Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army											Date: March 2014	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 0605604A / *Survivability/Lethality Analysis*							
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	-	40.865	43.256	33.295	-	33.295	28.203	28.320	28.572	29.638	-	-
675: *Army Survivability Analysis & Evaluation Supp*	-	40.865	43.256	33.295	-	33.295	28.203	28.320	28.572	29.638	-	-

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

Note

FY15 reduction attributed to realignment to other higher priority Army programs.

A. Mission Description and Budget Item Justification

This project funds analytical products necessary for inherently-governmental Army Test & Evaluation Command/Army Evaluation Center's (ATEC/AEC) mission. Products result from investigating, analyzing, assessing, and reporting on the survivability of Soldiers, and on the survivability, lethality and vulnerability (SLV) of the highest priority Army systems whether those systems are employed during stability, support, defensive, or offensive missions. Developed through measurement, experiment, test support, and modeling and simulation (M&S), the products funded by this project are used in many ways to make the Army force more survivable. The project provides quantitative lethality and survivability analyses and data for fielded and developmental systems as the Army makes the required choices to decisively transform into a modular Brigade Combat Team (BCT) based organization. Products concern Army fire support systems, direct fire munitions; Army air defense and missile defense systems; Army aviation systems including Unmanned Aerial Vehicles; network communications and other network enabled battle command and communication systems; and selected joint services systems particularly relevant to the Army's joint and expeditionary role. Products also include analysis and data concerning individual Soldier items including protective equipment such as helmets and vests. These survivability products are leveraged into rapid-equipping initiatives and other technical support for operational forces involved in the current fight. Continued development of these products also guarantees preservation of the Army's vitally needed technical corporate memory for expert survivability advice.

Survivability analyses funded by this project are conducted across the spectrum of battlefield threats to include guns, missiles, mines and other methods of inflicting physical damage; jammers, countermeasures, and other electronic warfare techniques; cybersecurity and computer network operations; and directed energy weapons. This survivability information enables developers, users, and decision makers to perform credible survivability tradeoffs for both Soldiers and materiel. These technical survivability details enable properly informed decisions concerning systems and tactics that maximize both the combat power and survivability of Army forces. Survivability data and analysis results funded by this project are efficiently leveraged for many different Army uses, reducing total cost to the Army by eliminating the need for duplicative capabilities funded by individual system developers. Central funding of this mission assures the Army accurate and consistent treatment of survivability across all classes of systems, across all formal system Evaluations, and across the Army's AR 5-5 studies process. Work program is prioritized principally by the ATEC/AEC and is used by them in the Army's formal Evaluation process in such a way that ATEC can comply with its legally mandated responsibility to assess system survivability along with effectiveness and suitability. Program Managers (PM) and the Program Executive Officers (PEO) use the survivability analyses and data funded by this project to make design decisions that are optimized for survivability, to direct specific weapon system development efforts that are needed for survivability enhancement, and to structure product improvement programs. Soldier survivability data and analysis is leveraged to support the survivability portion of the HQDA G1

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army	Date: March 2014
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605604A / *Survivability/Lethality Analysis*

MANPRINT program. TRADOC combat developers exploit the survivability products funded by this project to initiate and improve survivability/lethality requirements, and to develop and refine doctrine and tactics. Also, the quantitative analytical results funded by the project are leveraged as core inputs to formal AR 5-5 studies and other studies as directed by Army leaders. While the Army is at war, analytical results funded by this project are also directly leveraged for survivability support to current operations. Finally, for particularly urgent or controversial survivability issues, data and analysis funded by this project are used directly by senior Army decision makers to assure technically sound program/production decisions.

This project also supports cybersecurity survivability analysis of Army battle command/networked systems as well as Army network architectures and technology. Supports ATEC and other electronic warfare vulnerability testers and evaluators by developing and providing highly technical specialized field countermeasure environments that threat forces may employ against Army communications networks, air defense and other systems. In conjunction with PMs and Army intelligence agencies, analyzes technical vulnerabilities of foreign weapons, network related systems, and intelligence Electronic Warfare (EW) systems to U.S. Army EW systems. Without the survivability products funded by this project, ATEC would not have a technically credible account of survivability issues at milestone decision points and systems could be fielded with unknown vulnerabilities leading to unnecessary US casualties. PMs would make design choices that failed to properly optimize survivability, TRADOC would generate requirements that were not technically credible, and the Army studies process would rest on an inaccurate and inconsistent basis.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	44.753	43.280	41.736	-	41.736
Current President's Budget	40.865	43.256	33.295	-	33.295
Total Adjustments	-3.888	-0.024	-8.441	-	-8.441
• Congressional General Reductions	-0.107	-0.024			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.339	-			
• Adjustments to Budget Years	-	-	-8.441	-	-8.441
• Other Adjustments	-3.442	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army												Date: March 2014
Appropriation/Budget Activity 2040 / 6					R-1 Program Element (Number/Name) PE 0605604A / *Survivability/Lethality Analysis*				Project (Number/Name) 675 / *Army Survivability Analysis & Evaluation Supp*			
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**
675: *Army Survivability Analysis & Evaluation Supp*	-	40.865	43.256	33.295	-	33.295	28.203	28.320	28.572	29.638	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
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current operations. Finally, for particularly urgent or controversial survivability issues, data and analysis funded by this project are used directly by senior Army decision makers to assure technically sound program/production decisions.

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Title: Survivability, Lethality, Vulnerability (SLV) Analyses for Ground, Aviation, Munitions, and Soldier Systems	18.913	20.518	15.478
Articles:	-	-	-

Description: Conduct integrated survivability, lethality, vulnerability analyses for developmental aviation, ground, soldier and munition systems including Stryker, Ground Soldier System, Excalibur, and Intelligent Mine System (IMS). Completed ballistic survivability/vulnerability analysis for MRAP T&E, Guided Multiple Launch Rocket system (GMLRS) Alternative Warhead Initial Operational Test and Evaluation (IOT&E) and Excalibur Live Fire Test and Evaluation (LFT&E) System Engineering Test-P1 test events, which included providing pre-shot predictions, performing damage assessments after each live fire test, completing post-shot analyses, behind armor debris (BAD) test/analyses, and crew survivability analysis and providing technical data required by ATEC for the Systems Evaluation Reports. Additionally, results and recommendations from our crosswalk of MRAP LFT&E assessed casualty/selected Theater casualty incidents were briefed to MRAP PM & vendors, ATEC, HQDA and DOT&E resulting in vehicle design improvements for MRAP platforms.

FY 2013 Accomplishments:
Conducted survivability/vulnerability assessments of the RPG Protection and Underbody Blast Protection demonstrators provided by the GCV Technology Development contractors. Initiated the Paladin Improvement Management (PIM) vehicle Componennt Ballistic Tests.

FY 2014 Plans:
Conduct vulnerability analysis for future helicopter systems, such as future vertical lift. Conduct analysis for Kiowa CASUP MS C evaluations to include ballistic survivability assessment, MANPADs threat assessments, and EW and cybersecurity assessments.

FY 2015 Plans:

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Will conduct ballistic SLVA on AEC's highest priority platform and weapon systems, supporting LFT&E pre-shot predictions, damage assessments, post-shot analysis, and crew survivability analysis and providing technical data for system evaluation reports. Will provide vulnerability reduction recommendations to PMs for those systems supported. For systems analyzed will provide data to AMSAA for support of AR 5-5 and other Army studies. Will conduct conventional and under-body blast vulnerability analyses for the M270A1 MLRS. Will perform pre-shot predictions and prepare for the start of Paladin Integrated Management program's FUSL live-fire in 1QFY16.			
Title: Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) System Survivability Assessments	14.331	15.067	14.850
Articles:	-	-	-
Description: This effort produces assessments of the survivability of C4ISR systems in Electronic (EW) and cybersecurity threat environments and conducts Electronic Attack (EA) and Cybersecurity projects that reveal critical vulnerabilities in C4ISR systems. It also defines, demonstrates, and recommends mitigation options to proponents and evaluators of C4ISR. A cyber vulnerability database is maintained for the benefit of the community.			
FY 2013 Accomplishments: EW and Cybersecurity/CND modeling and analysis results were provided to AEC for their evaluation reports. Continued conducting EW and Cybersecurity modeling, testing and analysis of system evaluated in NIE events. Supported C4ISR systems survivability EW and Cybersecurity modeling analysis and test verification and validation of performance, for example, multi-spectral signature measurements. Conducted C4ISR system IO/EW/ES assessment. Completed the survivability assessment. ARL/SLAD, Product Manager and Combat Developer in concert with the intelligence community initiated a product improvement program (P31 strategy) to develop and field additional survivability enhancement measures (Electronic Protect/CND) to address future threat capabilities which may place the Army C4ISR system at risk to enemy targeting in the evolving EW threat environment during Army RESET.			
FY 2014 Plans: Conduct modeling and simulation on WIN-T Inc 3 in support of AEC's survivability evaluation of JC4ISR radio's Milestone C decision scheduled for FY15. Conduct priority modeling, testing and analyses of MNVR, Rifleman and Handheld, Manpack and Small Form Fit (HMS) systems. Conduct Electronic Protection (EP) and Cybersecurity survivability analysis investigations to help identify and mitigate capability gaps in areas such as: C4ISR, battlespace awareness, joint fires, intelligence fusion with secure data sharing and combat identification. Work with AEC, product developer and TRADOC user communities to provide integrated SV solutions that are necessary to counter increasingly smart and sophisticated evolving EW and IW threats. Provide analysis of systems and networks during System-of-Systems Network Vulnerability Assessments and Network Integration Evaluations.			
FY 2015 Plans:			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Will conduct Electronic Protection (EP) and Cybersecurity survivability analysis Investigations to help identify and mitigate capability gaps in areas such as: C4ISR, battle space awareness, joint fires, intelligence fusion with secure data sharing and combat identification. Will work in conjunction with AEC, product developers and TRADOC user communities to provide integrated SV solutions that are necessary to counter increasingly smart and sophisticated evolving EW and cyber threats. Will provide analysis of systems and networks during System-of-Systems Network Vulnerability Assessments and Network Integration Evaluations. Will conduct modeling, simulation and testing on WIN-T Inc 3 in support of AEC's survivability evaluation of JC4ISR radio's Milestone C decision scheduled for FY16. Will conduct analysis on both legacy and new COTs radios and waveforms as required. Will conduct EW and cyber studies on MARSS, DGCS, Prophet and UAS ISR, AFATDS and IPADS. Will advance development of SAGE communication modeling environment in support of NIE and other field test environments. Will develop a methodology to investigate and test GPS reliant systems in an anechoic chamber. Will continue developing tools and techniques to conduct software code analysis and the subsequent development of potential exploits. Will further development of a large-scale mobile ad-hoc network simulation environment to determine potential vulnerabilities in systems before DT/OT test events.			
Title: Survivability, Lethality, Vulnerability (SLV) Analyses for Developmental Air and Missile Defense Systems	5.877	5.905	1.554
Articles:	-	-	-
Description: Conduct integrated SLV analyses for developmental air and missile defense systems, pre-planned product improvements of current systems, and recently fielded systems. These systems include the Ballistic Missile Defense System (BMDS), Terminal High Altitude Air Defense (THAAD), PATRIOT, Surface-Launched Advanced Medium Range Air-to-Air Missile (SLAMRAAM), Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS), and Sentinel.			
FY 2013 Accomplishments: Continued FMS AEA upgrade for Patriot. Prepares for PDB-8 testing. Provided electronic countermeasures ground support to JLENS Limited User Test (LUT) testing and provides JLENS computer network operations testing and assessment to ATEC.			
FY 2014 Plans: Provide Patriot mobile flight simulator (FMS) with simulated adv. electronic attack countermeasure waveforms. Leverage capability to support air and missile defense systems. Conduct LFT&E testing and lethality assessment of PATRIOT MSE missile assessing new lethality enhancers. Provide cybersecurity testing on multiple air and missile defense system, e.g. counter artillery rocket & mortar (C-RAM) and future efforts, e.g. integrated air& missile defense (IAMD).			
FY 2015 Plans: Will design, develop, and employ advanced electronic attack countermeasures to assess AIAMD system of systems. Will provide advanced EA for Patriot PDB-08 limited user testing. Will conduct cybersecurity testing on next iteration of C-RAM. Will complete live-fire test and evaluation lethality assessment of the Patriot MSE missile.			
Title: System-of-systems survivability simulation (S4)	1.744	1.766	1.413

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2013	FY 2014	FY 2015
Articles:	-	-	-
Description: Develop and use an S4 tool to conduct system-of-systems vulnerability analysis supporting the evaluation of a full range of future military capabilities. This tool will allow SLAD to provide analytical information that extends beyond the reach of traditional single-thread analysis and addresses impacts on mission execution. ***FY 2013 Accomplishments:*** Conducted system-of-systems analyses to support major program decisions in support of Army Test and Evaluation Command (ATEC) formal evaluations. ***FY 2014 Plans:*** Supports Army Test and Evaluation Command (ATEC) electronic warfare analysis of software radio. Conduct decision making process development in the context of system of systems survivability analysis. ***FY 2015 Plans:*** Will use the system-of-systems survivability simulation to investigate the effects of wide-ranging battlefield threats upon mission execution. Threat effects include ballistic vulnerability/lethality, cybersecurity, and electronic warfare.			
Accomplishments/Planned Programs Subtotals	40.865	43.256	33.295

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A