RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)

DATE: **February 1995**

BUDGET ACTIVITY: **6 - Management Support**

PE NUMBER AND TITLE: **0605604A Survivability/Lethality Analysis**

COST (*In Thousands*)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	31907	37523	34535	33695	33299	33132	32652	35441	Continuing	Continuing
DC10 Aviation System Survivability/Lethality/Vulnerability	3714	4666	0	0	0	0	0	0	0	0
D067 Air Worthiness Qualification Support	2788	0	0	0	0	0	0	0	0	0
D089 Aircraft Certification	0	2994	0	0	0	0	0	0	0	0
D181 Antiradiation Missile Counter-Countermeasures	0	1063	0	0	0	0	0	0	0	0
D190 Integrated Analysis	6144	6802	0	0	0	0	0	0	0	0
D234 Close Combat/Fire Support Survivability Analysis	6562	6938	0	0	0	0	0	0	0	0
D235 Missile Counter-Countermeasure Technology	657	672	0	0	0	0	0	0	0	0
D267 Air Defense/Missile Defense System Vulnerability	6376	8024	0	0	0	0	0	0	0	0
D626 C4I Survivability	5666	6364	0	0	0	0	0	0	0	0
D670 Emerging Technology Systems	0	0	5570	5512	5447	5440	5246	5879	Continuing	Continuing
D671 Air Defense/Missile Defense Systems	0	0	6537	6476	6423	6630	6551	7015	Continuing	Continuing
D672 Aviation Systems	0	0	4467	3840	3791	3732	3803	3884	Continuing	Continuing
D675 C4I/IEW Systems	0	0	5140	5164	5106	5008	4897	5416	Continuing	Continuing
D677 Ground Combat Systems	0	0	6010	5982	5915	5840	5755	6295	Continuing	Continuing

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COST (*In Thousands*)	FY 1994 Actual	FY 1995 Estimate	FY 1996 Estimate	FY 1997 Estimate	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	Cost to Complete	Total Cost
D678 Munitions Systems	0	0	5982	5885	5794	5678	5580	6116	Continuing	Continuing
D679 Soldier Systems	0	0	829	836	823	804	820	836	Continuing	Continuing

A. Mission Description and Budget Item Justification This Program Element (PE) funds activities and functions to conduct objective and integrated survivability and lethality analyses (SLA) for all major and designated non-major Army systems. The analyses quantify the effects of electronic warfare (EW), ballistic, nuclear, chemical, and biological battlefield threats and meteorological conditions on Army individual soldiers and systems. The work is accomplished through threat research, theoretical and engineering analyses, signature measurements, modeling, simulations, laboratory experiments, and field investigations. Activities in progress include assessment of the effects of smokes and obscurants, passive countermeasures, tactics, lasers, high-power microwave, electro-optical/radio frequency (EO/RF) jammers, electromagnetic environment effects (E3), decoys, conventional ballistics and nuclear/biological/chemical (NBC) effects on Army soldiers and systems. The PE work efforts provide U.S. Army decision makers, materiel and combat developers, system users, and independent evaluators critical soldier and system survivability analyses that quantify the soldier/system's survivability effectiveness in battlefield threat environments. Recommendations are provided to the materiel and combat developers on how to mitigate soldier/system deficiencies and enhance their survivability. This PE funds civilian salaries, travel, development and maintenance of equipment and facilities, general management, administrative and contractor support required for program execution. This effort is conducted by the U.S. Army Research Laboratory (ARL) Survivability/Lethality Analysis Directorate (SLAD) . This PE supports Headquarters, Department of the Army (HQDA), Program Executive Offices (PEOs), Program Managers (PMs), and independent evaluators with EW, chemical, biological, nuclear, and ballistic expertise to conduct special studies, support Test Integration Working Groups (TIWG) and program reviews, review acquisition documentation, provide government testers with technical support, and support milestone decision reviews; and is appropriately funded in Budget Activity 6.

NOTE: This PE is restructured effective FY 1996 to provide management visibility for survivability/lethality projects and funds in a single PE.

Project DC10 - Aviation Systems Survivability/Lethality/Vulnerability (SLV): Project investigates the SLV of Army aviation systems to the full spectrum of battlefield threats to include conventional ballistic, electronic warfare (EW), directed energy, and chemical, biological, and nuclear. Aircraft SLV deficiencies are identified and hardening fixes identified as appropriate. SLV analysis directly supports major decision milestone reviews, acquisition documentation, test and evaluation master plans, and cost/operational effectiveness analyses. Through FY 1995, provides assessment of acoustic technology which might be developed to exploit potential susceptibilities of helicopters. Beginning in FY96, work performed in this project is restructured to Project D672.

FY 1994 Accomplishments:

- Through laboratory simulations, computer modeling, and field experiments, conducted EW vulnerability analysis (EWVA) and provided EW support as part of the integrated SLV program for Comanche, Apache Longbow, Chinook helicopters, and Unmanned Aerial Vehicles (UAV). (1078)

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- Through laboratory simulations, computer modeling, and field experiments, conducted ballistic vulnerability investigations/analysis of Comanche, Apache Longbow, and Special Operations helicopters (MH-60 and MH-47E). (858)
- Conducted theoretical investigation of Comanche and Apache Longbow vulnerability to low level out-of-band RF countermeasures. (200)
- Characterized optical/electro-optical devices and IR signatures of Comanche, Kiowa Warrior, Apache Longbow, and Chinook helicopters. (200)
- Conducted computer modeling and simulation as part of EWVA for Apache Longbow, Comanche, and UAV. (117)
- Assessed advanced tracking and target identification algorithms using ARL test bed for helicopter applications. (1261)

FY 1995 Planned Program:

- Through laboratory simulations, computer modeling, and field experiments, conduct, EWVA and ballistic vulnerability investigations and analysis, and provide EW support for SLV of Army aviation systems such as Comanche, Apache Longbow, Chinook helicopters, and UAV. (2386)
- Expand the survivability/lethality integrated analysis program to address improvements/modifications to all Army aviation systems across all battlefield threats. (626)
- Support development and execution of live fire test and evaluation for Army aviation systems including Comanche and Special Operations (MH-60K and MH-47E)
  helicopters. (416)
- Assessment of acoustic technology for use as low cost long range battlefield sensors for exploiting vulnerabilities of helicopters. (1203)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (35)

FY 1996 Planned Program: Project restructured to Project D672 within this PE.

FY 1997 Planned Program: Project restructured to Project D672 within this PE.

Project D089 - Aircraft Certification: Project performs all engineering functions essential for certifying the airworthiness of assigned Army aircraft. Performs safety-of-flight investigations/assessments and issues messages to the field. Manages/executes the Army's Aeronautical Design Standards (ADS) Program. The ADS is a continuous evolving process incorporating revisions for each change to the standard design of an aircraft system. Manages airworthiness approval of new vendor qualification/testing on field aircraft and material changes, for all assigned Army aircraft systems. Provides airworthiness engineering support to the Aviation Program Executive Office and Aviation and Troop Command Program/Project/Product Manager requirements for major development/modification and any future systems/subsystems. Manages the test and evaluation process to support the airworthiness qualification of development and fielded aircraft systems. **(This project transfers to PE 065606A Aircraft Certification in FY96)**

FY 1994 Accomplishments: Project not funded.

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FY 1995 Planned Program:
- Manage/execute technical and airworthiness qualification mission for PEO Aviation force modernization aircraft systems. (759)
- Manage/execute the Army Aeronautical Design Standards Program. (152)
- Update airworthiness standards. (90)
- Continue to ensure safety-of-flight investigations/assessments for PEO Aviation force modernization aircraft systems. (607)
- Provide continuing engineering support for emerging technology upgrades to PEO Aviation force modernization aircraft systems. (920)
- Continue to provide test management capability for PEO Aviation program/project/product managers. (403)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (63)

FY 1996 Planned Program: Project funded under PE 06506A Aircraft Certification in FY96.
FY 1997 Planned Program: Project funded under PE 06506A Aircraft Certification starting in FY96.

Project D181 - Antiradiation Missile Counter-Countermeasures (ARM-CCM): The ARM-CCM project objectives are to understand the capabilities of threat ARMs and how they work. The project provides simulation and hardware tools for both proposed and fielded ARM countermeasures as well as techniques and methodologies which support ARM-CCM investigations.

FY 1994 Accomplishments: Program not funded.

FY 1995 Planned Program:
- Conduct/coordinate EWVA of ARM threats to U.S. and Allied systems in support of the Army ARM Counter-Warfare Program. (152)
- Provide simulation support to ARM-CCM projects. (299)
- Provide survivability analysis of proposed and fielded ARM countermeasures. (292)
- Develop hardware, tools, techniques, and methodologies to support ARM-CMM. (298)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (22)

FY 1996 Planned Program: Beginning in FY 1996 work and funds restructured to Projects D670, D671, D672, D675, and D678 within this PE.

FY 1997 Planned Program: Beginning in FY 1996 work and funds restructured to Projects D670, D671, D672, D675, and D678 within this PE.

Project D190 - Integrated Analysis: This project provides supporting technology and data for the Army's integrated survivability analysis program to conduct survivability (SLV) analysis on Army systems and funds the investigation of the lethality/vulnerability of smart munitions to the full spectrum of battlefield threats. The analysis is integrated across all battlefield threats, i.e., conventional ballistic, electronic warfare, directed energy, nuclear weapons effect, and nuclear and chemical/biological contamination effects. This project supports development of the Army initiative to reduce systems' susceptibility to out-of-band radio frequency

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(RF) countermeasure effects. This project also includes the Army Electronic warfare (EW) signature measurement program and the assessment of laser countermeasure (CM) effects on Army optical/electro-optical (O/EO) systems. This project also supports investigations of new technologies/methodologies required for SLV analyses.

FY 1994 Accomplishments:

- Managed the U.S. Army survivability/lethality integrated analysis programs (Air Defense, Aviation Systems, C4I/IEW, Ground Systems, Munitions, and Integrated Soldier System) and participated in the ARL FOCUS programs, Battle Labs and ATD initiatives, and special projects for ARL, AMC, and HQDA. (1855)
- Through laboratory simulations, computer modeling, and field experiments, conducted electronic warfare and ballistic survivability/vulnerability analysis of U.S. Army munitions systems that are in development, production, or undergoing product improvements. Examples of systems under investigation to support decision milestones are Javelin, Hellfire Longbow, and Wide Area Mine (WAM). (2496)
- Exploited state-of-the-art computer science and graphics techniques to improve geometry processing and display of materiel systems for ballistics lethality analysis. (661)
- Established a computer virus laboratory and analyzed security models in operating systems and the effects of malicious electronic attack on imbedded processors. (302)
- Developed computer control codes, digital simulation models, and methods to increase power spectral density waveforms for EWVA programs. (591)
- Conducted integrated survivability analysis in support of The Enhanced Integrated Soldier System (TEISS). (239)

FY 1995 Planned Program:

- Manage the U.S. Army survivability/lethality integrated analysis programs (Air Defense, Aviation Systems, C4I/IEW, Ground Systems, Munitions, and Integrated Soldier System) for 38 systems under development or in improvement cycles and participate in the ARL FOCUS programs, Battle Labs and ATD initiatives, and special projects for ARL, AMC, and HQDA. (1970)
- Through laboratory simulations, computer modeling, and field experiments, conduct, electronic warfare and ballistic survivability/lethality analysis process for U.S. Army smart munitions including Javelin, Hellfire Longbow, and WAM. (3228)
- Investigate the effects of new/advanced threat technology on systems in the integrated analysis area. (1585)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (19)

FY 1996 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D670, D671, D672, D675, D677, D678, and D679 within this PE.

FY 1997 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D670, D671, D672, D675, D677, D678, and D679 within this PE.

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Project D234 - Close Combat/Fire Support Survivability/Lethality: Project investigates the survivability and vulnerability of Army ground combat systems to the full spectrum of battlefield threats; and the lethality of Army fire support munitions (smart and conventional). Analysis will support weapon requirements, test and evaluation master plans, cost/operational effectiveness analysis, and major decision milestones.

FY 1994 Accomplishments:

- Through laboratory simulations, computer modeling, and field experiments, conducted ballistic survivability/lethality investigations/analysis of U.S. Army ground systems including the AFAS/FARV, AGS, Breacher, Bradley Fighting Vehicle System (BFVS), M1 Abrams Main Battle Tank, and M109 Howitzer systems. (1655)
- Performed in depth comparison of the predictions of the Stochastic Quantitative Analysis of System Hierarchies (SQuASH) probabilistic computer models for armored vehicles with the results of the live fire test and evaluations (LFT&E) programs. (1137)
- Conducted EWVA of the U.S. Army ground systems including AFAS/FARV and Breacher. (1426)
- Conducted EWVA investigations on SADARM, STAFF, M829A2, BAT, LOSAT, TOW ITAS, and ATACMS (APAM) munitions. (1391)
- Provided signature measurements and computer modeling and simulation for EWVA of U.S. Army ground systems and smart munitions. (953)

FY 1995 Planned Program:

- Through laboratory simulations, computer modeling, and field experiments, conduct, EWVA and ballistic survivability/lethality investigations/analysis of U.S. Army ground systems such as AFAS/FARV, AGS, Breacher, Bradley, M1 Abrams, and M109 Howitzer systems. (3292)
- Conduct EWVA investigations on SADARM, STAFF, M829A2, BAT, LOSAT, TOW ITAS, and ATACMS (APAM) munitions. (1510)
- Provide signature measurements and computer modeling and simulation for integrated survivability/lethality analyses of U.S. Army ground systems and smart munitions. (2067)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (69)

FY 1996 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D677 and D678 within this PE.

FY 1997 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D677 and D678 within this PE.

Project D235 - Missile Counter-Countermeasure Technology: Supports Program Management Offices by development of CM/CCM hardening techniques that missile systems use against laser, RF, and directed energy threats. Supports modeling to investigate vulnerabilities of systems to air defense systems. Supports investigations of missile signatures and exploitability. Investigates technology to harden optical windows against lasers, RF, and directed energy threats. Also funds salaries, travel, equipment, and general management/administrative support.

FY 1994 Accomplishments:

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- Continued development of surface current dissipation coatings and selective surfaces patterning techniques for CCM applications. (198)
- Began testing and analysis of surface current dissipation coatings for hardening of missile systems. (198)
- Tested and analyzed missile systems and subcomponents for Radar Cross Section (RCS), Unintentional Radiated Emissions (URE), Special Electromagnetic Interference (SEMI) effects, and High Power Microwaves (HPM) in the context of weapon systems hardening. (100)
- Improved upon existing thin film materials for Army missile systems hardening. (50)
- Assessed missile system CM/CCM requirements for current/future system threats and conducted missile performance studies and analysis in an EW environment. (61)
- Developed one-on-one simulation for analysis of missile systems against known and projected threats. (50)

FY 1995 Planned Program:

- Continue to improve/upgrade hardening techniques, investigate, and develop new technology advanced CCM application. (175)
- Continue to conduct test and analysis to determine the susceptibility characteristics of selected weapon systems to specific environments and to specify the appropriate CCM techniques and validate the CCM effectiveness. (308)
- Verify and validate the one-on-one simulation with measured data to determine the region of validity. (177)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (12)

FY 1996 Planned Program: Project not funded.

FY 1997 Planned Program: Project not funded.

Project D267 - Air Defense/Missile Defense System Vulnerability: Provides the survivability/lethality analysis of U.S. Army air defense and missile defense systems to the full spectrum of battlefield threats and recommends fixes to improve their battlefield survivability. The results are used by each Project Manager (PM) and the Program Executive Officer (PEO) to direct weapon system development efforts and structure product improvement programs; by the user to develop doctrine and tactics; and by decision makers in formulating program/production decisions. Beginning in FY 1996 the work and funds are restructured to Projects D670 and D671 within this PE.

FY 1994 Accomplishments:

- Through laboratory simulations, computer modeling, and field experiments, conducted EWVA of U.S. Army air defense systems including PATRIOT, Stinger-RMP, Avenger, Corps SAM, HAWK, Ground Based Sensor (GBS), and Multi-Role Survivable Radar (MRSR). (2413)
- Conducted EWVA of U.S. Army missile defense systems including the Theater High Altitude Area Defense (THADD) system, the Extended Range Interceptor (ERINT), and the Ground Based Radar (GBR). (1263)
- Conducted ballistic susceptibility/vulnerability/lethality analysis of U.S. Army air defense/missile defense systems. (638)
- Determined the physical relation and functional capabilities of aerospace systems with degraded states due to ballistic damage. (1054)

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- Provided EWVA modeling and simulation support, both hardware-in-the-loop and digital simulations, for U.S. Army air defense/missile defense systems. (1008)

FY 1995 Planned Program:
- Conduct EWVA of U.S. Army air defense systems including PATRIOT, Stinger-RMP, Avenger, Corps SAM, HAWK, GBS, and MRSR. (2979)
- Conduct EWVA of U.S. Army missile defense systems including THAAD, ERINT, and GBR. (1559)
- Conduct ballistic susceptibility/vulnerability/lethality analyses of U.S. Army air defense/missile defense systems. (808)
- Provide EWVA and ballistic modeling and simulation support for survivability/vulnerability/lethality analysis of U.S. Army air defense/missile defense systems. (2030)
- Develop necessary SLV analyses, methodologies, capabilities and techniques to ensure soldier survivability. (557)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (91)

FY 1996 Planned Program: Beginning in FY 1996 work and funds restructured to Projects D670 and D671 within this PE.

FY 1997 Planned Program: Beginning in FY 1996 work and funds restructured to Projects D670 and D671 within this PE.

Project D626 - C4I Survivability: Supports survivability analysis of Army communications and electronic equipment against the full spectrum of friendly and enemy threats. Provides field threat environment support for EWVA. Analyzes vulnerabilities of foreign threat weapons and command, control, communications, computers and intelligence (C4I) and Intelligence Electronic Warfare (IEW) systems to U.S. Army EW systems. Provides threat weapon electronic design data to countermeasure developers and technical capability information to the intelligence community. Supports Army initiatives in vulnerability reduction of C4I/IEW systems against the full spectrum of battlefield threats. In FY 1996, work and funding in this project is restructured to Projects D670 and D675 within this PE.

FY 1994 Accomplishments:
- Conducted integrated survivability/lethality analysis for ATCCS and all of its functional area systems. (1342)
- Through laboratory simulations, computer modeling, and field experiments, performed EWVA and ballistics SLA on Army communications systems including SCAMP, SMART-T, MSE, and SINCGARS. (1338)
- Through laboratory simulations, computer modeling, and field experiments, performed EWVA and ballistics SLA on Army Intelligence Electronic Warfare (IEW) systems including JSTARS and Battlefield Combat Identification System (BCIS). (1062)
- Enhanced techniques for and provided Special Electromagnetic Interference (SEMI) analysis of Army C4I systems. (597)
- Enhanced capabilities to measure target signatures and performed EWVA of systems to RF countermeasures. (1327)

FY 1995 Planned Program:
- Conduct integrated survivability/lethality analysis for the Army Battlefield Command System (ABCS) and all of its functional area systems and their improvements. (2312)

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- Perform EWVA and ballistics SLA on Army communications systems and their improvements. (2201)
- Through laboratory simulations, computer modeling, and field experiments, perform EWVA and ballistics SLA on Army IEW systems such as BCIS, JSTARS, and enhanced Firefinder. (1792)
- Funds will be reprogrammed for SBIR/STTR Programs in accordance with the Small Business Innovation Research Program Reauthorization Act of 1992. (59)

FY 1996 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D670 and D675 within this PE.

FY 1997 Planned Program: Beginning in FY 1996 work and funding restructured to Projects D670 and D675 within this PE.

Project D670 - Emerging Technology Systems: This project performs integrated SLA for a category of systems which includes Horizontal Technology Integration systems, Advanced Technology Demonstration initiatives, and Anti-Radiation Missile (ARM) Counter-ARM systems. Survivability deficiencies are identified and recommendations are made to PEO/PMs to provide hardening fixes early on in program development. This work is accomplished through theoretical and engineering analyses, signature measurements, modeling, simulations, laboratory experiments, and field investigations. This effort also supports HQDA, PEOs, PMs and independent evaluators with EW, chemical, biological, nuclear, meteorological, and ballistic expertise to conduct special studies, support TIWGs and program reviews, acquisition documentation review, and provides Government testers with technical support. Horizontal Technology Integration systems include 2ND Generation FLIR (2ND GEN FLIR), Battlefield Combat Identification System (BCIS), Global Positioning System (GPS), and Enhanced Position Location Reporting System (EPLRS). Advanced Technology Demonstration initiatives include Active Protection Systems (APS), Missile Countermeasure Devices (MCD) and Advanced Laser Protection Program (ALPP). ARM Counter-Arm efforts assess threat technologies against Theater Missile Defense (TMD), PATRIOT, JSTARS, Corps SAM, and FAAD-C21 ground based sensors.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:

- Conduct EW performance analyses, to include infrared (IR), radio frequency (RF), and electro-optical spectrums to support integrated survivability and lethality analyses. Develop necessary test beds to conduct laboratory and field investigations, and prepare interim survivability analysis reports. This work supports 2ND GEN FLIR, BCIS, GPS, APS, EPLRS, and ALPP. (2861)
- Conduct analyses to determine ballistic effects. Develop system description models, perform damage simulations, and collect experimental data to support integrated survivability and lethality analyses. Develop necessary test beds to conduct experiments, and prepare interim survivability analysis reports. This work support 2ND FLIR, BCIS, GPS, APS, and EPLRS. (1500)

- Conduct analyses to address nuclear hardening and survivability, chemical and biological warfare contamination and decontamination, and dirty battlefield conditions. Develop necessary test beds to conduct laboratory and field investigations, and prepare interim survivability analysis reports. This work supports 2ND GEN FLIR, BCIS, GPS, APS, EPLRS, and ALPP. (1209)

FY 1997 Planned Program:

- Conduct EW vulnerability assessments to support integrated survivability and lethality analyses of emerging technology systems and horizontal technology applications. Develop necessary test beds to conduct laboratory and field investigations, and prepare interim survivability analysis reports. (2762)
- Conduct ballistic effects investigations, develop system description models, perform damage simulations, and collect experimental data to support integrated survivability and lethality analysis reports. (1525)
- Conduct engineering investigations addressing nuclear hardening and survivability, chemical and biological warfare contamination and decontamination, and dirty battlefield conditions to support integrated survivability/lethality analyses of emerging technology systems and horizontal technology applications. Develop necessary test beds to conduct laboratory and field investigations, and prepare interim survivability analysis reports. (1225)

Project D671 - Air Defense/Missile Defense Systems: Provides the survivability/lethality analysis of U.S. Army air defense and missile defense systems to the full spectrum of battlefield threats and recommends fixes to improve their battlefield survivability. The results are used by each Project Manager (PM) and the Program Executive Officer (PEO) to direct weapon system development efforts and structure product improvement programs; by the user to develop doctrine and tactics; and by decision makers in formulating program/production decisions. Also funds salaries, travel, equipment/facilities, and management/administrative support needed to execute the program.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:

- Conduct the electronic warfare vulnerability assessment for U.S. Army air defense and missile defense systems that are in development, undergoing P3I, or have been recently fielded. Examples of such systems are PATRIOT, Corps SAM, Stinger-RMP, Avenger, GBS, TMD-GBR, MRSR, THAAD, and ERINT. (4076)
- Conduct the ballistic survivability/lethality analysis for U.S. Army air defense and missile defense systems. (971)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army air defense and missile defense systems. (1215)
- Provide integrated survivability/lethality analyses to support scheduled air defense/missile defense program decision milestones in FY96. (275)

FY 1997 Planned Program:

- Conduct the electronic warfare vulnerability assessment for U.S. Army air defense and missile defense systems that are in development, undergoing P3I, or have been recently fielded. Examples of such systems are PATRIOT, Corps SAM, Stinger-RMP, Avenger, GBS, TMD-GBR, MRSR, THAAD, and ERINT. (3962)

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- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army air defense and missile defense systems. (1241)
- Conduct the ballistic survivability/lethality analysis for U.S. Army air defense and missile defense systems. (992)
- Provide integrated survivability/lethality analyses to support scheduled air defense/missile defense program decision milestones in FY97. (281)

Project D672 - Aviation Systems: Project investigates the SLV of Army aviation systems to the full spectrum of battlefield threats. Aircraft SLV deficiencies are identified and hardening fixes identified as appropriate. SLV analysis directly supports major decision milestones reviews, acquisition documentation, test and evaluation master plans, and cost/operational effectiveness analyses. In FY 1996, provides for assessment of acoustic technology which might be developed to exploit potential susceptibilities of helicopters.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:

- Conduct the electronic warfare vulnerability assessment for U.S. Army aviation systems that are in development, undergoing P3I, or have been recently fielded. Examples of such systems are RAH-66 Comanche, AH-64D Longbow Apache, MH-60K & MH-47E Special Operations Aircraft, Short-Range Unmanned Aerial Vehicle, OH-58D Kiowa Warrior, CH-47D Chinook, and UH-60Q Ambulance. (2549)
- Conduct the ballistic survivability/lethality analysis for U.S. Army aviation systems. (1077)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army aviation systems. (636)
- Provide integrated survivability/lethality analyses to support scheduled aviation systems program decision milestones in FY96. (205)

FY 1997 Planned Program:

- Conduct the electronic warfare vulnerability assessment for U.S. Army aviation systems that are in development, undergoing P3I, or have been recently fielded. Examples of such systems are AH-64D Longbow Apache, OH-58D Kiowa Warrior, MH-60K & MH-47E Special Operations Aircraft, Short-Range Unmanned Aerial Vehicle, RAH-66 Comanche, Ch-47D Chinook, and UH-60Q Ambulance. (2183)
- Conduct the ballistic survivability/lethality analysis for U.S. Army aviation systems. (795)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army aviation systems. (651)
- Provide integrated survivability/lethality analyses to support scheduled aviation systems program decision milestones in FY97. (211)

Project D675 - C4/IEW Systems: Supports survivability analysis of Army communications and electronic equipment against the full spectrum of friendly and enemy threats. Provides field threat environment support for EWVA. Analyzes vulnerabilities of foreign threat weapons and command, control, communications, computers and intelligence (C4I) and Intelligence Electronic Warfare (IEW) systems to U.S. Army EW systems. Provides threat weapon electronic design data to

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countermeasure developers and technical capability information to the intelligence community. Supports Army initiatives in vulnerability reduction of C4I/IEW systems against the full spectrum of battlefield threats.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:

- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army command and control systems. This effort supports Maneuver Control System, Common Hardware and Software, Standard Integrated Command Post Shelter, Advanced Field Artillery Tactical Data System, FAAD-C21, and Combat Service Support Control System. (2204)
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army communications systems such as Mobile Subscriber Equipment, SINCGARS, Global Positioning System, Single Channel Anti-jam Man Portable radio, Secure Mobile Anti-jam Reliable Tactical Terminal, and Enhance Manpack UHF-Terminal. (1674)
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army intelligence and electronic warfare (IEW) systems such as the Battlefield Combat Identification System, enhanced Firefinder radar, and Joint Surveillance Target Attack Radar System/Ground Station Module. (1052)
- Provide integrated survivability/lethality analyses to support scheduled C4I/IEW systems program decision milestones in FY96. (210)

FY 1997 Planned Program:

- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army command and control systems. This effort supports the Advanced Field Artillery Tactical Data System, Common Hardware and Software, Maneuver Control System, FAAD-C21, Standard Integrated Command Post Shelter, and Combat Service Support Control System. (2130)
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army communications systems such as SINCGARS, Global Positioning System, Mobile Subscriber Equipment, Single Channel Anti-jam Man Portable radio, Secure Mobile Anti-jam Reliable Tactical Terminal, and Enhance Manpack UHF Terminal. (1730)
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for U.S. Army intelligence and electronic warfare (IEW) systems such as the Battlefield Combat Identification System, Joint Surveillance Target Attack Radar System/Ground Station Module, and enhanced Firefinder radar. (1087)
- Provide integrated survivability/lethality analyses to support scheduled C4I/IEW systems program decision milestones in FY97. (217)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1995
BUDGET ACTIVITY 6 - Management Support	PE NUMBER AND TITLE 0605604A Survivability/Lethality Analysis

Project D677 - Ground Combat Systems: Project investigates the survivability and vulnerability of Army ground combat systems to the full spectrum of battlefield threats. Analysis will support weapon requirements, test and evaluation master plans, cost/operational effectiveness analysis, and major decision milestones.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:
- Conduct the electronic warfare vulnerability assessment for U.S. Army ground combat systems. This effort supports such systems as Bradley A3, Command and Control Vehicle (C2V), Armored Gun System (AGS), AFAS/FARV, ABRAMS M1A2, Breacher, and Heavy Assault Bridge. (1852)
- Conduct the ballistic survivability/lethality analysis for U.S. Army ground combat systems. (2517)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army ground combat systems. (1399)
- Provide integrated survivability/lethality analyses to support scheduled ground combat systems program decision milestones in FY96. (242)

FY 1997 Planned Program:
- Conduct the electronic warfare vulnerability assessment for U.S. Army ground combat systems such as AFAS/FARV, Armored Gun System, Bradley A3, Command and Control Vehicle, ABRAMS M1A2, Breacher, and Heavy Assault Bridge. (1936)
- Conduct the ballistic survivability/lethality analysis for U.S. Army ground combat systems. (2358)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army ground combat systems. (1439)
- Provide integrated survivability/lethality analyses to support scheduled ground combat systems program decision milestones in FY97. (249)

Project D678 - Munitions Systems: This project funds the investigation of the lethality/vulnerability of Army fire support smart weapons (smart and conventional) to the full spectrum of battlefield threats. The analysis is integrated across all battlefield threats, i.e., conventional ballistic, electronic warfare, directed energy, nuclear weapons effects, and nuclear and chemical/biological contamination effects. This work is accomplished through theoretical and engineering analyses, signature measurements, modeling, simulations, laboratory experiments, and field investigations.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:
- Conduct the electronic warfare vulnerability assessment for U.S. Army munitions systems such as the Hellfire Longbow Missile, BAT/BAT P3I, Wide Area Mine, STAFF, and Javelin. (4263)
- Conduct the ballistic survivability/lethality analysis for U.S. Army munitions systems. (729)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1995
BUDGET ACTIVITY 6 - Management Support	PE NUMBER AND TITLE 0605604A Survivability/Lethality Analysis

- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army munitions systems. (785)
- Provide integrated survivability/lethality analyses to support scheduled munitions systems program decision milestones in FY96. (205)

FY 1997 Planned Program:
- Conduct the electronic warfare vulnerability assessment for U.S. Army munitions systems such as BAT/BAT P3I, Hellfire Longbow Missile, STAFF, Wide Area Mine, and Javelin. (4136)
- Conduct the ballistic survivability/lethality analysis for U.S. Army munitions systems. (742)
- Conduct the chemical, biological, nuclear, and atmospheric effects survivability analysis for U.S. Army munitions systems. (799)
- Provide integrated survivability/lethality analyses to support scheduled munitions systems program decision milestones in FY97. (208)

Project D679 - Soldier Systems: This project provides the Soldier Survivability Assessments (SSvA) required for the MANPRINT Soldier Survivability Domain. The survivability of soldier systems is investigated and reported to milestone decision reviews. Broad areas addressed by SSvA are: Fratricide reduction; soldier detectibility reduction; attack prevention if detected; damage prevention; medical injury reduction; the reduction of mental and physical fatigue as they relate to the operation; maintenance and support of the system being evaluated and how these factors might impact the system's pre-established Manpower, Personnel, and Training goals and constraints. A major thrust of this project is to identify any problems in design characteristics which should be corrected to assure or enhance operational effectiveness.

FY 1994 Accomplishments: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1995 Planned Program: Work in this area performed in other projects in this PE. Restructured to this project in FY 1996.

FY 1996 Planned Program:
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for the U.S. Army Land Warrior System including the Protective Clothing and Individual Equipment, Chem/Bio Mask, Integrated Headgear, Computer and Commo System, and Weapon System. (587)
- Coordinate preparation and direct execution of MANPRINT Soldier Survivability Assessments and Reports. (121)
- Provide integrated survivability/lethality analyses to support scheduled soldier systems program decision milestones in FY96. (121)

FY 1997 Planned Program:
- Conduct integrated electronic, ballistic, and chemical/biological/nuclear/atmospheric effects survivability analysis for the U.S. Army Land Warrior System including the Computer and Commo System, Weapon System, Protective Clothing and Individual Equipment, Chem/Bio Mask, and Integrated Headgear. (592)
- Coordinate preparation and direct execution of MANPRINT Soldier Survivability Assessments and Reports. (122)
- Provide integrated survivability/lethality analyses to support scheduled soldier systems program decision milestones in FY97. (122)

DATE
February 1995

BUDGET ACTIVITY
6 - Management Support

PE NUMBER AND TITLE
0605604A Survivability/Lethality Analysis

B. Program Change Summary

	FY 1994	FY 1995	FY 1996	FY 1997
Previous President's Budget	32995	37757	34274	34500
Appropriated Value	32995	37523		
Adjustments to Appropriated Value				
a. SBIR/STTR decrement	(250)			
b. Reprogramming	(838)			
Current President's Budget	31907	37523	34535	33695