Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Army										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*				R-1 ITEM NOMENCLATURE PE 0605604A: *Survivability/Lethality Analysis*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	40.037	44.782	41.812	0.000	41.812	42.273	43.123	42.633	42.780	Continuing	Continuing
675: *Army Survivability Analysis & Evaluation Support*	40.037	44.782	41.812	0.000	41.812	42.273	43.123	42.633	42.780	Continuing	Continuing

Note

Per Charito the PB 11 Lock for FY10 is $44782 vice the $45398 that appeared when funds where imported.

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 BCT based organization. Specific survivability analysis products include assessments of systems such as MRAP, Stryker, Future Combat System and associated spin-out systems, Army fire support systems, direct fire munitions; Army air defense and missile defense systems; Army aviation systems including Unmanned Aerial Vehicles; communications and other systems enabling network enabled battle command and computer network operations (CNO); 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 analysis products funded by this project are integrated 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; information warfare attacks; and high and low power directed energy weapons. This survivability information permits developers, users, and decision makers to fully understand the technical details of the most important survivability tradeoffs for both systems and Soldiers. 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Army	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	**R-1 ITEM NOMENCLATURE** PE 0605604A: *Survivability/Lethality Analysis*

programs. Soldier survivability data and analysis is leveraged to support the survivability portion of the HQDA G2 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 highly technical specialized information warfare and information operations survivability analysis of Army communications and electronic equipment and communications architectures essential to network enabled battle command. Supports ATEC and other electronic warfare vulnerability testers by developing and providing highly technical specialized field countermeasure environments that threat forces may employ against Army air defense and other systems. In conjunction with PMs and Army intelligence agencies, analyzes technical vulnerabilities of foreign weapons, network related systems, and intelligence EW systems to U.S. Army Electronic Warfare (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 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	40.929	45.016	42.357	0.000	42.357
Current President's Budget	40.037	44.782	41.812	0.000	41.812
Total Adjustments	-0.892	-0.234	-0.545	0.000	-0.545
• Congressional General Reductions		-0.234			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.892	0.000			
• Adjustments to Budget Years	0.000	0.000	-0.545	0.000	-0.545

Exhibit R-2A, RDT&E Project Justification: PB 2011 Army			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 2040: *Research, Development, Test & Evaluation, Army* BA 6: *RDT&E Management Support*	R-1 ITEM NOMENCLATURE PE 0605604A: *Survivability/Lethality Analysis*	PROJECT 675: *Army Survivability Analysis & Evaluation Support*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
675: *Army Survivability Analysis & Evaluation Support*	40.037	44.782	41.812	0.000	41.812	42.273	43.123	42.633	42.780	Continuing	Continuing
Quantity of RDT&E Articles											

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 BCT based organization. Specific survivability analysis products include assessments of systems such as MRAP, Stryker, Increment 1 Brigade Combat Team and associated spin-out systems, Army fire support systems, direct fire munitions; Army air defense and missile defense systems; Army aviation systems including Unmanned Aerial Vehicles; communications and other systems enabling network enabled battle command and computer network operations (CNO); 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 analysis products funded by this project are integrated 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; information warfare attacks; and high and low power directed energy weapons. This survivability information permits developers, users, and decision makers to fully understand the technical details of the most important survivability tradeoffs for both systems and Soldiers. 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 G2 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

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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 highly technical specialized information warfare and information operations survivability analysis of Army communications and electronic equipment and communications architectures essential to network enabled battle command. Supports ATEC and other electronic warfare vulnerability testers by developing and providing highly technical specialized field countermeasure environments that threat forces may employ against Army air defense and other systems. In conjunction with PMs and Army intelligence agencies, analyzes technical vulnerabilities of foreign weapons, network related systems, and intelligence EW systems to U.S. Army Electronic Warfare (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. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Program #1	18.771	20.566	20.095	0.000	20.095
Conduct integrated survivability, lethality, vulnerability analyses for developmental aviation, ground, soldier and munition systems including JCA, MRAP, Stryker, GSS, Excalibur, and IMS. Completed ballistic survivability/ vulnerability analysis for MRAP T&E, GMLRS Unitary IOT&E and Excalibur LFT&E SET-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, SLAD's 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. FY10-FY11 plans include conducting engineering and crew casualty analyses for MRAP ATV, JLTV and PIM LFT&E test events. In FY09 SLAD conducted LF testing and ballistic survivability/vulnerability analyses for JCA. SLAD analyses are being finalized for the DOT&E report. In FY11 SLAD will conduct LB Apache Block III LFT&E test events and conduct HWIL investigations on LB Apache Block III. SLAD will conduct EW vulnerability assessments for IMS, Excalibur and JAGM. SLAD will conduct ballistic survivability/ lethality analysis for Excalibur, JAGM, GMLRS Alternate Warhead Program (AWP) and Excalibur Increment 1b. SLAD will provide ballistic and non-ballistic survivability/vulnerability/lethality analysis support to new					

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Army carbine program and provide technical data required by ATEC for the Systems Evaluation Report. Provide ballistic survivability/vulnerability analysis support to Army studies. CONTINUED BELOW... *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base *FY 2011 OCO Plans:* FY 2011 OCO					
Program #2 ...CONTINUED FROM BLOCK ABOVE. This effort provides the Army's Increment 1 Brigade Combat Team stakeholders with comprehensive survivability, lethality, and vulnerability assessments and vulnerability reduction recommendations that will enhance these attributes of the system-of-systems. Advanced technologies such as Active Protection Systems, hybrid propulsion, and advanced armors are evaluatedthrough precision experimentation and modeling and simulation. Methodology enhancements for simulation of new emerging technologies and system-of-systems operational constructs will be performed as required. SLAD's survivability based functional analysis and functional decomposition contributed to the development of the system-of-systems specification. Additional vulnerability analysis of MGV platforms were conducted in FY09 and the data will contribute to two scheduled program milestones; the FCS SoSPDR; and provided guidance to Increment 1 Brigade Combat Teams for engineering design and networking. Planning and execution of congressionally mandated LFT&E programs will be performed in conjunction with ATEC and OSD DOT&E including armor coupon testing. Further analysis and LFTE activities will continue in FY10-11. Ballistic vulnerability analysis	0.000	0.000	0.000	0.000	0.000

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
of the Increment 3 Brigade Combat Team will be conducted in support of planned CDRs, LFT&E activities, and initial qualification tests. Network analysis efforts will also continue during this time frame. Findings and recommendations for survivability enhancements will be disseminated to appropriate Army stakeholders. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base *FY 2011 OCO Plans:* FY 2011 OCO					
Program #3 This effort produces assessments of the survivability of C4ISR systems in Electronic (EW) and Information Warfare (IW) threat environments and conducts Information assurance (IA) projects that reveal critical vulnerabilities in C4ISR systems. It also defines, demonstrates, and recommends mitigation options to proponents and evaluators of C4ISR. An IW vulnerability database is maintained for the benefit of the community. Priority testing and analyses will be conducted from FY10-11 including EW/IA modeling, JTRS waveforms and hardware, WIN-T increment 2 and 3, ACS, DGCS-A, Increment 1 Brigade Combat Team , and software blocking. Modeling and simulation tools will be developed as required. Also from FY10-11 this project will continue to analyze the evolving EW threat to GPS as integrated into Army weapons. Capabilities will be developed to simulate and evaluate mobile ad-hoc networks which are critical to future Army mobile networks and during FY10-11 they will be used to analyze Army networks and enhance their survivability. This will include vulnerability analyses of tactical internet components to radio frequency directed energy weapons (RFDEW).	14.205	14.898	14.700	0.000	14.700

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
System-of-Systems Common Operating Environment (SoSCOE) assessments are also conducted. FY09 included conducting EW/IA assessments on JTRS. SLAD collaborated with developer to implement mitigations based on SLAD findings. FY10-11 IA testing and Increment 1 & 2 Brigade Combat Team will be conducted. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base *FY 2011 OCO Plans:* FY 2011 OCO					
Program #4 Conduct integrated survivability, lethality, vulnerability 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 10 - 11 plans include providing the OTA with BMDS CNO assessments, providing target simulator support to JLENS DT testing and countermeasure support of PATRIOT PDB-7 DT/OT testing. In FY09 SLAD conducted extensive modifications to the radar target jammer simulator in preparation for DT testing of the JLENS in FY10. Additionally in FY09 SLAD conducted technology upgrades on its signal receiver vans to analyze and evaluate multiple battlefield sensors simultaneously.	5.500	6.106	5.517	0.000	5.517

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base *FY 2011 OCO Plans:* FY 2011 OCO					
Program #5 System-of-systems survivability simulation (S4) - In FY09 SLAD extended S4 analytical capability by integrating engineering-level EW and CNO effects into the simulation; FY10 SLAD will demonstrate MUVES3 V/L service to S4; This capability will enable SLV analysis of the networked-enabled future force. In FY11 SLAD continue to improve capability to simulate IW and EW attacks on network-centric battle commands. *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base	1.561	2.000	1.500	0.000	1.500

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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 OCO Plans: FY 2011 OCO					
Program #6 Small Business Innovative Research/Small Business Technology Transfer Programs *FY 2009 Accomplishments:* FY 2009 *FY 2010 Plans:* FY 2010 *FY 2011 Base Plans:* FY 2011 Base *FY 2011 OCO Plans:* FY 2011 OCO	0.000	1.212	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	40.037	44.782	41.812	0.000	41.812

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.