Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army												Date: March 2014
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603734A *I Military Engineering Advanced Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	30.503	23.705	17.613	-	17.613	15.281	15.817	17.559	17.967	-	-
T08: *Combat Eng Systems*	-	30.503	23.705	17.613	-	17.613	15.281	15.817	17.559	17.967	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

FY15 funding realigned to support higher Army priorities.

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 physical and human terrain and weather; methodologies, software applications and hardware for improving ground vehicle mobility and countermobility to support ground force operations, including force projection; components, 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 components, systems, and interoperable systems of systems for detecting threats, assessing situations, defending against threats, and communicating information and warnings for deployable force protection.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

This work is fully coordinated with and complementary to PE 0602784A (Military Engineering Technology).
Work in this PE is led, managed or performed by the US Army Engineer Research and Development Center, Vicksburg, MS.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	28.458	23.717	20.874	-	20.874
Current President's Budget	30.503	23.705	17.613	-	17.613
Total Adjustments	2.045	-0.012	-3.261	-	-3.261
• Congressional General Reductions	-0.046	-0.012			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	5.000	-			
• SBIR/STTR Transfer	-0.639	-			
• Adjustments to Budget Years	-	-	-3.261	-	-3.261

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army					Date: March 2014
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*		R-1 Program Element (Number/Name) PE 0603734A *I Military Engineering Advanced Technology*			
• Other Adjustments 1	-2.270	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603734A / *Military Engineering Advanced Technology*	Project (Number/Name) T08 / *Combat Eng Systems*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
T08: *Combat Eng Systems*	-	30.503	23.705	17.613	-	17.613	15.281	15.817	17.559	17.967	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

not applicable for this item

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; components, systems, system of systems and decision aids to enable ground vehicle mobility (freedom of movement), including force projection, countermobility to impede movement of threat forces; survivability and force protection to protect personnel, facilities and assets through design and reinforcement of structures, and deployable force protection to detect, assess, and defend against threats for troops deployed at smaller bases (such as bases being compromised or overrun). Work is in support of current and future ground force operations. Software and architectures for geospatial projects mature and validate geospatial decision tools in support of operations planning and decision making to advance utility for 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 information and analytical tool suites. Deployable Force Protection (DFP) activities are focused on filling critical gaps in protecting forces operating at smaller, remote bases and include maturation, integration, and demonstration of components, systems and systems of systems for rapidly deployable threat detection in direct line-of-site and non-line-of-site environments; situation assessment to help reduce false alarms and decrease manpower required to monitor the environment; passive protection to mitigate blasts, direct, and indirect fire effects; and active defense to suppress or eliminate threats and threat systems. 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 support design and decision aids. Work in mobility and force projection includes maturing and demonstrating software and hardware to assess and improve freedom of movement for ground forces.

Work in this project supports the Army S&T Ground and Command, Control, Communications and Intelligence (C3I) Portfolios.

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.

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).

Work in this project is led, managed or performed by the US Army Engineer Research and Development Center, Vicksburg, MS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Geo-Enabled Mission Command Enterprise	3.457	4.129	5.113

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603734A / *Military Engineering Advanced Technology*	**Project (Number/Name)** T08 / *Combat Eng Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
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 DoD and increases situational awareness of the operational environment in support of mission planning and operations. ***FY 2013 Accomplishments:*** Matured and evaluated software algorithms and architectures for humanitarian assistance and disaster response, allowing military support to and incorporation of other nations and organizations into Army and DoD information computing environments; demonstrated applications of algorithms and architectures with 100% open software and standards; matured and delivered a wiki-like software environment to obtain, authenticate, and share socio-cultural data, information and concepts; developed tools for terrain and cultural feature extraction and begin the data enterprise framework integration; developed a unified sensor coverage framework and adaptive sensor performance assessment for active and passive counter-insurgency defeat tool; matured an optimized, operational pattern analysis tool focusing on physical, social, cultural, adversarial, and friendly datasets. ***FY 2014 Plans:*** Demonstrate software tools for mission command systems to include digital operation order generation and collaborative Course of Action planning; demonstrate use and application of map-based narratives for military applications on the Secure Internet Protocol Router Network and Joint Worldwide Intelligence Communications System with advanced spatial and temporal visualization and collaboration engines; demonstrate geospatially enabled persistent surveillance and analytic capabilities based on mission, threat, terrain and weather to provide synchronization of unattended ground sensors and small unit unattended aerial systems for increased situational awareness of threats at small outposts, convoy operations and key urban locations. ***FY 2015 Plans:*** Will evaluate and mature methods and techniques to facilitate efficient sharing of common geospatial information within Common Operating Environment and Army Programs of Record through delivery and exchange of geospatial data, information, and analytics between and among computing environments (e.g., Mobile/Handheld, Mounted, Data Center, Sensor, Command Post) within the Common Operating Environment.			
Title: Deployable Force Protection Technology Integration Demonstrations and Red Teaming ***Description:*** This effort matures, integrates and demonstrates rapidly deployable threat detection, situation assessment, passive protection and active defensive technology-enabled capabilities to meet critical capability gaps for troops operating remotely at smaller bases or integrated with local communities. The needs at these smaller bases (less than 300 persons, not all U.S. troops) are unique based on constraints in transportability, manpower, organic resources, lack of hardening of structures, resupply, and training for example. Moreover, lack of interoperability and scalability consume manpower and take away from time needed to perform missions. Threats include bases being overrun by hostiles; direct fire; rockets, artillery and mortars; and improvised	18.597	16.096	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603734A / *Military Engineering Advanced Technology*	**Project (Number/Name)** T08 / *Combat Eng Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
explosive devices. Force protection challenges at these remote, smaller bases include providing increased standoff detection, blast and ballistic protection, and kinetic technologies subject to the constraints mentioned above. This effort begins to fill a significant gap in force protection capabilities. This work is fully coordinated with PE0602784A/T40, Deployable Force Protection; PE 0602786A; PE0603313A/G03; and PE 0603125A. Work is performed by Army, Navy, and Air Force labs and centers. ***FY 2013 Accomplishments:*** Developed low-logistics, rapidly deployable, overhead cover system for select critical asset protection; demonstrated perimeter standoff enforcement capabilities and entry control point technologies; demonstrated reinforcement of existing structures typical of conditions in operating environments; evaluated deployable radio frequency direction finding system to locate hostile activity; demonstrated integrated architecture for sensor components/systems; demonstrated enhanced detection capabilities for identifying hostiles; conducted full-scale demonstrations and user assessments and conducted red and blue team missions in asymmetric and other relevant environments to identify further areas for improving robustness of design and implementation and to increase systems effectiveness. ***FY 2014 Plans:*** Develop first-generation, low-logistic reinforcement technologies for indigenous structures typical of conditions in operating environments; demonstrate lightweight vehicle ramming protection kits for base perimeter protection; develop integrated sensor architecture including web and tactical services, with data exchange standards, protocols, and compliance tools for interoperability; demonstrate integrated pre-shot sniper detection and non-line-of-site threat detection capabilities with improved designs for deployed forces; demonstrate light-weight threat assessment tools for predictive capabilities; conduct full-scale demonstrations and user assessments and conduct red and blue team missions in asymmetric and relevant environments to identify further areas for improving robustness of design and implementation and to increase systems effectiveness.			
Title: Occupant-Centric Survivability ***Description:*** This effort develops a comprehensive model of improvised explosive device (IED) detonations in soils that accurately predicts the blast pressure and fragmentation of IEDs on ground vehicle systems in a wide range of operational environments. This work supports PEs 0633005/221 and 0622601/C05 in collaboration with the Tank and Automotive Research, Development and Engineering Center (TARDEC). ***FY 2013 Accomplishments:*** Demonstrated advanced numerical methods for coupling occupant response to shock resulting from improvised explosive device (IED) detonations. ***FY 2014 Plans:***	0.677	0.724	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603734A / *Military Engineering Advanced Technology*	**Project (Number/Name)** T08 / *Combat Eng Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Demonstrate a comprehensive model of vehicle responses to mines/IEDs during Army Occupant Protection Suite Concept Demonstration. This model represents the next generation of Lagrangian Meshfree methods for airblast/fragmenting buried weapons of various sizes in different soils at a large range of burial depths. This model provides the Army with accurate predictions of the effect of IEDs on vehicles. ***FY 2015 Plans:*** Will demonstrate live fire full-scale model benchmark tests for evaluation, and model validation under a range of soil and operational threat conditions.			
Title: Austere Entry and Maneuver Support Demonstrations ***Description:*** This effort develops improved means for achieving Force Projection in coastal, estuary and riverine environments and an integrated sensing and simulation system for predicting physical conditions in these operational environments. ***FY 2013 Accomplishments:*** Demonstrated modular, extensible computational toolkit to rapidly assess throughput and mobility of vehicles at austere and remote sites, including along coasts, estuaries, and rivers via reliable simulation of waves, currents, sediment, and other material transport mechanisms affecting movement/throughput; demonstrated sensor utilization and characterization of operational conditions at austere ports and offload sites for determining infrastructure load carrying capability. ***FY 2014 Plans:*** Demonstrate a high performance computing computational testbed that allows for evaluation of sensor and platform tradeoff studies of potential off-loading platforms and soldiers in the 9-man squad. ***FY 2015 Plans:*** Will demonstrate simulation capability to enable rapid remote assessment of real-time structural capacity of infrastructure (airfields, ports, roads), river, estuary, and near shore; will demonstrate initial assessment of littoral environment for entry operations; will demonstrate initial austere airfield point of debarkation (APOD) assessment geospatial overlay capability to ENFIRE program; and will demonstrate reduced-order hydrodynamic models for an operational littoral environment.	2.772	0.256	5.000
Title: Integrated Base Protection ***Description:*** This effort demonstrates integrated protective technologies to plan and expediently construct Combat Outposts (COPs) and Patrol Bases (PBs). ***FY 2014 Plans:*** Demonstrate the first version of decision support tools for planning of overall basing architecture that integrates and optimizes force protection architectures and basing functions; incorporate user feedback into second version of modeling software;	-	2.500	-

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
demonstrate, using troops in the field, an initial perimeter barrier for perimeter security of a COP/PB constructed of advanced, reusable materials; evaluate troop constructability, protection, and retrograde value to optimize life-cycle cost and effectiveness of systems.			
Title: Adaptive Protection Demonstrations ***Description:*** This effort demonstrates protection solutions for critical assets, including fixed and semi-fixed facilities, required to support shifting operational focus. A focus will be on technologies to defeat new advanced weapons threats to include low-logistics protective construction and facility protection, use of indigenous materials, innovative structural hardening and retrofit, and the synergistic use of camouflage, concealment and deception to increase the effectiveness of protection to critical assets. This effort also demonstrates integrated protective technologies for force protection basing to include planning and expedient protective construction for combat outposts. ***FY 2015 Plans:*** Will demonstrate the use of indigenous materials from areas of interest in protective construction for critical assets against effects of new advanced weapons threats; will demonstrate initial force protection basing planning and protective construction for combat outposts to increase survivability of personnel and equipment against rocket and mortar attack; will demonstrate baseline effectiveness in the use of camouflage, concealment, and deception techniques to increase survivability of fixed and semi-fixed facilities against new threat weapons by decreasing the probability of direct hit on critical assets; and will demonstrate capability to construct expedient protection solutions for combat outposts and evaluate manpower requirements.	-	-	7.000
Title: Title: Map-based Adaptive Planning Course of Action Tool (MAPCAT) ***Description:*** Map-based Adaptive Planning Course of Action Tool (MAPCAT) is a joint, web-enabled, collaborative, map-based, Course of Action (COA) analysis tool to assist the Combatant Commands and their Service components/supporting commands to conduct Adaptive Planning (AP). This effort will technically and operationally assess MAPCAT functionality, Common Operating Environment compliance, and usability by Combatant Command and Service Component Command Planners. ***FY 2013 Accomplishments:*** Completed the technical, functional, and operational assessments of MAPCAT software prototype. Assessments determined MAPCAT is mature and ready for additional modernization and conversion of geospatial mapping capabilities to DoD compliance. Initiated software improviements to address software inconsistencies identified during technical assessment. Completed report listing potential modernization and additional assessment opportunities.	5.000	-	-
Accomplishments/Planned Programs Subtotals	30.503	23.705	17.613

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A