymetric-topographic LIDAR Research	8.000	8.200

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019
FY 2018 Accomplishments: Bathymetric-topographic LIDAR Research		
FY 2019 Plans: Bathymetric-topographic LIDAR Research		
Congressional Add: Demonstration of Ultra-high Efficiency Natural Gas Technologies	4.000	-
FY 2018 Accomplishments: Demonstration of Ultra-high Efficiency Natural Gas Technologies		
Congressional Add: Emerging Natural Gas Technologies	10.000	-
FY 2018 Accomplishments: Emerging Natural Gas Technologies		
Congressional Add: Energy Efficient Window Insulation Research	5.000	-
FY 2018 Accomplishments: Energy Efficient Window Insulation Research		
Congressional Add: Heavy Vehicle Simulator Research	8.200	-
FY 2018 Accomplishments: Heavy Vehicle Simulator Research		
Congressional Add: Inferential Sensing on Tactical Wheeled Vehicles	5.000	-
FY 2018 Accomplishments: Inferential Sensing on Tactical Wheeled Vehicles		
Congressional Add: Reliable Distributed Generation in Austere Environments	3.000	-
FY 2018 Accomplishments: Reliable Distributed Generation in Austere Environments		
Congressional Add: Sensor Protection from Underground Threats	5.000	-
FY 2018 Accomplishments: Sensor Protection from Underground Threats		
Congressional Add: Extreme Terrain Research	-	4.000
FY 2019 Plans: Extreme Terrain Research		
Congressional Add: Secure Management of energy generation and storage	-	3.000
FY 2019 Plans: Secure Management of energy generation and storage		
Congressional Add: Rapid low energy mobile manufacturing	-	3.000
FY 2019 Plans: Rapid low energy mobile manufacturing		
Congressional Add: Centrifuge Enabled Research	-	2.500
FY 2019 Plans: Centrifuge Enabled Research		
Congressional Add: Energy and technology research in cold and arctic regions	-	4.000

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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2018	FY 2019
<i>FY 2019 Plans:</i> Energy and technology research in cold and arctic regions		
<i>Congressional Add:</i> ERDC Collaboration (Transportation System Assessment Technologies)	-	2.000
<i>FY 2019 Plans:</i> ERDC Collaboration (Transportation System Assessment Technologies)		
<i>Congressional Add:</i> Natural Gas technology	-	4.000
<i>FY 2019 Plans:</i> Natural Gas technology		
<i>Congressional Add:</i> Reliable Distributed Energy in Austere Environments	-	3.000
<i>FY 2019 Plans:</i> Reliable Distributed Energy in Austere Environments		
<i>Congressional Add:</i> Research Facility Modernization	-	2.000
<i>FY 2019 Plans:</i> Research Facility Modernization		
<i>Congressional Add:</i> Research in the Permafrost environment	-	4.000
<i>FY 2019 Plans:</i> Research in the Permafrost environment		
<i>Congressional Add:</i> Secure and resilient power generation in cold region environments	-	5.000
<i>FY 2019 Plans:</i> Secure and resilient power generation in cold region environments		
<i>Congressional Add:</i> Silicone anode technology	-	4.000
<i>FY 2019 Plans:</i> Silicone anode technology		
<i>Congressional Add:</i> Transportation infrastructure evaluation system	-	3.900
<i>FY 2019 Plans:</i> Transportation infrastructure evaluation system		
Congressional Adds Subtotals	65.200	75.600

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

N/A

Remarks

D. Acquisition Strategy

N/A

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / <i>Military Engineering Advanced Technology</i>	Project (Number/Name) T15 / <i>MILITARY ENGINEERING TECHNOLOGY DEMONSTRATION (CA)</i>

E. Performance Metrics

N/A