Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE/BA 4				R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT			PE 0603228D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	1.157	17.482	0.000	0.000	0.000	0.000	0.000	0.000
ENVIRONMENTAL MGMT	0.000	0.948	0.000	0.000	0.000	0.000	0.000	0.000
SEMD	1.157	2.700	0.000	0.000	0.000	0.000	0.000	0.000
FIRRE	0.000	7.800	0.000	0.000	0.000	0.000	0.000	0.000
PPSUMS	0.000	6.034	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

This program is a budget activity level 4 based on the concept/technology development activities ongoing within the program. The purpose of this program is to develop physical security equipment (PSE) systems for near term Physical Security and Force Protection capabilities. Changing operational missions and evolving threats to warfighting assets and personnel dictate that the advanced development of physical security equipment remains a continuing process. As the political, social and economic landscape of the world undergoes change, so do operational security requirements pursuant to the protection of the forces and assets deployed around the world to meet emergent DoD challenges. To support these security requirements, the PSE program adapts, evaluates and tests equipment to meet the needs of the security force. In addition to the cost/benefit analysis that each R&D effort undergoes, each project is further evaluated relative to size, weight, deployability, operational environment, and logistical life cycle. Activities include systems engineering, system architecture design, interoperability, logistics planning, and test and evaluation of Unmanned Systems. Mission applications for these Unmanned Systems include networking of sensors, enhancing mobile applications of security devices, and protecting/securing captured ordnance stockpiles in the Middle East. The programs being funded by this PE are key to providing robotics capabilities to currently deployed forces and will enhance our troops' mission success and survivability.

Dem & Evaluation of Environmental Management System for Defense Facilities (ENVIRONMENTAL MGMT) (0.948)

This program will support the evaluation, demonstration and creation of an environmental management system for defense facilities.

(U) FY 2003 Accomplishments

Effective October 1, 2003, funding for this program transfers to the Air Force. Please refer to PE 0603287F for FY 2003 accomplishments.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	1.183	0.000	0.000	0.000
Current BES	1.157	17.482	0.000	0.000
Total Adjustments				
Congressional program reductions				
Congressional rescissions				
Congressional increases	1.500	17.900		
Reprogrammings				
SBIR/STTR Transfer	-.317	-.418		

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Not Applicable

E. Performance Metrics:
The program performance metrics are established/approved through the Joint Services Physical Security Equipment Action Group. The cost, schedule and technical progress of each project is reviewed at quarterly PSEAG meetings. Performance variances, are addressed and corrective action is implemented as necessary.

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST, & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4				R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT			PE 0603228D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
SEMD	1.157	2.700	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The purpose of the Security Enhancement through Mobile Devices (SEMD) project is to enhance the ability of the Naval Criminal Investigative Service (NCIS) and security personnel at U.S. Navy facilities to perform their primary mission of protecting U.S. Navy personnel, installations and other assets. This will be done through the utilization of mobile devices to automate the process of authentication of identification cards and documents presented by individuals seeking entry into U.S. Navy facilities. SEMD will also automate checking federal, state and local Law Enforcement databases for "Be On the Look Out" (BOLO) information and generate Suspicious Incident Reports. SEMD will provide for the secure access, reporting and dissemination of information.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/ Effort/Subtotal Cost	1.157	2.700	0.000	0.000
RDT&E Articles Quantity * (as applicable)				

FY2004 Accomplishments:

- Surveyed commercially available mobile devices suitable for NCIS agents and security guards (Personal Data Assistants – PDAs) magnetic strip readers, barcode readers (1-D and 2-D), wireless communications devices.
- Tested and evaluated selected commercial mobile devices to determine suitability.
- Surveyed wireless data service coverage at two U.S. Navy installations in the Pacific Northwest Region.
- Conducted requirements analysis for mobile NCIS agents.
- Conducted Requirements analysis for base security guards.
- Conducted Requirements analysis for access to NCIS, FBI and Washington State databases (in progress, Task continues in FY 2004).
- Developed, integrated and tested a prototype Gate Guard version of SEMD.
- Integrated SEMD with the NCIS, WACIC and CLEOC law enforcement databases.

FY 2005 Plans:

- Develop, integrate and test a prototype Gate Guard version of SEMD.
- Develop, integrate and test a prototype mobile NCIS agent version of SEMD.
- Integrate SEMD with NCIS, WACIC and CLEOC law enforcement databases.
- Integrate SEMD with LinX, SFSIMS and COPS military law enforcement databa.ses.
- Integrate with JPEN.
- Include tools to read and decode bar codes and magnetic stripes of remaining military identification card types, plus state identification cards (including driver's licenses).
- Include tools to read and decode non-US identification cards (Canadian, Mexican).
- Include interfaces and tools to support in the field searches of DMDC and other watch lists.
- Develop off-line software tools for fusion of SEMD reports to provide alerts to NCIS agents and Gate Guards.
- Secure a wireless waiver from NAVNETWARCOM.
- Integrate SEMD with the Base Computer Aided Dispatch system at the Pacific Northwest Region Headquarters.
- Initiate Pilot test programs at Navy and Marine Corps bases in the Pacific Northwest and Southwest Regions, and coordinate with CNI and NORTHCOM.
- Develop a waterside security variant of SEMD.
- Develop an Arabic language transliteration capability.

C. Other Program Funding Summary

Not Applicable

D. Acquisition Strategy:

Transition to Program of record in FY 2006.

Exhibit R-3 Cost Analysis (page 1)								Date:	February-2005				
RDT&E DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603228D8Z					SEMD					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.157		0.400						
Ancilliary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				0.157		0.252						
Remarks:												
Development Support												
Software Development				0.450		0.100						
Training Development												
Integrated Logistics Support												
Configuration Management				0.200		0.148						
Technical Data				0.200		0.150						
GFE												
Subtotal Support				1.007		0.850						
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February-2005				
RDT&E DEFENSE-WIDE BUDGET ACTIVITY 0			Program Element PE 0604709D8Z				SEMD					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2007 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT				0.050		0.750						
IOT&E												
Subtotal T&E				0.050		0.750						
Remarks:												
Contractor Engineering Support												
Government Engineering Support				0.050		0.400		0.080				
Program Management Support				0.050		0.400		0.060				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.000	0.100		0.500		0.140				
Remarks:												
Total Cost			0.000	1.157		2.700		0.140				
Remarks:												

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity RDT&E, DEFENSE WIDE/B.A. 4	Program Element Number and Name PE 0603228D8Z Physical Security Equipment		Project Number and Name SEMD

Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Prototypes, Gate Guard and NCIS Agent												▲																								
Integrate with NCIS, WACIC and CLEOC databases												▲																								
Integrate with Base CAD System, Pacific NW Region HQ												▲																								
Develop SEMD Fusion Tools															▲																					
Integrate with NCIS LinX Program															▲																					
Develop Waterside SEMD															▲																					
Develop Arabic Transliteration															▲																					
Field Test																▲																				

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity RDT&E, Defense Wide/ Budget Activity 4	Program Element Number and Name PE 0603228D8Z	Project Number and Name SEMD

Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Prototypes, Gate Guard and NCIS Agent		4Q						
Integrate with NCIS, WACIC and CLEOC databases		4Q						
Integrate with Base CAD System, Pacific NW Region HQ		4Q						
Develop SEMD Fusion Tools			3Q					
Integrate with NCIS LinX Program			3Q					
Develop Waterside SEMD			3Q					
Develop Arabic Transliteration			3Q					
Field Test			4Q					

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE BA 5				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603228D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
FIRRE	0.000	7.800	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Family of Integrated Rapid Response Equipment (FIRRE) provides our forward deployed Soldiers, Airmen, Marines and Sailors with an enhanced Near and Long Term unmanned force protection system of systems capability that reduces manpower requirements, enhance force protection and keeps our forces out of harms way. Near Term FIRRE consists of the best available force protection unmanned systems technology: semi-autonomous Unmanned Ground Vehicles (UGV); Unmanned Sensors—the Battlefield Anti-Intrusion System (BAIS), Ground Surveillance Radars (GSR) and the Multiple Resource Host Architecture (MRHA) for command and control purposes. FIRRE allows commanders to return Soldiers to their normal wartime missions. The Near Term will feed the Long Term which includes Unmanned Ground Vehicles (UGV), Unmanned Aerial Vehicles (UAV), Unattended Ground Sensors (UGS) and other value added technology for a wide variety of force protection missions. Lessons learned from Near Term FIRRE will assist the Combat Developer to refine capabilities documentation required for the Joint Capabilities Integration Development System (JCIDS) process.

Schedule: If step one efforts of prototypes is successful, the continuation of the scheduled events is reflected in the outyears.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	0.000	7.800	0.000	0.000
RDT&E Articles Quantity * (as applicable)				
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:

- Design, develop and integrate the Unmanned Ground Vehicle (UGV) technology for analysis of materiel approaches for application of robotic systems.
- Initiate Command, Control, and Communications (C3) architecture development, integration, test and evaluation; patrol unit ("robotics") technology transfer; field support; Integrated Product Team (IPT) support; and Technical Manuals.
- Provide training and supportability; Integrated Logistic Support (ILS) documentation; frequency management allocation; system development demonstration support; and modeling and simulation.

- Conduct environment, limited operational and safety testing, and certification and release safety release.

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Being staffed through the IPT process

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005			
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Eleement PE 0604709D8Z				FIRRE				
Cost Categories (Tailor to WBS, or System Requirements)	Contract Method & Type	Performin Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost
Primary Hardware Develop						4.300					
Ancilliary Hardware Devel											
Systems Engineering											
Licenses											
Tooling											
GFE											
Award Fees											
total Product Development						4.300					
Remarks:											
Development Support						0.750					
Software Development						1.000					
Training Development						0.200					
Integrated Logistics Suppor						0.400					
Configuration Managemen											
Technical Data											
GFE											
Subtotal Support				0.000		2.350		0.000			
Remarks:											

Exhibit R-3 Cost Analysis (page 2)								Date:	February-2005			
RDT&E DEFENSE-WIDE BUDGET ACTIVITY 0			Program Element PE 0604709D8Z					FIRRE				
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2007 Award Date	Cost To Complete	Total Cost
DT						0.450					
IOT&E											
Subtotal T&E						0.450					
Remarks:											
Contractor Engineering Support						0.500					
Government Engineering Support						1.000					
Program Management Support						1.000					
Program Management Personnel						1.000					
Travel											
Labor (Research Personnel)											
Miscellaneous						1.500					
Subtotal Management											
Remarks:											
Total Cost						7.800					

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity RDT&E, Defense Wide/ Budget Activity 4	Program Element Number and Name PE 0603228D8Z	Project Number and Name FIRRE

Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Milestone								
Award contracts				2Q			1Q MS B	
System Delivery								
EUA Training				2Q-4Q				
EUA								
Initiate					1Q			
Complete								
IOT&E						4Q		
Milestone C IPR								

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST, & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4				R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT			PE 0603228D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
PPSUMS	0.000	6.034	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Air Force Research Laboratory's Airbase Technologies Division, Force Protection Branch, Robotics Research Group located at Tyndall AFB, FL, is the Air Force's lead laboratory for developing technical solutions to meet mission requirements in the Agile Combat Support & Unmanned Ground Systems areas. AFRL/MLQF Robotics has been engaged in an ongoing research effort to develop technologies for automated force protection and perimeter security missions. Radiance Technologies has developed the Persistent Perimeter Security with Unmanned Mobile Systems (P2SUMS) program, in support of this requirement. Further development is needed to make the system ready for field experiments in support of force protection and perimeter security missions. The work included under this effort will include software and algorithm development and for an integrated target acquisition and tracking system for the Remote Detection, Challenge and Response (REDCAR) engagement platform.

The AFRL/MLQF Robotics Group is developing technologies to support the requirements for EOD disposal and clearance technologies. AFRL/MLQF Robotics has had an ongoing research effort to develop and integrate physical security technologies with robotic platform to automate and enhance security force functions. Further development is required in the areas of sensor system integration, platform command and control functions, target acquisition, and tracking for both lethal and non-lethal weapons systems, and sustained, quiet power system for platform physical security sensor systems.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/ Effort/Subtotal Cost	0.000	6.034	0.000	0.000
RDT&E Articles Quantity * (as applicable)				

FY2005 Plans:

- Develop a Joint Architecture for Unmanned Systems (JAUS) and Electronic Systems Center (ESC/FD) Interface Control Document using XML, compatible common operational environment control system.
- Develop a UGV/UAV integrated counter targeting (target acquisition and tracking) system.
- Develop and integrate IED detection system for route and perimeter clearing applications.
- Develop weapons system for selected perimeter patrol UAV.
- Conduct Capstone demonstration for integrated Perimeter Security System Technologies .

- Integrate intruder detection system with self-networking mini sensor platforms, identify Friend or Foe and intruder type classification capability.
- Develop hybrid electric UGV propulsion for robotic platform and payloads supporting silent watch and long endurance missions.

C. Other Program Funding Summary
Not Applicable

D. Acquisition Strategy:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603228D8Z				PPSUMS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	2003 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development						1.500						
Ancilliary Hardware Development												
Systems Engineering						1.550						
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development						3.050						
Remarks:												
Development Support						0.450						
Software Development						0.534						
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support						0.984						
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603228D8Z				PPSUMS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	2003 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Subtotal T&E												
Remarks:												
Contractor Engineering Support						1.000						
Government Engineering Support												
Program Management Support						1.000						
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Subtotal Management												
Remarks:												
Total Cost						6.034						
Remarks:												

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 20062003228D8Z Physical Security Equipment		Project Number and Name PPSUMS

Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
JAUS/IBDSS COE Control System															▲																						
JAUS/IBDSS Target Acq System																▲																						
JAUS IED Detection System																▲																						
JAUS Weapon System for UAVs																	▲																					
Integrated Demo of P2SUMS Prog																			▲																			

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity RDT&E, Defense Wide/ Budget Activity 4	Program Element Number and Name PE 0603228D8Z	Project Number and Name PPSUMS

Schedule Profile	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
JAUS/IBDSS COE Control System			3Q					
JAUS/IBDSS Target Acq System			4Q					
JAUS IED Detection System			4Q					
JAUS Weapon System for UAVs				1Q				
Integrated Demo of P2SUMS Prog				3Q				

R-4a Schedule Profile

BUDGET JUSTIFICATION
FOR PROGRAM ELEMENTS OF THE
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM
FISCAL YEAR (FY) 2006/2007 BUDGET ESTIMATES SUBMISSION

PE 0603527D8Z, Retracked Larch, program is submitted separately in the classified annex.

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost-	15.670	21.314	11.755	12.020	12.017	12.085	12.331	12.613
ADCR	0.150	0.324	0.246	0.000	0.000	0.000	0.000	0.000
TECH TRANSFER	0.000	0.500	0.000	1.000	1.000	1.000	1.000	1.000
USV	0.000	0.900	0.000	0.000	0.000	0.000	0.000	0.000
MPRS	0.258	0.900	0.000	0.000	0.000	0.000	0.000	0.000
JOINT SERVICE EOD	2.500	3.300	1.810	3.150	3.150	3.150	3.150	3.150
JAUS	1.000	1.810	1.000	0.400	0.400	0.400	0.400	0.400
GLADIATOR	3.125	0.900	1.700	0.000	0.000	0.000	0.000	0.000
RCSS	1.058	0.000	1.000	1.500	1.250	0.000	0.000	0.000
NUSE 2	0.000	3.064	1.065	0.000	0.000	0.000	0.000	0.000
INTELLIGENT MOBILITY	1.000	4.516	1.120	1.500	1.500	1.500	1.500	1.500
RACS	4.579	1.800	3.614	1.200	1.200	1.200	1.200	1.200
COTS	2.000	0.500	0.200	0.000	0.000	0.000	0.000	0.000
CEE	0.000	2.800	0.000	0.000	0.000	0.000	0.000	0.000
ROBOTIC TECHNOLOGY ENHANCEMENT	0.000	0.000	0.000	3.270	3.517	4.835	5.081	5.363

A. Mission Description and Budget Item Justification:

This program is a budget activity level 4 based on the concept/technology development activities ongoing within the program. This PE was established in response to Congressional guidance to consolidate DoD robotic programs on unmanned ground systems and related robotic technologies in order to increase focus of the Services' robotic programs on operational requirements. The program ensures coordination between the Services and provides for interoperability and commonality among unmanned ground systems. The Joint Robotics Program (JRP) will develop and field a family of affordable and effective mobile ground robotic systems; develop and transition technologies necessary to meet evolving user requirements, and serve as a catalyst for insertion of robotic systems and technologies into the force structure. Unmanned Ground Systems are now realizing the often foreseen potential to provide our service men and women with the leap-ahead warfighting capability they need to reduce risk levels to our personnel. The war on terrorism has created urgent and compelling requirements for UGVs. The JRP has responded by deploying unmanned countermine and reconnaissance systems to Bosnia and Kosovo and in support of Operation Enduring Freedom and Operation Iraqi Freedom. The JRP

continues to support UGV deployments around the globe providing the Services with unmanned force protection and countermine capabilities. Increasing Service UGV demand and positive feedback from users in the field have validated the JRP mission.

Automatically Deployable Communications Relays (ADCR) (0.150)

The purpose of the Automatically Deployable Communications Relays (ADCR) project is to develop a practical method of extending range of high-bandwidth wireless digital communications and to overcome line-of-sight (LOS) problems for unmanned ground vehicles (UGV). The proposed method provides a universal relay-deploying module that connects to a UGV through a standard Ethernet. The deployer contains several radio "bricks" that are dropped off automatically (transparent to the operator) in order to form a chain of communication relay nodes, thereby extending the effective range between the base station and the UGV. This project is a follow-on to a DARPA-funded research project into autonomous wireless ad hoc network maintenance, and heavily leverages the prior effort. Four systems will be developed in response to requests from other military users, including NAVEODTECHDIV and TARDEC.

FY2005-2006 Plans:

- Develop telescopic antenna system for radio "bricks" to extend range between nodes.
- Develop ruggedized radio units.
- Design a deployer module that can connect to four different UGVs.
- Integrate software and hardware, and perform tests and demonstrations.
- Deliver one system for each of the following ground robots: SSC-SD URBOT, iRobot PackBot, TAGS-DM, Remotec ANDROS Wolverine.

Technology Transfer (0.500)

Technology Transfer (TechTXFR) employs a spiral development process to enhance the functionality and autonomy of mobile robot systems in the JRP Robotic Systems Pool by converging existing component technologies onto a transition platform for optimization. The technical approach is to harvest prior and on-going technology developments from disparate players that address the technology needs identified by emergent in-theatre requirements and the users of the JRP Robotic Systems Pool. The component technologies are tested and evaluated on a transition platform to identify the best features of the different approaches, which are then integrated and optimized to work in harmony in a complete solution. TechTXFR has already produced phenomenal results with tremendous savings to the government. TechTXFR does not develop new technologies from scratch; it instead brings in pre-developed proven technologies from the research environment and offers them a transition opportunity as opposed to the technologies stagnating as unutilized laboratory prototypes. TechTXFR has leveraged resources from a wide variety of disparate players, including other government agencies and academia, and equally important has also been leveraged by other government programs. TechTXFR has also teamed with a number of organizations with similar ambitions to synergistically pursue robotic technologies in a spiral

development process, such as the Idaho National Laboratory (DoE). INL has a direct interest to transition autonomous technologies for use in a variety of DoE missions, including homeland defense and critical infrastructure protection. The collaborative work maximizes efficiency by bringing in additional resources (money and personnel) that result in leveraging of even more technologies. The end result is a centralized JRP mechanism that continuously capitalizes on state-of-the-art technologies from the research environment to create a standardized solution that can be easily transitioned to ongoing development programs service-wide.

Plans for FY2005-2007 include:

- Integration of miniature stereo vision sensor system and development of obstacle avoidance software.
- Integration of obstacle avoidance and path following behaviors.
- Development of next generation stereo vision system and integration onto the small robot.
- Development of more robust formation following/convoying behaviors.
- Demonstration of autonomous communications relaying.

Unmanned Surface Vehicle (USV) (0.900)

The Unmanned Surface Vehicle (USV) program is developing and transitioning the core technologies required to develop a truly autonomous USV. Much of the technology has been or will be transitioned directly from current Unmanned Ground Vehicle (UGV) programs including GPS waypoint navigation**.** Further development is required for: over the water obstacle avoidance (OA) using commercial marine radar, use of stereo vision for USV OA applications, dynamic mission planning and enhanced multi-vehicle command and control.

Plans for FY2005-2006

- Development and demonstration of obstacle avoidance software.
- Development/transition of stereo vision sensor systems for USV applications.
- Investigation and integration of other obstacle detection sensors including laser and radar.
- Integration of nautical chart data into the obstacle avoidance software.
- Development of cooperative USV behaviors and cooperative behaviors between USVs UAVs, ROVs and UUVs.

Man-Portable Robotic System (MPRS) (0.900)

The purpose of the Man-Portable Robotic System (MPRS) program is to increase the autonomous capabilities of small robots by transferring and developing technologies that will have an immediate impact on the autonomy and capability of current man-portable robotic systems. Tele-operated systems have proven to be extremely useful but only in life-threatening situations where the burden of driving the vehicle manually is justified. The MPRS program is focused on adapting technologies that have been developed for larger unmanned ground vehicle systems to the man-portable class of robots. These technologies will increase the autonomy in small robots

and lessen the burden on the operator of manually driving the vehicle. Specific technologies include navigation, obstacle detection/obstacle avoidance (ODOA) and collaborative behaviors for small vehicles. Collaborative behaviors include formation following/convoying, intelligent communications relaying, and marsupial systems.
Plans for FY2005-2006:

- Integration of miniature stereo vision sensor system and development of obstacle avoidance software.
- Integration of obstacle avoidance and path following behaviors.
- Development of next generation stereo vision system and integration onto the small robot.
- Development of more robust formation following/convoying behaviors.
- Demonstration of autonomous communications relaying.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY2007
Previous President's Budget	15.784	11.771	11.907	12.145
Current FY 2006 President's Budget Submission	15.670	21.314	11.755	12.020
Total Adjustments	-0.114	+9.543	-0.152	-0.125
Congressional program reductions	-0.114	-0.507		
Congressional rescissions				
Congressional increases		+10.050		
Reprogrammings				
SBIR/STTR Transfer				
Other			-0.152	-0.125

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
This program's acquisition strategy continues to maintain two tracks: (1) to develop and field first generation UGVs with current technologies, and (2) pursue advanced technologies critical to semi-autonomous mobility that can be inserted into first generation systems in an evolutionary manner.

E. Performance Metrics:

The Joint Robotics Program prepares and publishes its JRP Master Plan annually. The Plan contains detailed descriptions of the approximately 8 individual projects under this funding line. Each project description includes a task schedule with associated milestones, whereby progress against end goals can be measured. The cost, schedule and technical progress against these milestones is reviewed by DoD participants at semi-annual JRP Working Group meetings.

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Joint Service EOD	2.500	3.300	1.810	3.150	3.150	3.150	3.150	3.150

A. Mission Description and Budget Item Justification:

This project supports the lifecycle management of EOD equipment for all four military Services. This project will conduct Concept and Technology Development efforts to determine maturity of existing technology and exploration of new concepts to meet EOD requirements. The Joint Service EOD community needs increased autonomy in its robotic platforms, and cooperative control of the different classes of robots, and these technology needs are addressed in this project.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		3.300		
RDT&E Articles Quantity * (as applicable)				

FY2004 Accomplishments:

- NGEODRCV Neo-Mover Pre-Production Development and Demonstration
- EOD Operational Analysis
- Extension of the TSWG Common Architecture

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost			5.500	3.150
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:

- NGEODRCV System Level Development

- Transition Technologies from the NGEODRCV Project
- Final Demonstrations and Approvals of RONS CIP Projects
- Initiate EOD Cooperative Robotics Project

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Not Applicable

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603709D8Z					Joint Service EOD					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				1.000		1.650		2.400				
Ancilliary Hardware Development												
Systems Engineering				0.200		0.500		0.600				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.200		2150		3.000				
Remarks:												
Development Support				0.100		0.100						
Software Development				0.100		0.300		0.750				
Training Development				0.100		0.100						
Integrated Logistics Support				0.100		0.100		0.100				
Configuration Management				0.100		0.100		0.100				
Technical Data				0.100		0.300		0.500				
GFE												
Subtotal Support				0.600		1.000		1.450				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								Date:	February 2005			
DEFENSE-WIDE		Program Element						Joint Service EOD				
BUDGET ACTIVITY 4		PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost
DT				0.500		0.500		0.500			
IOT&E								0.150			
Initial Verification Testing											
Subtotal T&E				0.500		0.500		0.650			
Remarks:											
Contractor Engineering Support				0.100		0.100		0.100			
Government Engineering Support				0.100		0.200		0.200			
Program Management Support						0.100		0.100			
Program Management Personnel											
Travel											
Labor (Research Personnel)											
Miscellaneous											
Subtotal Management				0.200		0.400		0.400			
Remarks:											
Total Cost						4050		5500			
Remarks:											

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 0603709D8Z – Joint Robotics Program		Project Number and Name Joint Service EOD

Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
MTRS PSVM T&E																																				
MTRS PRM T&E																																				
MTRS AAP PROD DEC																																				
RONS CIP																																				

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 0603708DZ Joint Robotics Program	Project Number and Name Joint Service EOD

	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
MTRS PSVM T&E		3-4 Q	1-2 Q					
MTRS PRM T&E			3-4 Q	1 Q				
MTRS AAP PROD DEC				1 Q				
RONS CIP		1-4 Q	1-4 Q					
Next Gen EOD RCV				1-4 Q	1-4 Q	1-4 Q		
EOD Cooperative Robotics					1-4 Q	1-4 Q	1-4 Q	1-4 Q

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
JAUS	1.000	1.810	1.000	0.400	0.400	0.400	0.400	0.400

A. Mission Description and Budget Item Justification:

The intent of this program is to develop common open software architecture to ensure unmanned systems' interoperability and evolution with resultant cost savings. JAUS will specify the logical interfaces between computing modules to allow for rapid technology transfer. Continue to develop JAUS such that it attains clear objectives and maintains a consistent philosophy while promoting JAUS as the domain architecture for Unmanned Systems. We will educate the Unmanned Systems community on JAUS to support acquiring, developing, testing, and manufacturing organizations' incorporation of JAUS into their products and services. JAUS has started the transition to a commercial standards body through the petitioning of the Society of Automotive Engineers, Aerospace Council Avionics Standards Development group. JAUS will migrate to the Committee AS-4, Unmanned Systems.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	1.000			
RDT&E Articles Quantity * (as applicable)				

FY2004 Accomplishments:

- Released Version 1.3 of the JAUS Strategic Plan.
- Released Version 1.0 of the JAUS Compliance Specification.
- Released Version 3.0 and 3.1 of the JAUS Domain Model.
- Released Version 3.1 and 3.2 of the JAUS Reference Architecture Specification.
- Conducted four JAUS Working Group meetings.
- Validated JAUS for Unmanned Ground Systems control.
- Validated JAUS support for mission packages/payloads.
- Developed support mechanism for Ad-Hoc networking of Unmanned Systems.
- Established SAE AS-4 Committee, Unmanned Systems.

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		1.810	1.000	0.400
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:

- Demonstrate and validate support for network-based systems.
- Demonstrate and validate support for all unmanned system types.
- Integrate JAUS into Simulation Systems for experimentation/validation.
- Develop interface for Net-Centric systems for mission level data.
- Complete first version of the compliance tool suite.
- Release Version 4.0 of the Domain Model.
- Release Version 3.0 of the Compliance Specification.
- Maintain JAUS Documents.
- Maintain JAUS Compliance Tools Suite.

C. Other Program Funding Summary:

Internal Research and Development spending on behalf of participating/affiliated organizations (commercial firms, academic institutions, and other Government entities) is ongoing.

D. Acquisition Strategy:

JAUS is currently a requirement in a number of unmanned systems acquisitions including Future Combat Systems.

E. Major Performers:

Not applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				JAUS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2004 Cost	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancilliary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development												
Remarks:												
Development Support												
Software Development			0.742	0.950		0.250						
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.742	0.750		0.250						
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603709D8Z					JAUS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2004 Cost	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Initial Verification Testing			0.300	0.500								
Subtotal T&E			0.300	0.500								
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support			0.150	0.150		0.150						
Program Management Personnel			0.050	0.050								
Travel			0.050	0.050								
Labor (Research Personnel)												
Miscellaneous			0.100	0.100								
Subtotal Management			0.350	0.450		0.150						
Remarks:												
Total Cost			1.000	1.810		0.400						
Remarks:												

Exhibit R-4, Schedule Profile																																			
																																	Date: February 2005			
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4													Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																Project Number and Name JAUS							
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones																V 3.2				V 4.1																
Reference Architecture Specification														V 3.1			V 4.0																			
Domain Model													V 3.0		V 3.1		V 4.0	V 4.1		V 4.3																
Compliance Spec Versions															V 1.0		V 2.0																			
Developmental Evaluation																																				

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 0603708DZ Joint Robotics Program	Project Number and Name JAUS

Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
RA Versions 3.1; 3.2; 4.0; 4.1			2Q; 4Q	1Q; 3Q				
DM Versions 3.0; 3.1; 3.2; 3.3; 4.0; 4.1; 4.2; 4.3			1Q; 3Q;	1Q; 3Q				
Compliance Spec Versions 1.0; 2.0			3Q	1Q				
Developmental Evaluation			Cont.	Cont.				

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
GLADIATOR	3.125	0.900	1.700	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Gladiator Program is a USMC initiative based on the Joint Army-Marine Corps Tactical Unmanned Vehicle (TUV) ORD originated by the U.S. Army Infantry School. Mission Need Statement (MNS) INT 12.1.1 (dated 4 November 1993) validated the need for a tactical unmanned ground vehicle system, and the ORD was approved by the Army in August 1995 and by the Marine Corps in May 1996. Changes in Service deficiencies and required capabilities have led both Services to reevaluate the existing ORD and to initiate efforts to revise it or to approve new requirements documents for robotic systems supporting the tactical commander. The Marine Corps has drafted the Gladiator ORD to support the dismounted infantry of the Marine Ground Combat Element (GCE) with the organic unmanned capability to remote combat tasks including scout/surveillance. The system will reduce risk and neutralize threats to Marines across the full spectrum of conflict and military operations. Gladiator formal capabilities document is in final staffing within the Marine Corps. The Gladiator is a teleoperated/semi-autonomous, small-to-medium sized, highly mobile UGV with, initially, the basic capability to conduct scout/surveillance missions and to carry various mission payloads for specific tasks. It will be inherently simple, durable, multi-functional, and easily transported. In the conduct of Operational Maneuver From The Sea (OMFTS), Ship To Objective Maneuver (STOM), Sustained Operations Ashore (SOA), and Operations Other Than War (OOTW), the Gladiator will enhance the ability to accomplish assigned missions. Operating just forward of the GCE units, Gladiator will perform basic scouting/surveillance, obstacle breaching, and NBC reconnaissance tasks while permitting the operator to remain covered or concealed. The basic Marine Corps system will consist of a mobile base unit (MBU), an OCU, and specific mission payload modules (MPMs). Initial MPMs will include Shoulder-launched Multi-purpose Assault Weapon (SMAW), Anti-Personnel Obstacle Breaching System (APOBS), and direct fire (lethal and non-lethal) weapons.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	3.125			
RDT&E Articles Quantity * (as applicable)				

FY 2004 Accomplishments:
- Program remained in CTD.
- Completed detailed design of Gladiator.
- Completed Future Naval Capability demonstrations.
- Completed System Design and Development (SDD) acquisition documentation.
- Released SDD acquisition package to contractors.
- Successfully competed within the Marine Corps for Gladiator funding in the FY 2006-2011 POM.

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		0.900	1.700	0.000
RDT&E Articles Quantity * (as applicable)				

FY 2005-2006 Plans:
- Initiate SDD.
- Complete PDR and DRR.
- Complete Developmental Testing.
- Begin preparation of MS C documentation.

C. Other Program Funding Summary:
Gladiator is a cooperative program of the Office of Naval Research and the DoD Joint Robotics Program. The ONR is responsible for funding the major portion of the technology demonstration, while the JRP continues to manage the Gladiator program through SDD to production in support of Marine Corps requirements. FNC funding, under Autonomous Operations is:
FY 2002 5.0million
FY 2003 2.5million
FY 2004 1.5million

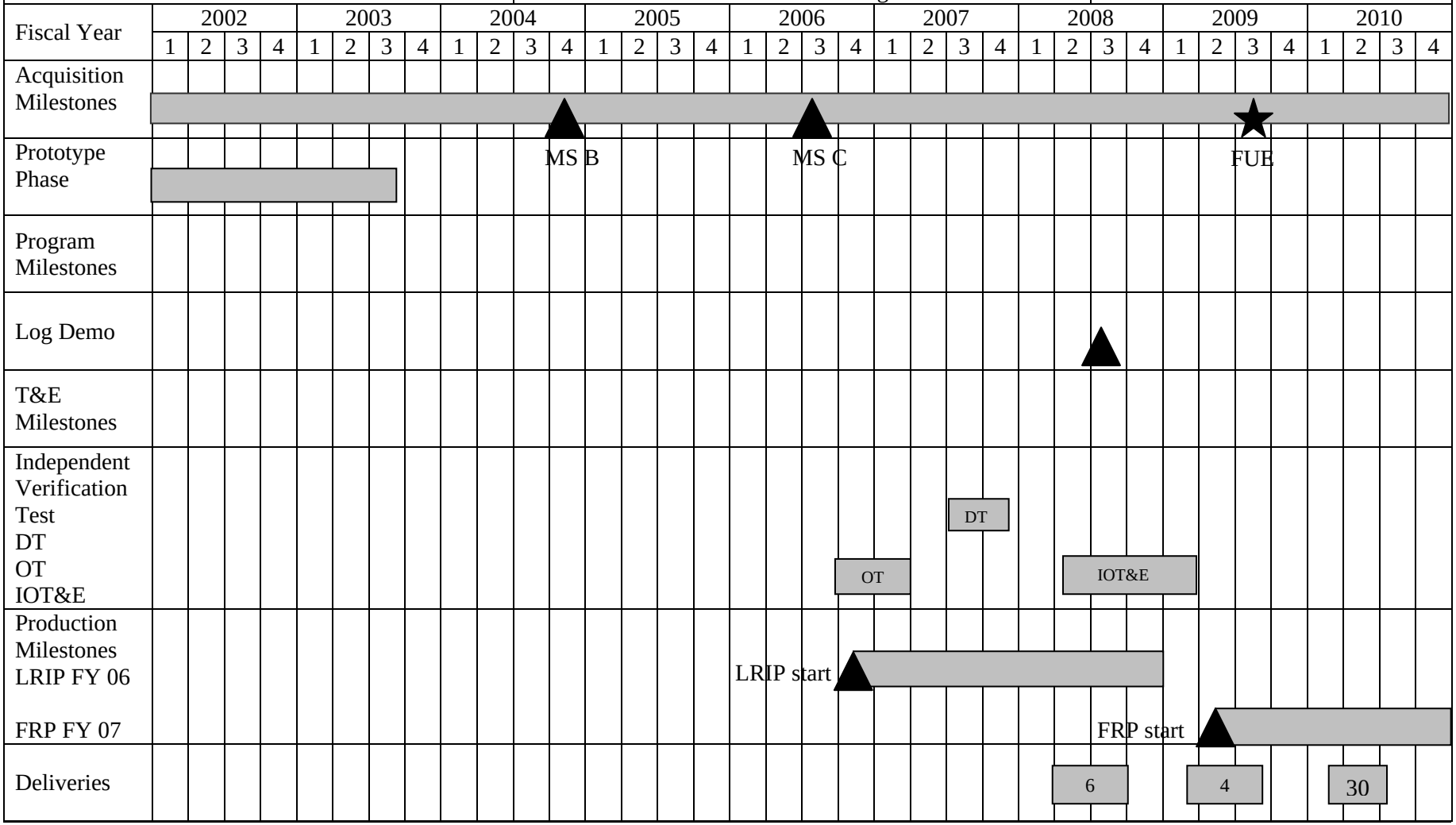
D. Acquisition Strategy:
Two contractors were selected for down select competition for Gladiator SDD. These two contractors are Lockheed Martin, Dallas, TX and Carnegie Mellon, Pittsburgh, PA.

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				GLADIATOR					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				2.335		1.373		0.373				
Ancilliary Hardware Development												
Systems Engineering				0.148		0.095		0.095				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				2.483		1.468		0.468				
Remarks:												
Development Support				0.040		0.172		0.172				
Software Development				0.075								
Training Development				0.050		0.095		0.095				
Integrated Logistics Support				0.025								
Configuration Management				0.055								
Technical Data												
GFE												
Subtotal Support				0.245		0.267		0.267				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)									Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z						GLADIATOR					
Cost Categories (Tailor to WBS, or System/Item Requirements)		Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT														
IOT&E														
Initial Verification Testing					0.130		0.135		0.135					
Subtotal T&E					0.130		0.135		0.135					
Remarks:														
Contractor Engineering Support				0.067		0.070								
Government Engineering Support				0.120		0.120		0.050						
Program Management Support				0.080		0.080		0.080						
Program Management Personnel														
Travel														
Labor (Research Personnel)														
Miscellaneous														
Subtotal Management					0.267		0.270		0.130					
Remarks:														
Total Cost				3.125		1.140		1.000						
Remarks:														

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #5		Program Element Number and Name PE 0604709D8Z – Joint Robotics Program	Project Number and Name GLADIATOR



R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity Research, Development, Test & Evaluation, Defense-Wide, Budget Activity 5	Program Element Number and Name PE 0604709D8Z Joint Robotics Program	Project Number and Name Gladiator

Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Milestone A								
Contract Preparation	1-2Q							
CTD Contract Award	2Q							
CTD	2-4Q	1-4Q						
Milestone B			4Q					
Contract Preparation			2-4Q					
SDD Contract Award				1 Q				
SDD				1-4Q	1-4Q	1-4Q		
Developmental Test					3-4Q			
Log Demo							3Q	
Operational Test							2-4Q	
Milestone C						2Q		
Low Rate Initial Production						3-4Q	1-4Q	
IOT&E							2-4Q	
Full Rate Production								2Q
First Unit Equipped								3Q

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
RCSS	1.058	0.000	1.000	1.500	1.250	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Robotic Combat Support System (RCSS) Program is an upgrade approach from the Product Improved Mini-Flail (PIMF). The PIMF has proven effective in Bosnia and Kosovo, as well as in current operation in Afghanistan, as a contingency asset. RCSS threshold requirements include anti-personnel mine clearing and neutralization, improved reliability and human-machine interface, Anti-Personnel wire obstacle breaching, remotely deployed smoke and obscurants, and the capability to carry soldier loads. Initial RCSS deployment to Afghanistan occurred during FY 2004 and continues through FY 2006 to deployed forces. P3I requirements include advanced controls, remotely delivered special munitions to support dismounted operations, hands-free control using dismounted soldier leader-follower technology, and mechanical devices that will be used to emplace demolitions and special breeching systems. A Mission Need Statement (MNS) and Operational Requirements Document (ORD) have been approved by Army Training and Doctrine Command (TRADOC). Procurement continues through FY 2006, while system engineering to develop full ORD required capability will be developed and integrated into the operational fleet.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	1.058			
RDT&E Articles Quantity * (as applicable)				

FY2004 Accomplishments:

- Completed evaluation of CTD contract efforts.
- Revised Acquisition Strategy to meet War on Terrorism Urgent Requirements.
- Conducted market survey to determine availability of COTS capability.
- Selected RCSS COTS vendor.
- Initiated RCSS COTS procurement contract.
- Conducted safety testing and obtain safety release.
- Fielded RCSS COTS systems to War on Terrorism operating forces including training and maintenance support.
- Began preparation for Type Classification testing.

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		0.000	1.000	1.500
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:
- Accomplish Type Classification testing.
- Continue fielding and support of RCSS COTS systems to War on Terrorism forces.
- Obtain Type Classification.
- Determine and identify Mission Essential Modules to improve COTS system multi-mission capability.
- Initiate Mission Essential Modules Integration program

C. Other Program Funding Summary:
Army Procurement funding utilized to procure RCSS COTS systems in FY 2004 and FY 2005.

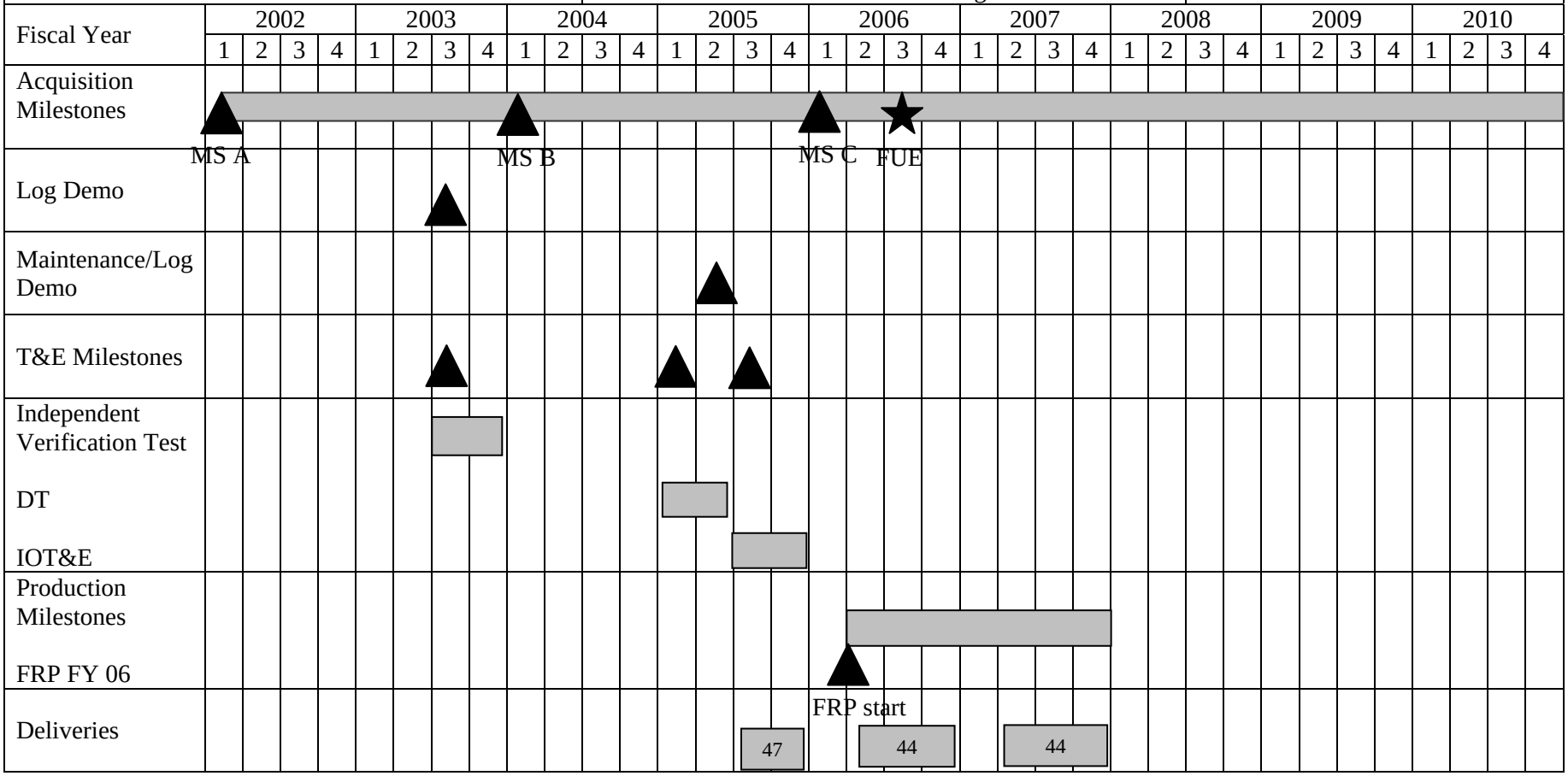
D. Acquisition Strategy:
Not Applicable

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE			Program Element				RCSS					
BUDGET ACTIVITY 4			PE 0603709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.500		0.284		0.284				
Ancilliary Hardware Development												
Systems Engineering				0.438		0.142		0.142				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				0.938		0.426		0.426				
Remarks:												
Development Support						0.002		0.002				
Software Development						0.062		0.062				
Training Development						0.030		0.030				
Integrated Logistics Support						0.025		0.025				
Configuration Management						0.025		0.025				
Technical Data												
GFE												
Subtotal Support				0.000		0.144		0.144				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				RCSS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT						0.230		0.228				
IOT&E												
Initial Verification Testing				0.120								
Subtotal T&E				0.120		0.230		0.228				
Remarks:												
Contractor Engineering Support						0.063		0.065				
Government Engineering Support						0.074		0.074				
Program Management Support						0.063		0.065				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.000		0.200		0.202				
Remarks:												
Total Cost				1.058		1.000		1.000				
Remarks:												

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 0603709D8Z – Joint Robotics Program		Project Number and Name RCSS



R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity Research, Development, Test & Evaluation, Defense-Wide, Budget Activity 4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program	Project Number and Name Robotic Combat Support System (RCSS)

Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Milestone A	1Q							
Contract Preparation	1-4Q	1-4Q						
CTD Contract Award		1Q						
CTD	4Q	1-4Q						
Milestone B			1Q					
COTS Contract Preparation		4Q	1Q					
COTS Contract Award			1Q					
Safety Testing			1					
Safety Certification				1-4Q				
Spiral Fielding initiated				1-4Q	1-2Q			
Type Classification Testing				3-4Q	1-4Q			

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
NUSE 2	0.000	3.064	1.065	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The National Unmanned Systems Experimentation Environment (NUSE2) is a new Department of Defense/Private sector teaming initiative. This will be a collaborative effort to provide infrastructure and assets for experimenting with all types of Unmanned Systems - air, ground, surface and underwater – that is national in scope. NUSE2 will provide developers/acquirers of Unmanned Systems with dedicated experimentation facilities, ranges, and airspace that would otherwise be hard to schedule and are often expensive. The initiative will begin in FY 2004, starting with some limited objective experiments using Unmanned Ground Vehicles.

NUSE2 will be a consortium of organizations agreeing to form and provide the experimentation capability. The Nation is the true beneficiary of this effort and conveys the coast-to-coast and Alaska and Hawaii, scope of NUSE2. NUSE2 is intended to provide an experimentation base for Unmanned System acquirers over the life cycle. This will include live as well as virtual experiments. NUSE2 will be a valuable asset in the coming years, providing accessible, affordable, RDTE capabilities.

The objectives of NUSE2 are to:

- Assist users in refining capabilities (formerly operational requirements)
- Support acquirers in conducting experiments to reduce technical risk.
- Participate in the evaluation of evolutionary upgrades to Unmanned Systems
- Support experiments associated with Advanced Concept Technology Demonstrations
- Facilitate the evaluation of new technologies and aid the tech transfer process of new capabilities for Unmanned Systems
- Support the developmental, operational, and live fire testing requirements of acquirers
- Aid in the development of advanced integrated architectures as they apply to Unmanned Systems
- Be dual capable, i.e., able to support experimentation and testing in both live and virtual venues

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	0.000	3.064	1.065	0.000
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:

Technology: The following Technology requirements are being filled by the applicable institution

Lightweight, Low Power, Robust means of removing image jitter	University of Wyoming
Biometric Vision Sensor	University of Wyoming
Ultra Wideband Communication and Positioning Systems	University of Alaska
Autonomous data exchange in Multi-Robot Collectives	University of Wyoming
JAUS Compatible Mission Planning	University of Florida
Integrated Mobile Manipulation Systems	University of Texas – Austin

Infrastructure: NUSE2 has awarded infrastructure improvements to all sites.

High Speed test track	Florida
JUTTC improvements	Wyoming
Test track upgrade	Alaska
Wireless Wide Area Network	Mississippi
Site Upgrades	Texas
Improved Integration facility	California

- Formalize NUSE2 strategy, campaign plan, and organize team.
- Formalize technology requirement and fulfillment process.
- Develop statements of work for NUSE2 site infrastructure improvements
- Operate the IPT's (M-IPT, E-IPT, T-IPT).
- Identify and refine standards and metrics for experiments.
- Let contracts to fulfill requirements.
- Verification of technology fulfillment
- Identify and begin planning for follow-on experimentation.
- Continue to identify and acquire infrastructure requirements.
- Continue IPT oversight.
- Continue to identify and refine standards and metrics for experiments.
- Execute FY 2005 multi-year contracts.
- Expand NUSE2 as required.
- Expand NUSE2 capabilities to include unmanned air, surface, and subsurface systems.

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Not Applicable

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				NUSE 2					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancilliary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				0.000		0.000		0.000				
Remarks:												
Development Support						1.440						
Software Development												
Training Development												
Integrated Logistics Support						0.624						
Configuration Management												
Technical Data												
GFE												
Subtotal Support				0.000		1.964		0.250				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				NUSE2					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.000								
Remarks:												
Contractor Engineering Support												
Government Engineering Support								0.750				
Program Management Support						1.000		0.065				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.000		1.000						
Remarks:												
Total Cost						3.064		1.065				
Remarks:												

Exhibit R-4, Schedule Profile																																					
Date: February 2005																																							
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4											Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																		Project Number and Name NUSE 2							
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Infrastructure																																					
Standards Identification																																					
UMS Experiments															▲				▲																			

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail								Date: February 2005
Appropriation/Budget Activity Research, Development, Test & Evaluation, Defense-Wide, Budget Activity 4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program							Project Number and Name NUSE 2
Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Infrastructure				3-4Q	1-4Q			
Standards Identification				3-4Q	1-4Q			
UMS Experiments				3Q	2Q, 4Q			

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Intelligent Mobility Program	1.000	4.516	1.120	1.500	1.500	1.500	1.500	1.500

A. Mission Description and Budget Item Justification:

The Intelligent Mobility program is an effort under the U.S. Army Research and Development Command Engineering Center (RDECOM-TARDEC) Intelligent Mobility (IM) Program. Mobility Enhancement through the utilization of novel running gear such as reconfigurable shape, Omni-directional drive systems, and improved mobility sensor integration will improve the mobility of small unmanned ground vehicles (UGVs) to operate on both improved surfaces and off-road terrain in support of urban warfare, physical security and force protection missions for military police and engineering operations. Of particular and immediate interest is the Omni-Directional Inspection System, which is a man packable size robot capable of omni-directional locomotion on structured surfaces for the purpose of inspecting vehicles in a force protection role and in an EOD role as an IED disruptor delivery device. There is a current validated urgent need generated by CENTCOM to utilize UGV's for EOD and force protection missions. Twenty three prototype ODIS UGV's are currently deployed to Iraq and Afghanistan in order to collect data, prove out the current prototype system, and simultaneously provide needed UGV functionality to the user in hostile environments. TRML is also working to develop a draft Mission Needs Statement for the ODIS robot with Military Police/Force Protection agencies. We are working with soldiers in Iraq to fulfill requirements delivered in an official needs statement. The next spiral development iteration will produce approximately 40 upgraded ODIS units for deployment. These units will have enhanced mobility, allowing them to operate in rough terrain (1"-2" cobble stone roads), rutted roads/ areas, etc. They will also have the capability to easily accept chemical detectors and other sensors as needed by the soldier.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	1.000			
RDT&E Articles Quantity * (as applicable)				

FY 2004 Accomplishments:

- Completed a build of 26 production prototype units for experimentation and deployment.
- Deployed 16 units to Iraq (Baghdad area) for use by Force Protection Units.
- Deployed 4 units to Afghanistan for use by Force Protection units.
- Completed first revision and product improvement of ODIS for functional prototype testing.
- Began next spiral of ODIS development which will yield upgraded systems in 3QFY 2005.

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		4.516	1.120	1.500
RDT&E Articles Quantity * (as applicable)				

FY 2006-2007 Plans :

- Revise the ODIS platform design to include changes suggested from testing and user input in theater.
- Management and planning for building 100 units based on the President's emergency supplemental budget
- Further testing of ODIS at the Port of Los Angeles and Long Beach for data realtive to force protection in a Homeand defense a application
- Continue to deploy ODIS robots and support personnel for ODIS in SWA theater
- Track data from deployment and integrate lessons learned for ODIS and other small robots
- Develop prototype ODIS platform variants based on user request
- Investigate utility and need for ODIS platform variants
- Further improve robot control based on Iraq deployment data
- Improve methods for integrating mission packages
- Investigate other intelligent mobility mechanical concepts for improved functionality

C. Other Program Funding Summary:
Not Applicable

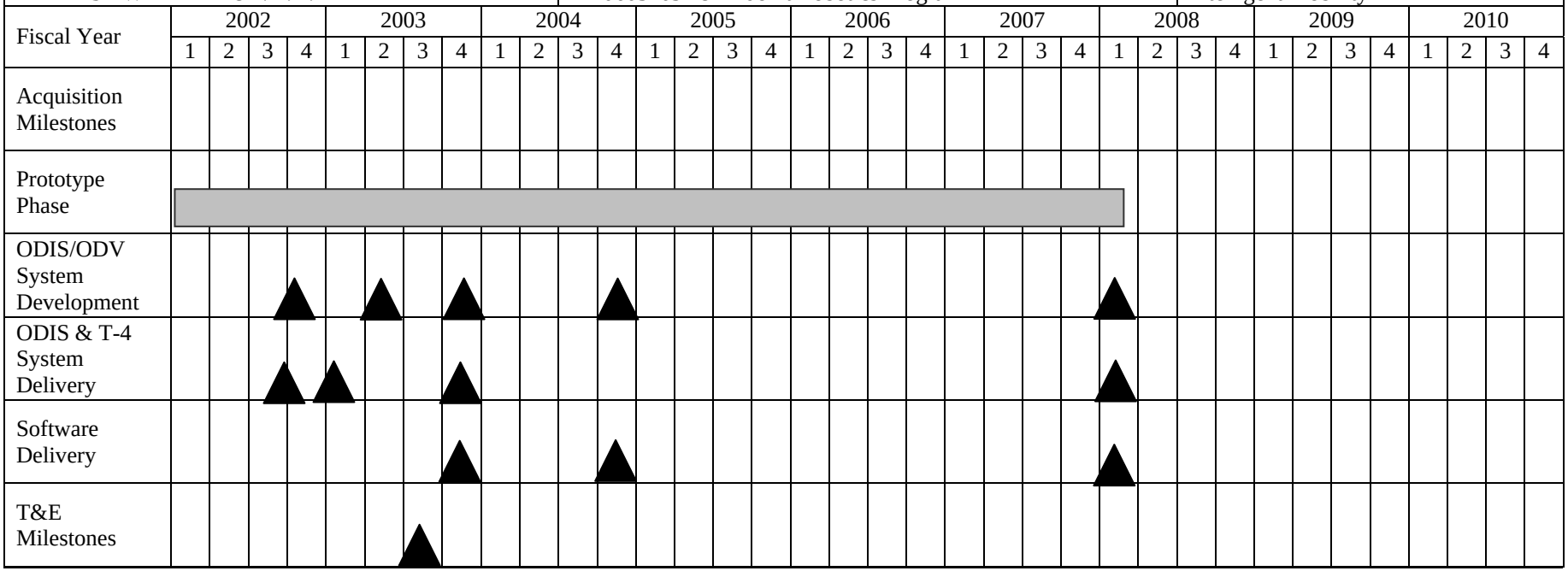
D. Acquisition Strategy:
Not Applicable

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				Intelligent Mobility					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Developmer				0.220		2.200		0.147				
Ancilliary Hardware Developm				0.047		0.500		0.049				
Systems Engineering				0.070		0.600		0.033				
Licenses												
Tooling								0.033				
GFE												
Award Fees												
Subtotal Product Development				0.337		3.232		0.262				
Remarks:												
Development Support				0.140		0.100		0.065				
Software Development				0.187		0.150		0.022				
Training Development				0.047		0.100		0.033				
Integrated Logistics Support				0.033		0.200		0.033				
Configuration Management				0.033		0.200		0.065				
Technical Data						0.034		0.131				
GFE												
Subtotal Support				0.440		0.784		0.349				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				Intelligent Mobility					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.000		0.000		0.000				
Remarks:												
Contractor Engineering Support												
Government Engineering Support				0.223		0.500		0.509				
Program Management Support												
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management												
Remarks:												
Total Cost				1.000		4.516		1.120				

Appropriation/Budget Activity	Program Element Number and Name	Project Number and Name
DEFENSE WIDE RDT&E/B.A. #4	PE 0603709D8Z – Joint Robotics Program	Intelligent Mobility



R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity RDT&E, Defense Wide, Budget Activity 4	Program Element Number and Name PE 0603709D8Z	Project Number and Name Intelligent Mobility

Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Contract Preparation	1Q	2Q	1Q	1Q	1Q	1Q	1Q	
System Development	2-4Q	3-4Q	2-4Q	3Q	4Q	3Q	3Q	
Quality Design and Build	4Q	1Q	4Q	4Q	3Q	4Q	4Q	
Developmental (PD&RR) Technical Testing		4Q	1Q		2Q		4Q	
Developmental Evaluation			1Q		3Q		4Q	
Etc.								

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
RACS	4.579	1.800	3.614	3.999	3.494	2.833	2.940	2.876

A. Mission Description and Budget Item Justification:

The Robotics for Agile Combat Support (RACS) is a USAF effort to advance the robotic state-of-the-art capability for counter-terrorism and force protection technologies. RACS programs include the following: Advancements for the All-purpose Remote Transport System (ARTS), Advanced Systems and Control, Active Range Clearance, Force Protection Robotics, and the Next Generation Explosive Ordnance Disposal Remote Control Vehicle (NGEODRCV). The basic platform for the ARTS has been formally transitioned to a Systems Program Office (SPO) for production and sustainment. Future improvements and advancements will enhance the control and payload capabilities for this system. This technology has been applied to Formerly Used Defense Sites (FUDS) and active range clearance for cleanup/disposal.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	4.579	1.800	3.614	1.200
RDT&E Articles Quantity * (as applicable)				

FY2004-2005 Accomplishments/Planned Program:

- Airborne Engineer – This research effort develop a prototype concept demonstrator that will provide small area ordnance clearance system to allow rapid beddown of RED HORSE personnel. The system includes Power Rake, GPS, New Laptop Operator Control Station, Clam Shell Bucket, and AR-10, 7.62 mm rifle for Stand off Munitions Disruption. The Chief of Staff (CSAF), United States Air Force (USAF) stated that the Air Force requires an Airborne Rapid Engineer Deployable Heavy Operations Repair Squadron, Engineers (RED HORSE) combat engineer capability to "Assess, Prepare and Establish" contingency airbases in remote locations through airdrop, air-insertion, or air-delivery. This requires training some existing RED HORSE personnel as jump-capable and acquiring lighter equipment that is air-droppable, air-insertable, or air-deliverable. It also requires in some cases for Airborne RED HORSE to be augmented by Explosive Ordnance Disposal (EOD), Readiness, and Fire Rescue to meet mission requirements. This Airborne RED HORSE Engineer Concept of Operations (CONOPS) supports the Global Strike Task Force CONOPS: once F-22 and B-2 stealth roll back the enemy offensive threat and uncover basing structure, follow-on forces in the way of Airborne RED HORSE Engineers can deploy to an air base and fix damaged runways for continued offensive operations. Accomplishments include development and transition of three prototypes of the Airborne Engineer ARTS that were airdrop certified (two of which were deployed to Operation Iraqi Freedom). Continued efforts support sling load capabilities for the Airborne Engineer ARTS.

- Enhanced Standoff Munitions Disruption System (E-SMUD) – Sponsored in cooperation with the Office of Special Technology EOD Low Intensity Conflict Office, this effort is for EOD personnel of the Air Force and Marines. This research effort consists of integrating a Telepresent Rapid Aiming Platform (TRAP) from Precision Remotes to the ARTS platform to provide EOD personnel the remote capability of detonating, disrupting, or deflagrating small ordnance at safe distances, thereby taking the EOD technician out of harms way. This effort will provide two prototype systems, one for the USMC that incorporates the Barrett .50 caliber and 7.62 mm Designated Marksmanship Rifle (DMR) and another to the USAF with the Barrett .50 caliber and 5.56 mm rifles. These systems provide remote capability to bring to bear 7.62mm or 0.50 caliber rifle against surface scatterable munitions. Integrating visual optics and current pan/tilt technology, this technology removes the EOD technician out-of-harms way to perform clearance of high threat submunitions currently being validated on CONUS ranges while practice for wartime clearance procedures. A low cost laboratory demonstrator version of an AR-10, 7.62mm rifle has been developed and limited testing performed. Transition planned late FY 2004. Tele-operated Remote Aiming Platform: TRAP is a future P^3I effort that is contained in the CE Readiness Modernization Roadmap and is scheduled to undergo system design and development (SDD) in FY2004 with production to follow in FY2005. Accomplishments include demonstration of a radio controlled TRAP system. Main activity includes not only hardware interface but JAUS compatible weapons message set.
- Robo-Trencher – US Air Force 738 EIS Initiative to provide a standoff capability to perform cable trenching and excavation in hazardous areas. The system need was prompted by 2 separate UXO incidents with manned equipment. Accomplishments included design, build, testing, and delivery of the Robo-Trencher in 90 Days. The integration of production ARTS robotic components to an existing 738th EIS Ditch Witch 7610 Trenching Tractor demonstrated the feasibility of using ARTS robotics system as a robotic kit. The system is currently deployed to support Operation Enduring Freedom. User has requesting conversion of three more systems including potential spiral development for increased capabilities. Currently, AFRL is assisting with development of one additional unit to be delivered in FY 2005.
- Automated Ordnance Excavator (AOE) – This research effort is to develop technologies that can be integrated into an autonomous excavator. To accomplish this goal, technologies must be developed that address the essential mission elements. The development path for this technology is a four-step process: 1. automated digging, 2. independent boom/stick motion, 3. independent machine mobility, and 4. independent work planning and analysis. A contract has been awarded to Caterpillar, Inc. to develop the 1st stage technology, an Auto-dig Mission Planning Module (AMPM) for the AOE. The AMPM is a JAUS compatible electronics module that will take telemetry data from the AOE, process the data to calculate the boom, stick, and bucket motion paths, and return the motion commands to the AOE for execution. Future efforts will concentrate on the completion of stage 2-4 technologies. Accomplishments for this effort include approximately 95% completion of the auto dig mission planning module and hardware upgrade of the AOE.
- J-LONS (Joint Laser Ordnance Neutralization System) – This effort is to develop and validate a remotely operated modular laser system for standoff UXO/IED neutralization capability. Laser technology has been identified as a viable method of clearing areas clear of UXO by rapidly heating the explosive filler to point of detonation. It may also prove to be a method to gain access and disposal to IEDs. Accomplishments include oversight on the international program partner's development of a low power laser system. Due to a slow down in the international program, plans to begin integration of J-LONS onto a mobile unmanned platform are expected in the FY05-06 time frame.

- Advanced Robotics System – The primary effort is to develop common architecture designs for autonomous vehicle technologies that focus on vehicle mobility, speed, and control, as well as multi-vehicle operations and marsupial control. This program seeks to develop and document these modular designs within the evolving JAUS Standards. Specifically the program addresses: (1) vehicle position; (2) sensors; (3) path planning; (4) path execution; (5) vehicle control, and (6) obstacle detection and avoidance. Multi-vehicle and marsupial control technologies will be developed. Technologies being investigated are position/mapping (GPS/INS, Dual antenna GPS, dead-reckoning), Advanced Operator Control Unit (laptop/PDA), obstacle detection and avoidance, mobile communications (droppable repeaters) and support for the OSD Joint Architecture for Unmanned Systems (JAUS).
  Accomplishments include support to the JAUS community, obstacle detection and avoidance simulation, sensor fusion for obstacle detection, and high speed assisted tele-operation algorithm development. Demonstrated JAUS concepts by controlling multiple robotic systems using a single operator control station.
- REDCAR (Remote Detection Challenge and Response system) – REDCAR is an Air Force, Force Protection Battlelab (AFFB) Initiative to demonstrate the benefits of unmanned systems for the security force mission. The program focuses on the application of mobile unmanned ground systems to support and augment security force personnel in the perimeter defense of Air Force installations and forward deployed units. The AFRL REDCAR system will consist of a network of robotic platforms integrated with existing security force sensors and Tactical, Area Security System (TASS). The REDCAR system will have limited simulation and modeling capabilities to interact with the current AFFPB modeling systems. All components and platforms in the REDCAR system will be capable of communication using JAUS (Joint Architecture for Unmanned Systems) for system interoperability and control. Proof of concept demonstration was conducted in June FY 2004. Accomplishments include development and demonstration of the Scout robotic platform at the Force Protection Battlelab exposition for AF/XOF.
- UAV-UGV – This program includes: (1) the development of a dual JAUS / NATO STANAGS-compliant UAV to evaluate JAUS viability in the UAV realm, (2) insertion of Aerial Imagery into OCU for map/model building and situational awareness, aerial Communications Relay to extend the radio range of UGVs, (3) precision UGV marsupial emplacement and recovery using a rotary-wing UAV, and (4) an unmanned helicopter to provide aerial pesticide spraying to mitigate vector-borne disease in deployed operations. Accomplishments included the demonstration of the rotary-wing UAV, training, and transfer of aerial video through JAUS networked system. Accomplishments include application of rotary-wing UAV to the Remotely Controlled Aerial Vehicle for Application of Pesticide (RCAVAP) project.
- Active Range Clearance – The US Army Engineering and Support Center (USAESCH) in Huntsville, Alabama continues its interest in active range clearance. In FY 2004, the center requested AFRL/MLQF Robotics Group to a design and build of a system to remotely pick up range scrap. Accomplishments include preliminary design of a system.
- BomBot – This FY 2004/2005 program investigates low-cost remotely controlled vehicle to deliver an explosive charge to neutralize an Improvised Explosive Device (IED). This will enable a convoy to expediently destroy IEDs remotely through utilization of two alternatives: Non-Recoverable, Recoverable: Non-Recoverable model will be destroyed with the charge and the recoverable model will drop off charge, and then be driven back to the control point. Vehicle is operated using line-of-sight communications. Accomplishments include shipping 4 prototype units to the Marines in Camp Lejeune, 2 prototypes to USMC in Haiti, 5 prototypes to support USAF in Iraqi Freedom, and forming a working group to prioritize requirements for a small low cost robotic system for EOD.

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Technology transition plans (TTPs) are developed when concept demonstration phases begin. The TTP identifies how and when the technology will transfer from AFRL/MLQ to AAC/YBS (or some other EMD/fielding office). This is the same for every initiative under development. The primary user (typically Air Combat Command) allocates AF POM funding in anticipation/coordination of the TTP for transition to 6.4 and production dollars. Some projects are leveraged with other sponsoring agencies (e.g. Technical Support Working Group) that have their own technology transition office that offers a secondary avenue for an acquisition strategy to reach other federal agencies. A third strategy involves the documentation and drawings that can be offered to industry as a build-to-print option as was the case with the All-purpose Remote Transport System

E. Major Performers:
Not Applicable

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				RACS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.530		0.100		0.300				
Ancilliary Hardware Development				0.320		0.100		0.300				
Systems Engineering				0.320		0.100		0.300				
Licenses												
Tooling												
GFE												
Award Fees				0.130				0.053				
Subtotal Product Development				1.300		0.300		0.953				
Remarks:												
Development Support				0.230		0.100		0.100				
Software Development				0.230		0.100		0.100				
Training Development				0.100								
Integrated Logistics Support												
Configuration Management												
Technical Data				0.220		0.100		0.110				
GFE												
Subtotal Support				0.780		0.300		0.310				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z				RACS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT				0.449		0.310		0.300				
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.449		0.310		0.300				
Remarks:												
Contractor Engineering Support				0.110		0.170		0.170				
Government Engineering Support				0.300		0.100		0.400				
Program Management Support				0.520		0.050		0.344				
Program Management Personnel				0.380		0.050		0.375				
Travel				0.380		0.141		0.400				
Labor (Research Personnel)				0.180		0.190		0.190				
Miscellaneous				0.180		0.189		0.172				
Subtotal Management				2.060		0.890		2.051				
Remarks:												
Total Cost				4.579		1.800		3.614				
Remarks:												

Exhibit R-4, Schedule Profile																																						
Date: February 2005																																							
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																Project Number and Name RACS – Advancements for ARTS														
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones			MS B				MS A				MS B				MS A		MS C							MS C													
Prototype Phase																																				
User Evaluation																																				
EMD																																				
Production																																				

R-4 Schedule Profile

Main Programs in Advancements for ARTS

- Remote Water Cutting System
- Alternate Control System
- Deployed Nozzle
- Articulated Remote Manipulation System

Exhibit R-4a, Schedule Detail								Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E BA #4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program				Project Number and Name RACS – Advancements for ARTS			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Concept Design								
Hardware Procurement								
Quality Design and Build								
Developmental (PD&RR) Technical Testing								
Transition to System Program Office	4Q		4Q					
Developmental (User) Evaluation	4Q		3Q					
EMD			4Q			4Q		
Production					1Q			

Main Programs in Advancements for ARTS

- Remote Water Cutting System
- Alternate Control System
- Deployed Nozzle
- Articulated Remote Manipulation System

Exhibit R-4, Schedule Profile																																			
																																			Date: February 2005	
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																				Project Number and Name RACS – Active Range Clearance				
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones										▲ MS A									▲ MS B													▲ MS C						
Prototype Phase																																				
User Evaluation																																				
EMD																																				
Production																																				

R-4 Schedule Profile

Main Programs within Active Range Clearance

- Automated Ordnance Excavator
- Remote Standoff Munitions Disruption System
- Charge Setting System
- Joint Laser Ordnance Neutralization System
- Power Rake

Exhibit R-4a, Schedule Detail								Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E BA #4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program				Project Number and Name RACS – Active Range Clearance			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2010
Concept Design	1Q							
Hardware Procurement	2Q							
Quality Design and Build		3Q						
Developmental (PD&RR) Technical Testing		4Q						
Transition to System Program Office			2Q					
Developmental (User) Evaluation			3Q					
EMD					3Q			
Production						3Q		

R-4a Schedule Profile

Main Programs within Active Range Clearance

- Automated Ordnance Excavator
- Remote Standoff Munitions Disruption System
- Charge Setting System
- Joint Laser Ordnance Neutralization System
- Power Rake

Exhibit R-4, Schedule Profile																																					
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																				Project Number and Name RACS – Advanced Robotics Systems							
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones										MS A														MS B													
Prototype Phase																																					
EMD																																					
Production																																					

R-4 Schedule Profile

Main Programs include

- Advanced Navigation capabilities
- Object Detection/Avoidance
- Multi-vehicle control
- Marsupial Control
- Path Planning/Execution
- JAUS Compliance, Testing, and Evaluation

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E BA #4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program	Project Number and Name RACS – Advanced Robotics Systems

Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Concept Design								
Hardware Procurement		1Q						
Quality Design and Build				1Q				
Developmental (PD&RR) Technical Testing						1Q		
Transition to System Program Office							1Q	
EMD							1Q	
Production								

R-4a Schedule Profile

Main Programs include

- Advanced Navigation capabilities
- Object Detection/Avoidance
- Multi-vehicle control

Marsupial Control

- Path Planning/Execution
- JAUS Compliance, Testing, and Evaluation

Exhibit R-4, Schedule Profile																																		
Date: February 2005																																		
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																				Project Number and Name RACS – NGEODRCV							
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones																				MS B								MS C								
Proto. Phase Evolutionary Development																																				
EMD																																				
Production/ Authorization																																				

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail		Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E BA #4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program	Project Number and Name RACS – Next Generation Explosive Ordnance Disposal Remote Control Vehicle (NGEODRCV)

Schedule Profile	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Concept Design	1Q							
Hardware Procurement		1Q						
Quality Design and Build			1Q					
Developmental (PD&RR) Technical Testing				1Q				
Transition to System Program Office					4Q			
EMD						1Q		
Production								

R-4a Schedule Profile

Exhibit R-4, Schedule Profile																																		
																																	Date: February 2005	
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																				Project Number and Name RACS – Force Protection Robotics							
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones															MS A										MS B											
Prototype Phase																																				
EMD																																				
Production																																				

R-4 Schedule Profile

Main Programs include

REDCAR
DTRA
STORK

Exhibit R-4a, Schedule Detail									Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E BA #4	Program Element Number and Name PE 0603709D8Z Joint Robotics Program				Project Number and Name RACS – Force Protection Robotics				
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Concept Design	1Q								
Hardware Procurement		3Q							
Quality Design and Build		4Q							
Developmental (PD&RR) Technical Testing	4Q		1Q						
Transition to System Program Office				4Q					
EMD						3Q			
Production									

R-4a Schedule Profile

Main Programs include
REDCAR
DTRA
STORK

Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM			PE 0603709D8Z	
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
COTS	2.000	0.500	0.200	0.200	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The purpose of the Commercial-off-the-Shelf (COTS) program is to create and maintain a pool of small, mobile robots that will be made available on loan to government agencies, laboratories and universities. The goal of COTS is to assist agencies in defining their requirements, modifying their operational practices, and to make more appropriate acquisitions of unmanned systems. The robots that populate the pool will be COTS systems currently available from several manufacturers. The evaluations and experiments conducted with COTS robots will provide valuable feedback for future small robot developments. In requesting the loan of small robots from COTS, priority will go to Department of Defense, Homeland Security, and Emergency Response users. Where appropriate, COTS systems will be supplemented with unique developmental technologies to address emerging operational and programmatic requirements, for example, extensions to COTS systems in support of OEF/OIF. The COTS robot pool is also a source of contingency assets for operational (war time) needs - in FY 2004, over 20 small robots were supplied to Explosives Ordnance Disposal teams deployed to Iraq for the removal of Improvised Explosive Devices.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	2.000			
RDT&E Articles Quantity * (as applicable)				

FY2004 Accomplishments:

- Procured over 20 man portable robotic systems for use by Explosives Ordnance Disposal (EOD) teams in Iraq for discovery and examination of Improvised Explosive Devices (IED).
- Provided U.S. Navy Reserve forces to Robotic Systems Joint Project Office for deployment to Iraq as part of robot maintenance team under SKISKY effort.
- Provided training to USMC/Navy EOD Technicians in the use of man portable robots for IED inspection and disposal.
- Transitioned chemical/radiation/gas sensor systems to commercial partner (iRobot) for production and deployment on robotic systems deployed to Iraq.
- Developed a common Operator Control Unit (OCU) for use on a multitude of unmanned systems using OSD Joint Architecture for Unmanned Systems protocol.
- Developed/procured a small throwable robot prototype for use as a light-weight (IED) inspection device.

- Collected, organized, and posted user feedback to on-line website. Expanded on-line website to include collaborative data management tools for sharing lessons learned across GOVT agencies.
- Man portable robot loans made to over ten DoD, GOVT, and local/federal agencies.
- Supported research in the areas of unmanned systems radio communications, miniature stereo-based obstacle detection and avoidance, and command and control.

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost		0.500	0.200	0.200
RDT&E Articles Quantity * (as applicable)				

FY2005-2006 Plans:

- Procure off-the-shelf small robots for loan to government agencies, laboratories, and universities. Several configurations will be procured. Payloads that offer additional capabilities to address emerging threats/needs will be pursued.
- Support limited objective experiments, feasibility demonstrations, and concept exploration projects.
- Support requests for contingency assets where feasible.
- Support training and maintenance of assets in the field.
- Collection of performance data to provide feedback to developers for the improvement of COTS systems and technologies.
- Provide advice, maintenance, and training to the requesting agencies.
- Continue maintenance, upgrades, and support as required.

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Not Applicable

E. Major Performers:
Not Applicable

DEFENSE-WIDE			Program Element				COTS					
BUDGET ACTIVITY 4			PE 0603709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
COTS System Procurement				2.000		0.300						
Ancilliary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				2.000		0.300		0.000				
Remarks:												
Development Support												
Software Development												
Training Development												
Integrated Logistics Support						0.200		0.200				
Configuration Management												
Technical Data												
GFE												
Subtotal Support				0.000		0.200		0.200				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2005				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603709D8Z					COTS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	2006 Cost	2006 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.000		0.000		0.000				
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.000		0.000		0.000				
Remarks:												

Exhibit R-4, Schedule Profile																																	Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4									Program Element Number and Name PE 0603709D8Z – Joint Robotics Program																								Project Number and Name COTS
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009				2010			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Procure COTS Systems																																				
Perform Maintenance, Training Support & Upgrades																																				

R-4 Schedule Profile

Exhibit R-4a, Schedule Detail								Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4	Program Element Number and Name PE 0603709DZ Joint Robotics Program				Project Number and Name COTS			
	FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Procure COTS Systems			1-4Q					
Maintenance, Training, Support			Cont.	Cont.	Cont.	Cont.		

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification				Date: February 2005			
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z			
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
CEE	0.000	2.800	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Autonomous UAV Mission System (AUMS) project and the Collaborative Engagement Experiment (CEE) support the JRP's goal of furthering UGV-UAV collaboration by providing compatible hardware and software interfaces for UAVs and UGVs. The AUMS project is developing a launch/landing/refueling system for Class I/II VTOL UAVs. The AUMS project is developing command and control software for controlling the AUMS hardware and for coordination of the VTOL UAV assets. The AUMS project is also using GPS and vision technologies to develop a precision landing system for use with a UGV. SPAWAR Systems Center San Diego is working with AMRDEC and AFRL to demonstrate UGV-UAV collaboration technologies midway through FY 2006. This demonstration will be part of the CEE program. Lessons learned from this and other CEE experiments will enable advancements in UGV-UAV collaboration and provide value to the warfighter.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006
Accomplishment/Effort/Subtotal Cost	0.000	2.800	0.000
RDT&E Articles Quantity * (as applicable)			

Accomplishments for FY2004 include:

- Developed a second generation automated launch/landing/refueling pad for Class I/II UAV’s.
- Developed automated refueling system for UAV launch/landing pad.
- Explored vision/GPS technologies for precision landing system.
- Demonstrated AUMS to the JRP in December 2003.

	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	2.800	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

Plans for FY2005-2006 include:

- Integrate and test precision landing technologies on VTOL UAVS.

- Complete design of launch/landing/refueling pad to work with several VTOL UAV platforms including the Allied Aerospace iSTAR and small helicopter UAVs.
- Participate in UAV-UGV Collaboration experiments with other JRP organizations including AMRDEC and AFRL.

C. Other Program Funding Summary:
Not Applicable

D. Acquisition Strategy:
Technologies are transitioned to other government programs or to industry as they become available or are requested.

E. Major Performers:
Not Applicable

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 4				R-1 Item Nomenclature: Advanced Sensor Applications Program PE 0603714D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	32.833	26.110	18.275	18.527	18.470	18.554	19.055	19.714

A. Mission Description and Budget Item Justification:

The program focuses on continued development of domestic technologies and assessment of foreign technologies that have demonstrated potential for improvements in U.S. capabilities. Unique and innovative approaches are used to expand the performance envelopes of existing systems. This program supports military requirements identified in Joint Vision 2010, the Defense Science and Technology Strategy, Full Spectrum Dominance and the Joint Warfighting Capability Objectives. This program is funded under Budget Activity 4, Demonstration and Validation because it supports advanced technology demonstrations that evaluate technology transition to operational use.

Program Accomplishments and Plans:

FY 2004 Accomplishments:

- Mission Support $32.833

FY 2005 Accomplishments:

- Mission Support $26.110

FY 2006 Plans:

- Mission Support $18.275

FY 2007 Plans:

- Mission Support $18.527

B. **Program Change Summary:** (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President' s Budget Submission)

	FY 2004	FY 2005	FY 2006	FY2007
Previous President's Budget	32.983	17.581	17.863	18.175
Current President's Budget	32.833	26.110	18.275	18.527
Total Adjustments	-0.150	+8.529	+0.412	+0.352
Congressional program reductions		-0.621		
Congressional rescissions				
Congressional increases		+9.150		
Other adjustments	0.150		+0.412	+0.352

Change Summary Explanation:

FY 2004: Miscellaneous reductions $0.150
FY 2005: Congressional adds $9.150; Undistributed congressional reductions $0.621
FY 2006: Department adjustments
FY 2007: Department adjustments

C. Other Program Funding Summary: Not Applicable

D. Acquisition Strategy: Not Applicable

E. Performance Metrics: Numbers of operational field demonstrations; actual/in-kind resource sharing differential among participating entities; numbers of studies produced; numbers of successful anomaly detections; numbers of false-positive results. Numbers of technology transfers.

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E. Defense-Wide BA4				R-1 Item Nomenclature: Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total ESTCP Cost	34.465	42.046	30.632	28.392	33.671	33.182	33.657	34.330

A. Mission Description and Budget Item Justification:

(U) This program demonstrates and validates the most promising innovative environmental technologies that target DoD's most urgent environmental needs. Technologies selected are projected to provide pay back of the investment within five years through cost savings and improved efficiencies. The program responds to: (1) congressional concern over the slow pace of remediation of environmentally polluted sites on military installations, (2) congressional direction to conduct demonstrations specifically focused on emerging new technologies, and (3) the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by environmental restoration and waste management. Preference for demonstrations are given to technologies that have successfully completed all necessary research and development objectives, and address the highest priority DoD environmental requirements.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget:	35.191	32.546	29.992	28.709
Current President's Budget Submit:	34.465	42.046	30.632	28.392
Total Adjustments	-0.726	9.500	0.640	-0.317
Adjustments to Appropriated Value				
Congressional Program Reductions:				
Congressional Rescissions:		-1.000		
Congressional Increases:		5.500		
Reprogrammings:	-.272	5.000		
SBIR/STTR Transfers:	-.454			
Other:				-0.317

C. Other Program Funding Summary: Related RDT&E

D. Acquisition Strategy. ESTCP solicits proposals from all DoD organizations. In the areas of Cleanup and Unexploded Ordnance (UXO), ESTCP solicits proposals from other Federal Agencies and the commercial sector as well. Projects are selected based on an annual competitive process through reviews conducted by multi-agency review panels.

Exhibit R-2a, RDT&E Project Justification							Date: February 2005
Appropriation/Budget Activity RDT&E. Defense-wide BA 4				Environmental Security Technology Certification Program (ESTCP) 0603851D8Z			
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY2011
ESTCP Cost	34.465	42.046	30.632	28.392	33.671	33.182	33.657	34.330

A. Mission Description and Budget Item Justification

(U) This program demonstrates and validates the most promising innovative environmental technologies that target DoD's most urgent environmental needs. Technologies selected are projected to provide pay back of the investment within five years through cost savings and improved efficiencies. The program responds to: (1) congressional concern over the slow pace of remediation of environmentally polluted sites on military installations, (2) congressional direction to conduct demonstrations specifically focused on emerging new technologies, and (3) the need to improve defense readiness by reducing the drain on the Department's operation and maintenance dollars caused by environmental restoration and waste management. Preference for demonstrations are given to technologies that have successfully completed all necessary research and development objectives, and address the highest priority DoD environmental requirements.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/ Effort/Subtotal Cost	34.465	42.046	30.632	28.392

(U) FY 2004 Accomplishments

- Reviewed and selected 36 technologies for demonstration.
- Reviewed and selected sites for demonstration of technologies.
- Prepared site-specific implementation plans.
- Prepared sites and secured regulatory permitting.
- Continued to demonstrate and evaluate 64 selected technologies. Of these, 35 were completed.

By Pillar:

- Remediation: Successfully demonstrated and validated technologies in multiple high priority areas related to cleanup of contaminated DoD sites. ESTCP has completed the successful demonstration of new cost-effective bioremediation technologies for chlorinated solvents and perchlorate. Evaluations continued on site characterization technologies, source treatment technologies, additional perchlorate treatment approaches, and in-situ treatment for RDX and TNT. These technologies are projected to reduce future DoD liability by $100s of millions. ($9.651 million)

- Unexploded Ordnance (UXO): ESTCP researchers continued to demonstrate improved UXO detection hardware and software technologies at the DoD UXO standardized test sites. Completed testing and transitioned new software package to assess UXO data

features and data quality. Continued demonstration of mechanical clearance technology. Initiated transition of previously Strategic Environmental Research Defense Program (SERDP)-funded efforts to ESTCP to demonstrate a UXO detection and characterization system in a marine environment, an approach to characterize areas with UXO based on statistical methods, and a multi-sensor cart based system to detect and characterize UXO in the 20mm to 150mm size range. Initiated new wide area assessment mapping technology, modeling for prediction of UXO mobility underwater, and various sensor system and data analysis demonstrations. ($9.448 million)

- Pollution Prevention: ESTCP continued to validate and transition environmentally benign technologies that directly support the military mission. Examples include the demonstrations of environmentally friendly alternatives for hard chrome plating and cadmium replacements for a wide variety of weapon systems and components, demonstration of an new combustor design for DoD aircraft and fuel additives which result in reduced emissions, demonstration of lead free primers for small and medium caliber munitions, and environmentally benign coating removal technologies. ($10.315 million)

- Compliance: Significant progress was made in the development of waste treatment and environmental monitoring technologies required by DoD to ensure DoD facilities and ranges are in compliance. These include, testing of treatment system for oily and non-oily waste, effluent discharges in marine environments, blast noise emission, and air emissions monitoring and control technologies. ($5.051 million)

FY 2005 Plans: The FY 2005 funds will be invested in projects that address priority DoD environmental requirements. The focus of the program is on UXO cleanup, range sustainment and pollution prevention required for DoD weapon systems. Funds are primarily required to continue ongoing investments.
- Continue 65 demonstration projects
- Review and select 24 new technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans.
- Prepare sites and secure regulatory permitting.
- Award demonstration testing and evaluation for selected technologies.

Additional funding provided by Congress will be invested in perchlorate treatment and wide area site assessment pilot program for UXO contaminated sites.

By Pillar:
- Remediation: ($13.810 million)
- UXO: ($14.526 million)
- Pollution Prevention: ($8.900 million)
- Compliance: ($4.810 million)

FY 2006 Plans: The FY 2006 funds are planned for investment in projects that address priority DoD environmental requirements.

The focus of the program is on UXO cleanup, range sustainment and pollution prevention required for DoD weapon systems. Funds are primarily required to continue ongoing investments.
- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans.
- Prepare sites and secure regulatory permitting.
- Award demonstration testing and evaluation for selected technologies.

By Pillar:
- Remediation: ($8.320 million)
- UXO: ($9.272 million)
- Pollution Prevention: ($8.160 million)
- Compliance: ($4.880 million)

FY 2007 Plans: The FY 2007 funds are planned for investment in projects that address priority DoD environmental requirements. The focus of the program is on UXO cleanup, range sustainment and pollution prevention required for DoD weapon systems. Funds are primarily required to continue ongoing investments.
- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans.
- Prepare sites and secure regulatory permitting.
- Award demonstration testing and evaluation for selected technologies.

By Pillar:
- Remediation: ($7.610 million)
- UXO: ($9.072 million)
- Pollution Prevention: ($7.100 million)
- Compliance: ($4.610 million)

C. Other Program Funding Summary: Related RDT&E

D. Acquisition Strategy: ESTCP solicits proposals from all DoD organizations and competes them with a multi-agency review panel. In Cleanup and UXO, ESTCP solicits proposals from other Federal Agencies and the commercial sector as well. These are also competed using review panels.

Exhibit R-3 Cost Analysis							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 4			PROGRAM ELEMENT 0603851D8Z				PROJECT NAME AND NUMBER Environmental Security Technology Certification Program (ESTCP) 0603851D8Z	
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY 2004 Cost	FY 2005 Cost	FY 2006 Cost	FY 2007 Cost	Cost to Complete	Total Cost
Demonstration and Validation	C	DoD	32.365	38.946	28.632	26.492	Continuing	Continuing
Overhead			2.10	3.1	2.0	1.9		
Subtotal Management			2.10	3.1	2.0	1.9		
Total Cost			34.465	42.046	30.632	28.392	Continuing	Continuing
Remarks								

Exhibit R-2, RDT&E Budget Item Justification							February 2005	
Appropriation/Budget Activity RDT&E BA 4				R-1 Item Nomenclature: Humanitarian Demining 0603920D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	12.812	13.426	14.305	14.489	14.480	14.531	14.966	15.312
Humanitarian Demining/P920	12.812	13.426	14.305	14.489	14.480	14.531	14.966	15.312

A. Mission Description and Budget Item Justification:

The Humanitarian Demining (HD) R&D program element demonstrates and evaluates prototype demining systems for US forces and for indigenous DoD supported, host nation conducted demining operations. The Humanitarian Demining R&D Program focuses on technologies to improve the efficiency and safety of the process of eliminating post conflict landmines, which are a significant danger to US forces performing peace and stability operations as well as to civilians. This is accomplished through adaptation of commercial-off-the-shelf equipment, the integration of mature technologies, and leveraging R&D activity within DoD, particularly in the Army Night Vision Electronic Sensor's Directorate (NVESD) Tactical Countermine mission area. One goal is to assess equipment capabilities in actual demining conditions. Under the Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict (OASD(SO/LIC)), the HD R&D Program is a strong participant in the International Test and Evaluation Program (ITEP). The program aims to improve existing technologies for: individual mine and minefield detection; wide area survey; mechanical/mine and vegetation clearance; mine neutralization; individual soldier/deminer protection; detection of explosives in buried mines; verification of the presence of mines; marking and mapping of mines/minefields; post clearance quality assurance (QA); mine awareness training; and individual deminer tools. Areas of emphasis are determined/validated at annual Program Reviews conducted by OASD(SO/LIC). The Program Reviews involve representatives from the combatant commands and from mine affected nations.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	13.108	13.747	13.912	14.108
Current President's Budget	12.812	13.426	14.305	14.489
Total Adjustments				
Congressional program reductions				
Congressional rescissions				
Congressional increases				
Reprogrammings	-0.296	-0.321	0.393	0.381

SBIR/STTR Transfer
Other Program Adjustments

C. Other Program Funding Summary: NA

D. Acquisitions Strategy:
Following a rapid prototyping strategy, the program emphasizes the use/modification of existing, commercially available items and components to build functional prototype equipment suited for humanitarian demining operations. This approach is required due to the immediate need for new demining technologies in the face of ongoing US forces and host nation citizen casualties in mine-affected countries. The program evaluates prototype equipment by acquiring it off-the-shelf from industry using competition to the maximum extent possible, by leveraging ongoing countermine R&D efforts in other U.S. and foreign R&D activities, and by taking advantage of extensive in-house fabrication capabilities at the Army's NVESD.

E. Performance Metrics:

Humanitarian Demining - 0603920D8Z	
Long Term Strategies: Obtain adequate funding to support critical shortfalls; prioritize proposals that are deemed acceptable and allocate funding accordingly; and establish outreach programs to leverage institutional knowledge and expertise.	
Performance Indicator and Rating:	
FY 2004 Target	• 70% of currently funded research projects completed on time and within budget • 5% increase in the number of research projects accepted • Conduct annual Humanitarian Demining R&D Program International Program Review
FY 2004 Rating	ON TARGET
FY 2005 Target	• 70% of currently funded research projects are completed on time and within budget • 5% increase in the number of research projects accepted • Complete scheduled R&D project tasks • Conduct annual Humanitarian R&D Program International Program Review
FY 2006 Target	• 70% of currently funded research projects are completed on time and within budget • 5% increase in the number of research projects accepted • Conduct annual Humanitarian R&D Program International Program Review • Transition scheduled projects to user communities
FY 2007 Target	• 70% of currently funded research projects are completed on time and within budget • 5% increase in the number of research projects accepted

	• Conduct annual Humanitarian Demining R&D Program International Program Review
Basis of FY 2004 to Date Performance Rating	Currently the number of funded research projects are on track to be completed per the target
Verification	The Humanitarian Demining Program performs program reviews and has oversight from OSD.
Validation	Completed R&D products increase the capabilities of the DoD to effectively perform demining missions.

Exhibit R-2a, RDT&E Project Justification							February 2005	
Appropriation/Budget Activity RDT&E BA 4				Project Name and Number Humanitarian Demining 0603920D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Humanitarian Demining/P920	12.812	13.426	14.305	14.489	14.480	14.531	14.966	15.312

A. Mission Description and Budget Item Justification: The Humanitarian Demining (HD) R&D program element demonstrates and evaluates prototype demining systems for US forces and for indigenous DoD supported, host nation conducted demining operations. The Humanitarian Demining R&D Program focuses on technologies to improve the efficiency and safety of the process of eliminating post conflict landmines, which are a significant danger to US forces performing peace and stability operations as well as to civilians. This is accomplished through adaptation of commercial-off-the-shelf equipment, the integration of mature technologies, and leveraging R&D activity within DoD, particularly in the Army Night Vision Electronic Sensor's Directorate (NVESD) Tactical Countermine mission area. One goal is to assess equipment capabilities in actual demining conditions. Under the Office of the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict (OASD(SO/LIC)), the HD R&D Program is a strong participant in the International Test and Evaluation Program (ITEP). The program aims to improve existing technologies for: individual mine and minefield detection; wide area survey; mechanical/mine and vegetation clearance; mine neutralization; individual soldier/deminer protection; detection of explosives in buried mines; verification of the presence of mines; marking and mapping of mines/minefields; post clearance quality assurance (QA); mine awareness training; and individual deminer tools. Areas of emphasis are determined/validated at annual Program Reviews conducted by OASD(SO/LIC). The Program Reviews involve representatives from the combatant commands and from mine affected nations.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	12.812	13.426	14.305	14.489

FY2004 Accomplishments: In support of the Army's PM for Close Combat Systems, fabricated three Rotar Berm Sifters for US Forces in Operation Enduring Freedom. The HD Program modified Army MV-24 Bucket Loaders to add mine clearance capability and armor protection. All three systems are now in use by US Forces in Afghanistan. Completed several operational evaluations of mine/vegetation clearance and neutralization technologies in mine infested regions of the world. These included the Sifting Excavator in Honduras, the Tempest and Uni-Disk in Mozambique, the MAXX Mini-Mulcher in Namibia and Rwanda, and SETCO Tires in Sri Lanka, Djibouti and Georgia and the Minefield Marking Kit to Mozambique. Performed Site Assessments in 10 countries to provide technical advice to the combatant command and Embassy staffs on equipment that would be best suited based on the situation in the country, and to determine if the situation warrants new development efforts by the HD R&D Program. Awarded new contract / small purchase efforts which will result in the evaluation of 25 detection systems, 25 mechanical mine and vegetation clearance prototypes,

11 mine neutralization technologies and 2 individual deminer tool prototypes. Demonstrated / tested 31 prototype technologies. Conducted the annual OASD(SO/LIC) hosted Program Review, attended by representatives from the combatant commands and 18 governments working with DoD to eliminate post-conflict landmines form their countries.
Continued operational evaluations of the Mine Clearing Cultivator and Mine Clearing Sifter in Angola, a Tempest vegetation clearer in Thailand, and the Survivable Demining Tractor and Tools in Thailand. Also continued technical testing of prototype technologies in all mission areas.
For OASD(SO/LIC) and with ITEP participation, began an international field evaluation/demonstration of the Handheld Standoff Mine Detection System (HSTAMIDS) in Thailand and Namibia. Initiated operational evaluations of the Improved Backhoe in Korea, the Solar Battery Charger in Mozambique, the Minefield Marking Kit in Thailand and the Air Spade in Afghanistan and Korea. Initiated a comparative evaluation of existing individual mine neutralization technologies.

FY 2005 Plans: As a result of the outstanding success of the Rotar Berm Sifters in Afghanistan, fabricate four additional systems for US Forces engaged in Operation Enduring Freedom / Operation Iraqi Freedom. Complete operational evaluations of the Mine Clearing Cultivator and Mine Clearing Sifter in Angola, the Tempest in Thailand, and the Survivable Demining Tractor and Tools in Thailand. For OASD(SO/LIC) and with ITEP participation, complete the field evaluation / demonstration of the HSTAMIDS in Thailand and Namibia. Complete the comparative analysis of existing high and low order individual mine neutralization technologies. Continue final development of, test and evaluation of prototype technologies in the following areas: detection technologies for discrimination and confirmation from the tactical countermine area; improved handheld detection technologies; mechanical mine and vegetation clearance systems for removing dense vegetation from mined areas and excavating and clearing mines; non-explosive based mine neutralization technologies able to replace the practice of using explosives in humanitarian demining situations; and development of equipment suitable for area reduction and quality assurance operations.
In support of the combatant commands and Embassy staffs, conduct site survey(s), country assessment(s), and initiate operational field evaluations of prototypes developed under the program in the areas of detection, mine/vegetation clearance, neutralization and personal deminer protection systems in mine-infested regions of the world. Conduct the OASD(SO/LIC) International Program Review. Update and distribute the HD R&D Program Video.

FY 2006 Plans: Complete ongoing equipment developments / modifications, site surveys and operational evaluations from FY2005. Continue development of the following: demonstrate detection technologies for discrimination and confirmation to include leveraging technology with the tactical countermine area; detection technologies to improve detection capability and reduce false alarms; to conduct site survey(s), country assessment(s) and operational field evaluations of detection, mine/vegetation clearance and neutralization systems in mine infested regions of the world; demonstrate individual deminer tools and equipment; and equipment suitable for area reduction and quality assurance operations.
In support of the combatant commands and Embassy staffs , conduct site survey(s), country assessment(s), and initiate operational field evaluations of prototypes developed under the program in the areas of detection, mine/vegetation clearance, neutralization and personal deminer protection systems in mine-infested regions of the world. Conduct the OASD(SO/LIC) International Program Review. Update and distribute the HD R&D Program Video.

FY 2007 Plans: Complete ongoing equipment developments / modifications, site surveys and operational evaluations from FY2006. Continue development of the following: demonstrate detection technologies for discrimination and confirmation to include leveraging technology with the tactical countermine area; detection technologies to improve detection capability and reduce false alarms; to conduct site survey(s), country assessment(s) and operational field evaluations of detection, mine/vegetation clearance and neutralization systems in mine infested regions of the world; demonstrate individual deminer tools and equipment; and equipment suitable for area reduction and quality assurance operations.
In support of the combatant commands and Embassy staffs, conduct site survey(s), country assessment(s), and initiate operational field evaluations of prototypes developed under the program in the areas of detection, mine/vegetation clearance, neutralization and personal deminer protection systems in mine-infested regions of the world. Conduct the OASD(SO/LIC) International Program Review. Update and distribute the HD R&D Program Video.

C. Other Program Funding Summary: NA

D. Acquisition Strategy. Following a rapid prototyping strategy, the program emphasizes the use/modification of existing, commercially available items and components to build functional prototype equipment suited for humanitarian demining operations. This approach is required due to the immediate need for new demining technologies in the face of ongoing US forces and host nation citizen casualties in mine-affected countries. The program evaluates prototype equipment by acquiring it off-the-shelf from industry using competition to the maximum extent possible, by leveraging ongoing countermine R&D efforts in other U.S. and foreign R&D activities, and by taking advantage of extensive in-house fabrication capabilities at the Army's NVESD.

Exhibit R-3 Cost Analysis												Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 4 ($ in millions)			PROGRAM ELEMENT 0603920D8Z									PROJECT NAME AND NUMBER Humanitarian Demining / P920
Cost Categories ($ in millions) (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	CY Cost	CY Award Date	BY1 Cost	BY1 Award Date	BY2 Cost	BY2 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Various[1]	Various[2]	89.014	7.618	NA[3]	8.117	NA[3]	8.222	NA[3]	33.643	146.614	NA[4]
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			89.014	7.618		8.117		8.222		33.643	146.614	

Remarks:
1: The Humanitarian Demining R&D Program manages many individual contracts for the development of mine and minefield detection, mine and vegetation clearance, individual deminer tools and personal protection equipment, and mine neutralization technologies optimized for humanitarian demining. As such, one entry cannot be made for any category in this document. Competitive contracting is used to the maximum extent possible. Due to the nature of this program, which acquires very limited quantities (normally 1 or 2 each) of hand built or modified prototype items, most contract types are cost based.
2. Since so many performing organizations, both U.S. and foreign, are involved, one entry cannot be made for any cost category in this document (but can be provided upon request).
3. The HD Program goal is to award all individual efforts to ensure DoD performance goals are met or exceeded.

4. Because individual contracts / task efforts seldom exceed a 12 month period of performance resulting in delivery of one or two prototypes, the total value of each individual contract is usually the same as the award amount for all cost categories in this document.

Development Support												
Software Development	Various[1]	Various[2]	3.495	.416	NA[3]	.443	NA[3]	.449	NA[3]	1.836	6.639	NA[4]
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			3.495	.416		.443		.449		1.836	6.639	
Remarks: See remarks for notes 1, 2, 3 and 4 in the Product Development Section.												

Exhibit R-3 Cost Analysis (page 2)												Date: February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E / BA 4			PROGRAM ELEMENT 0603920D8Z						PROJECT NAME AND NUMBER Humanitarian Demining / P920			
Cost Categories ($ in millions) (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	CY Cost	CY Award Date	BY1 Cost	BY1 Award Date	BY2 Cost	BY2 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation	NA	RDECOM NVESD Fort Belvoir, VA	3.505	.906	NA[3]	.966	NA[3]	.978	NA[3]	4.003	10.358	NA[5]
Tooling												
GFE												
Subtotal T&E			3.505	.906		.966		.978		4.003	10.358	

Remarks:
3. See remarks for note 3 in the Product Development Section.
5. For the HD R&D Program, Operational Test and Evaluation is the limited operational field evaluations of prototype equipment. These evaluations are performed by a governmental mine action organization, or a supporting non-governmental demining organization in the host nation under actual conditions. Funds for this category support the preparation and shipment of the equipment, and logistics support packages (training, manuals, spare parts, etc.) to support the field evaluation. Although foreign governments are responsible for performing their own evaluation, the performing organization for the purpose of this document is CECOM NVESD.

Contractor Engineering Support	Various[1]	Various[2]	6.019	.768	NA[3]	.818	NA[3]	.829	NA[3]	3.392	11.826	NA[4]
Government Engineering Support	NA	RDECOM NVESD Fort Belvoir, VA	5.763	.980	NA[3]	1.044	NA[3]	1.058	NA[3]	4.329	13.174	NA
Program Management Support	Various[1]	Various[2]	8.521	1.055	NA[3]	1.124	NA[3]	1.139	NA[3]	4.659	16.498	NA[4]
Program Management Personnel	NA	RDECOM NVESD Fort Belvoir, VA	.920	.146	NA[3]	.156	NA[3]	.158	NA[3]	.647	2.027	NA
Travel	NA	NA	1.930	.307	NA[3]	.327	NA[3]	.332	NA[3]	1.357	4.253	NA
Labor (Research Personnel)	NA	RDECOM NVESD Fort Belvoir, VA	9.778	1.230	NA[3]	1.310	NA[3]	1.324	NA[3]	5.423	19.065	NA
Overhead												
Subtotal Management			32.931	4.486		4.779		4.840		19.807	66.843	
Remarks: See remarks for notes 1, 2, 3 and 4 in the Product Development Section.												
Total Cost			128.945	13.426		14.305		14.489		59.289	230.454	
Remarks												

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2005		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/ Budget Activity 4				R-1 ITEM NOMENCLATURE Coalition Warfare 0603923D8Z				
COST ($ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total 0603923D Cost	5.704	5.749	5.777	5.787	5.947	5.849	5.965	6.102
Quick-Win II – Interoperable Tactical Communications	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Satellite Coalition Broadcast Environment	0.569	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Battlefield Combat Identification	0.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JTRS/Bowman Interoperability	0.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Shared Network Intelligence Environment/ACTD	0.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CATALYST II - Soothsayer Interoperability	0.334	0.000	0.000	0.000	0.000	0.000	0.000	0.000
US-UK Imagery	0.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000
COSINE Phase II Support	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.000
DAU Cooperative Acquisition Program	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Joint Threat Warning System	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mark XIIA Mode 5 IFF	0.855	0.650	0.000	0.000	0.000	0.000	0.000	0.000
Subnet Relay	0.650	0.425	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Blue Force Situational Awareness	0.375	0.375	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Warfare Support	0.375	0.383	0.390	0.395	0.000	0.000	0.000	0.000
ROK/U.S. Exercise Simulation Interoperability	0.047	0.028	0.000	0.000	0.000	0.000	0.000	0.000
Littoral Metrification	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000
Navigation Warfare Electronic Support UAV Project	0.000	0.450	0.500	0.000	0.000	0.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2005		
Commander Leadership and Intent Project	0.000	0.125	0.125	0.000	0.000	0.000	0.000	0.000
Coalition Fires Interoperability Project	0.000	0.600	0.400	0.000	0.000	0.000	0.000	0.000
Network Centric Mapping Database Project	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000
Multi-Level Thin Client Project	0.000	0.623	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Logistics Decision Support Capability	0.000	0.050	0.350	0.400	0.000	0.000	0.000	0.000
Coalition Communication Interoperability Guide	0.000	0.500	0.500	0.000	0.000	0.000	0.000	0.000
Allied Wide Area Network RF Controller Project	0.000	0.527	0.360	0.000	0.000	0.000	0.000	0.000
Coalition Roadmap/ Requirements Harmonization	0.000	0.463	0.600	0.600	0.375	0.000	0.000	0.000
Coalition Workshops	0.000	0.050	0.100	0.200	0.100	0.000	0.000	0.000
Coalition Collaborative Logistics	0.000	0.000	0.625	0.400	0.000	0.000	0.000	0.000
Maritime Security	0.000	0.000	0.627	0.675	0.000	0.000	0.000	0.000
Combat Support Initiative	0.000	0.000	0.600	0.675	0.000	0.000	0.000	0.000
Combat Aircraft Technology Initiative	0.000	0.000	0.600	0.675	0.000	0.000	0.000	0.000

Mission Description: The Coalition Warfare (CW) initiative adds value to the Department's overall international cooperation strategy by providing resources for the U.S. portion of bilateral and multilateral development projects aimed at improving interoperability with allies and other likely coalition partners. Fighting the war on terrorism and coping with the new and emerging threat paradigms have highlighted coalition warfare issues on the radar screens of policy makers and senior leaders throughout the U.S. Government. Coalitions are the preferred means for addressing international crises, lending political legitimacy and providing resources that mitigate U.S. financial, materiel and personnel burdens (OPTEMPO). Interoperability gaps between and among coalition partners have compromised

operational effectiveness and jeopardized force protection (e.g., fratricidal incidents). Cooperative efforts with likely coalition partners are needed to close interoperability gaps related to C4ISR, combat identification, logistics, weapon systems and training. Moreover, small

investments early in the R&D process yield large dividends (e.g., Joint Strike Fighter). The OSD CW initiative encourages PMs and PEOs to involve friendly countries as well as Allies in cooperative development projects to the extent permitted by security considerations (classified data and critical technology), when such partnering is advantageous to the U.S. Government and necessary in terms of regional threat scenarios.
The CW initiative leverages foreign and other U.S. investment in ongoing projects by adding coalition-related enhancements that would otherwise not be realized. For example, recent tragedies linked to fratricide or friendly fire in OEF and OIF have brought on-going efforts in combat identification (CID) programs to the highest level of CW support and interest. By providing the necessary financial support, CW internationalized the Coalition Combat Identification Advanced Concept Technology Demonstration (ACTD) and the Coalition Blue Force Situational Awareness ACTD (FY 2004-FY 2005 project). Both U.S. and foreign technologies and research may be applied to improve fielded coalition capabilities.

The CW approach to cooperative RDA projects is consistent with OSD-articulated, preferred methodologies: spiral development and evolutionary acquisition (i.e., getting solution-oriented, threshold-capabilities into the hands of the coalition warfighter quickly). Projects benefiting from CW funding fall into one of two categories: those for which the CW funds no more than 50% of the coalition-directed portion, with foreign contributions making up the difference; and those involving CW funding of coalition-oriented features of U.S.-only projects. Priority is given, in both categories, to initiatives offering potential solutions to interoperability issues that can be leveraged across multiple Combatant Commands.

The Combatant Commands, Services, Defense Agencies, and OSD nominate candidate projects. OSD selects projects based on their compatibility with established CW criteria: meeting the needs and requirements specified by the warfighter, funding commitments of international partners, potential for leveraging results across multiple Combatant Commands, addressing potential risks related to security and controlled technology, responsiveness to USD (AT&L) priorities for international armaments cooperation (e.g., metrification of littoral defense, joint and coalition experimentation and coalition logistics).

As the CW Program works on a yearly proposal and selection process, prospective new-start projects are being evaluated in anticipation of final selections in September 2005

B. Program Change Summary:	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget Submit	5.906	5.886	5.657	5.675

Current President's Budget Submission:	5.704	5.749	5.777	5.787
Adjustments to Appropriated Value	-0.202	-0.137	+0.120	+0.112
Congressional Reduction:	-0.113	-0.137		
Undistributed Recission				
Congressional Increase				
Reprogramming				
SBIR/STTR	-0.089			
Other			+0.120	+0.112

C. Other Program Funding Summary N/A

D. Execution

For the execution year (CY), provide a list of funding recipients within the following categories:

U.S. Pacific Command, Honolulu, HI
U.S. Strategic Command, Offutt Air Force Base, NB
U.S. Special Operations Command, Tampa, FL
U.S. Army Communication and Electronics Command, Ft. Monmouth, NJ
U.S. Army Forces Korea, Korea Battle Simulation Center, Ft Leavenworth, KS
U.S. Joint Program Office, Joint Tactical Radio System, Arlington, VA
U.S. Joint Program Office, Global Broadcast Service (GBS), Hanscom AFB, MA
U.S. Navy Space and Naval Warfare Systems Center, San Diego, CA
U.S. Navy Space and Naval Warfare Systems Center, Charleston, SC
U.S. Naval Air Systems Command, Patuxent River, MD
U.S. Naval Surface Warfare Center, Dahlgren, VA
National Security Agency, National Tactical Integration Office (NTIO), Ft. Meade, MD
NATO Consultation, Command and Control Agency (NC3A), Brussels, BE

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				Corrosion Prevention and Control (CPC) PE 0604016D8Z				
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost-0604016D8Z	0.000	0.000	5.141	5.135	5.303	5.174	5.159	5.165
EMI sealants and coatings with improved corrosion resistance	0.000	0.000	0.200	0.210	0.285	0.290	0.290	0.290
Improved protective coatings for magnesium alloys	0.000	0.000	0.300	0.300	0.300	0.300	0.300	0.300
Prior Corrosion and Extended Service of Aging Aircraft	0.000	0.000	0.350	0.350	0.350	0.350	0.350	0.350
Solvent Free Weatherable Top-Sided Coatings for DoD Surfaces	0.000	0.000	0.341	0.335	0.453	0.300	0.300	0.300
Total Underwater Hull Husbandry and Monitoring Demonstration	0.000	0.000	0.300	0.325	0.325	0.325	0.325	0.325
Improved Steel Formations/Chemical Treatments for Corrosion Resistant Concrete Reinforcement	0.000	0.000	0.200	0.250	0.225	0.244	0.229	0.235
Personnel Protective Coating Systems for USMC Vehicles and Systems	0.000	0.000	0.900	0.900	0.900	0.900	0.900	0.900
Corrosion Sensors for Fleet Monitoring and Corrosion Management	0.000	0.000	0.250	0.325	0.325	0.325	0.325	0.325
Demonstration of High Performance Corrosion Prevention Compounds (CPCs)	0.000	0.000	0.900	0.900	0.900	0.900	0.900	0.900
In-Situ Smart Corrosion Sensors for Water Piping Systems	0.000	0.000	0.400	0.320	0.320	0.320	0.320	0.320
Smart Self-Healing Coatings for Water Storage Tanks	0.000	0.000	0.500	0.420	0.420	0.420	0.420	0.420
Electrophoretic Control of Corrosion of Electrical/Mechanical Equipment in Below-Grade Structures	0.000	0.000	0.500	0.500	0.500	0.500	0.500	0.500

Mission Description and Budget Item Justification:

(U) This program is a budget activity level 4 based on the concept/technology development activities required to support the program. The purpose of this program is to develop a comprehensive capability to prevent and mitigate corrosion and its effects on Department of Defense (DoD) weapon systems and infrastructure. Corrosion severely impacts system and facility reliability, readiness and safety, and consumes a disproportionate amount of material and labor hours for repair and treatment of corrosion damaged systems and facilities. The cost of corrosion across the DoD has been estimated at between $10 billion and $20 billion each year. The impact and cost of corrosion are so pervasive that Congress enacted Public Law 107-314 Sec: 1067 [portions codified in 10 U.S.C. 2228]: Prevention and mitigation of corrosion of military infrastructure and equipment. This legislation requires that DoD develop a long-term corrosion strategy to include establishment of a coordinated R&D program with transition plans. The legislation also requires that DoD designate a responsible official or organization to oversee a corrosion prevention and mitigation program.

(U) The DepSecDef designated the Principal Deputy Under Secretary of Defense (Acquisition, Technology, and Logistics) (PDUSD(AT&L)) as the DoD Corrosion Official in May 2003. The DoD Corrosion Official subsequently established a Corrosion Control and Oversight office in the Defense Systems Directorate to implement the program. A major responsibility of the Corrosion Control and Oversight Office is to select high payoff research and development projects that promise to prevent or mitigate corrosion and significantly reduce the total cost of corrosion along with the adverse impact of corrosion effects on weapon system and infrastructure operational capability. This office chartered a Corrosion Prevention and Control Integrated Product Team (CPCIPT) that already has selected and funded O&M projects for FY2004 and FY2005. However, the DoD CPCIPT has determined that the biggest payoff in corrosion prevention and mitigation will come from investing in up-front prevention technologies, materials, and processes to leverage downstream cost avoidances in corrosion maintenance and repair. Likewise, development of improved predictive and prognostic techniques can eliminate unseen failure and reduce unnecessary maintenance and repair costs.

(U) The Corrosion Prevention Control Integrated Product Team membership consists of both the equipment and infrastructure corrosion control experts from the Services, the Joint Staff, the Coast Guard, and NASA. The Services are given project guidelines and selection criteria. The CPC project board from DDR&E, L&MR, I&L, DS and the J-4, Joint Staff chaired by the Special Assistant, Corrosion Control and Oversight reviews the projects and makes recommendations to the DoD Corrosion Executive for final approval.

(U) As a result, the Acting USD(AT&L) issued a policy letter that states: “Basic systems design, materials and processes selection, and intrinsic corrosion-prevention strategies establish the corrosion susceptibility of Defense material. The early stages of acquisition provide our best opportunity to make effective trade-offs among the many competing design criteria. . .” The Congress and the DoD Corrosion Official have made it clear that research and development into materials and methods to prevent or mitigate corrosion should receive high priority. Since Congress has clearly established this program as one of its highest priorities, and has reiterated its expectations regarding funding levels and methods, our budget request is designed to reflect both fiscal realities of scarce dollar availability and the high importance Congress places on effectively funding the program. Studies indicate that we may realize substantial rates of return on investment of 10 to 1 on many proposed projects over the next 5 to 10 years.

(U) The Department has identified well over 30 research and development projects that need to be funded and would have an impact on reducing the effects and costs of corrosion. These projects address critical corrosion issues in both DoD infrastructure as well as warfighting systems. A number of low-risk, high-payoff technologies promise to vastly improve the service life and significantly reduce the maintenance costs of storage tanks and other mission support facilities essential to maintain support for the warfighter. Each of the services has identified important projects that vastly increase operational readiness and reduce operations and maintenance costs. All services are studying corrosion inhibitors that improve reliability and life of electrical and avionics equipment. Likewise, an array of highly effective, rapid cure coatings that are easy to apply and can forestall corrosion for many years on aircraft and ships are being developed. Other vital projects being considered include sealants, wash down systems, sensors and prognostic technologies that have joint service applications and potential to prevent and mitigate corrosion and its effects over a wide range of systems. The $5M budget request will provide a critically needed resource to trigger even larger investment and cost avoidance.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY2007
Previous President's Budget	0.000	0.000	0.000	0.000
Current FY 2006 President's Budget	0.000	0.000	5.141	5.135
Total Adjustments	0.000	0.000	+5.141	+5.135
Congressional program reductions				
Congressional rescissions				
Congressional increases				
Reprogrammings				
SBIR/STTR Transfer				
Other			+5.141	+5.135

C. Other Program Funding Summary: N/A

D. Acquisition Strategy:

There is an annual CPCIPT call for proposed project plans in April. Projects are submitted by the Services annually in June. The project plan format is contained in the DoD Corrosion Prevention and Mitigation Strategic Plan. Each project plan contains:

1. Problem statement: Description of the problem or situation, including background, history, issues, operational problems and support costs.
2. Impact statement: Details regarding why project is important including description of the operational and/or logistic impact if no action is taken.
3. Technical description: Definition of the corrosion prevention and control objective and description of the system affected by this project; applicable technologies and associated development; expected operations and logistics performance improvement characteristics; brief description of the user community and how it will apply to their mission; and current acquisition status.
4. Risk analysis: Description of the risk in managing/developing/ proto-typing/testing/qualifying/manufacturing/completing the technical effort including assumptions that could affect project development or implementation.

5. Proposed phases: If project is complex and will be performed in phases, description of each phase objective.
6. Expected deliverables and results or outcomes: Description of products to be delivered such as type/number of hardware, technical orders/drawings, installation, training, etc.; and description of expected operations and/or logistics performance improvements.
7. Program management: Description of the overall approach and tasks to be taken to accomplish the project, including organization, coordination and acquisition approach.
8. Cost/benefit analysis: Definition of all resources necessary to accomplish project, description of resulting benefits, computation of Return-On-Investment (ROI), and documentation of mission criticality.
9. Schedule: Milestone chart showing all significant events through project completion.
10. Implementation plan: Explanation of how the project will be implemented when completed including a description of the transition approach.

The project evaluation criteria are also provided as part of the call for use by the CPCIPT in arriving at their prioritized project list. There are seven categories for evaluation:

1. Return on investment credibility: Degree to which there is evidence that the project will achieve a return on investment of greater than 10:1: 3, 2, 1 points respectively for low, medium, high risk:
2. Benefits credibility: Degree to which there is evidence that the projected benefits will be achieved: 3, 2, 1 points respectively for low, medium, high risk
3. Technology maturity: Degree to which proposed technology has been developed or demonstrated and will satisfy project objectives: 3, 2, 1 points respectively for low, medium, high risk
4. Schedule confidence: Degree to which the project is likely to be completed on time: 3, 2, 1 points respectively for low, medium, high risk
5. Budget confidence: Degree to which the project is likely to be completed within the proposed budget: 3, 2, 1 points respectively for low, medium, high risk
6. Operational readiness improvement: Degree to which there is evidence that the project will improve readiness, reliability, maintainability or sustainability of the system or facility: 6, 4, 2 points respectively for low, medium, high risk
7. Management support: Degree to which management actively supports this project and has committed program resources to both manage and support this project: 6, 4, 2 points respectively for low, medium, high risk

The CPCIPT receives project plans and makes a priority ranking based on detailed analysis of each proposed initiative against the seven evaluation criteria. This priority ranking is sent to the CPCIPT lead. Upon acceptance and approval of the projects by the CPCIPT, the projects are briefed to the Corrosion Forum. Funding is distributed between the Services based on priority and the evaluation process results.

Upon selection by CPCIPT of the highest priority projects and final funding approval, MIPRs are prepared by OSD to transfer individual project funding to the appropriate funding sites. These funding sites are provided by the Services. After receiving the project funding, the Services are responsible for the funding and management of the projects. OSD retains oversight and direction of the CPC initiative through the CPCIPT. Project oversight includes the review of bi-monthly status reports which address progress summary, performance goals and metrics and upcoming key events, as well as reports to periodic Corrosion Forums.

The bi-monthly project report (PR) format has been defined and requires the following input:

1. statement of progress
2. outstanding issues
3. performance goals and metrics
4. upcoming events
5. schedule status
6. current return on investment (ROI) status

These PRs are submitted to the CPCIPT office. The CPCIPT analyzes project status, progress and project statistics and informs the Service POCs of any project problems. Projects are also required to report verbally at Corrosion Forums, as appropriate.

CPC Program direction, control and oversight include the following activities to be performed by staff and support contractors:

1. Plan and schedule Corrosion Forums and oversee Corrosion Forum activities and working IPT meetings.
2. Oversee project performance including review of bi-monthly status reports which address progress summary, performance goals and metrics and upcoming key events, as well as reports to periodic Corrosion Forums.
3. Perform DoD cost of corrosion study.
4. Develop improved, standard DoD-wide specifications, standards and qualification processes.
5. Develop corrosion training courses.
6. Prepare and publish Corrosion Prevention and Control Planning Guidebook spirals.
7. Prepare and publish annual Reports to Congress
8. Update short-term and long-term metrics.
9. Develop corrosion control program management guide for selecting materials.
10. Develop and implement the DOD Corrosion Prevention and Mitigation Strategic Plan.
11. Develop and maintain Roadmaps of IPT activities and accomplishments.
12. Assist in the annual project plan implementation and evaluation process, including the assessment of return on investment associated with proposed projects
13. Respond to Congressional, Government Accountability Office and DoD inquiries regarding the CPC Program.
14. Perform CPC Program communication and outreach to services, agencies and other organizations.

E. Performance Metrics:

The objective of each of the projects is the reduction in the life cycle costs of corrosion for affected systems. ROI is the primary performance metric for the projects and for the CPC initiative. Each project plan includes a cost/benefit analysis, which is based on discounted cash flow calculations of project investment costs and projected cost avoidances. OMB discount rates are used to provide real comparisons of future value against current uses of resources. Projected cost avoidances are based on engineering estimates of the benefits provided by project implementations. Sources of cost avoidances are defined as part of the project submittal and come from any acquisition or operational cost

source (materials and production cost reduction, fewer spares, lower maintenance hours, faster turnaround times, improved readiness, reduced scheduled maintenance, etc.). Updated ROI calculations are part of the required bi-monthly project reports to provide tracking of this metric.

The average projected ROI for these projects (based on discounted cash flow calculations) exceeds 10:1 with estimated annual direct cost avoidance of over $50 million across the FYDP. Thus, the critical performance metric for this effort is the resulting life cycle cost reduction. Gains in reliability, maintainability, supportability, and thus readiness are the by-products of the projects with attendant additional cost reduction benefits Cost avoidances will be measured and tracked for each project, summed to the Service level, and totaled at the OSD level.

Fiscal Year (FY) 2006 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity Defense Wide RDT&E, BA4				R-1 ITEM NOMENCLATURE J-UCAS Advanced Component and Prototype Development		PE-0604400D8Z		
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
J-UCAS PE-0604400D8Z	0.000	217.401	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Information Operations/ Electronic Attack, Persistent Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture for the warfighting community. The J-UCAS program combines and expands the efforts that were previously conducted under the DARPA/Air Force Unmanned Combat Air Vehicle (UCAV) program and the DARPA/Navy Naval UCAV (UCAV-N) program. These efforts were targeted towards service-specific needs, However the Department recognized the potential for significant synergy by combining the programs. The accomplishments and ongoing efforts of the X-45A technology demonstrator, as well as the development of the X-47A demonstrator, are reducing the risk of the "operationalized" demonstration system being developed for a joint operational assessment (OA) planned for the FY 2007-2010 timeframe. The J-UCAS concept incorporates the next generation family of demonstrator air vehicles, together with common subsystems (e.g. sensors, payloads, communications) and a Common Operating System to achieve the system's diverse mission functionality. These common system elements will maximize mission flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint OA. The J-UCAS Office operates in close coordination with Service users and other operational components. The program is focused on demonstrating capabilities that support both Services and enable an operational system development decision by the end of the decade. PE 0604400D8Z is for J-UCAS Advanced Component and Prototype Development. These funds are used for the development of the common systems and technologies as well as the Boeing and Northrop Grumman demonstrator programs. In addition, these funds are used to conduct the joint operational assessment including modeling and simulation and flight testing.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget:	0.000	422.873	667.307	380.105
Current FY2006 President's Budget Submission:	0.000	217.401	0.000	0.000
Adjustments to Appropriated Value:		-205.472	-667.307	-380.105
Congressional Program Reductions:		-205.472		
Congressional Rescissions:				
Congressional Increases:				
Reprogrammings:			-667.307	-380.105
SBIR/STTR Transfers:				
Other:				

C. Other Program Funding Summary:

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY2009	FY2010
PE 0603400D8Z, OSD	0.000	354.794	0.000	0.000	0.000	0.000	0.000
PE 0603114N, Navy	117.865	0.000	0.000	0.000	0.000	0.000	0.000
PE 0604731F, Air Force	160.551	0.000	0.000	0.000	0.000	0.000	0.000
PE 0207256F, Air Force	2.305	0.000	0.000	0.000	0.000	0.000	0.000
PE 0603285E, DARPA	41.385	0.000	0.000	0.000	0.000	0.000	0.000
PE 0603400F, Air Force	0.000	0.000	77.800	0.000	0.000	0.000	0.000
PE 0604400F, Air Force	0.000	0.000	272.300	400.100	554.100	780.500	955.200

D. Acquisition Strategy:

The J-UCAS Advanced Component and Prototype Development acquisition strategy is to advance the work being conducted under PE 0603400D8Z (J-UCAS Advanced Technology Development and Risk Reduction) and prove the operational value of the J-UCAS concept in the joint operational assessment. The J-UCAS program blends the advantages of both the Advanced Technology

Demonstration (ATD) and the Advanced Concept Technology Demonstration (ACTD) concepts to facilitate rapid development and integration of advanced technologies in an experimental system that addresses operational needs. Using the next generation of demonstrator air vehicle families, together with common subsystems and a Common Operating System, this nontraditional approach also incorporates key acquisition considerations (i.e., user requirements, comprehensive system lifecycle perspective, and rigorous risk mitigation processes) to provide the necessary insights, operational data and identified options for the services to make an informed decision for accelerated acquisition near the end of the decade.

E. Performance Metrics:

2Q FY 2006 Delivery of 'Build 0', Basic Services Build of the Common Operating System (COS).
2Q FY 2007 Delivery of 'Build 1', Single Ship Build of the Common Operating System (COS).

Fiscal Year (FY) 2006 Budget Estimates Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2005		
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE J-UCAS Advanced Component and Prototype Development		PE-0604400D8Z		
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
J-UCAS PE-0604400D8Z	0.000	217.401	0.000	0.000	0.000	0.000	0.000	0.000

A. Mission Description and Budget Item Justification:

The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Information Operations/ Electronic Attack, Persistent Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture for the warfighting community. The J-UCAS program combines and expands the efforts that were previously conducted under the DARPA/Air Force Unmanned Combat Air Vehicle (UCAV) program and the DARPA/Navy Naval UCAV (UCAV-N) program. These efforts were targeted towards service-specific needs, however the Department recognized the potential for significant synergy by combining the programs. The accomplishments and ongoing efforts of the X-45A technology demonstrator, as well as the development of the X-47A demonstrator, are reducing the risk of the "operationalized" demonstration system being developed for a joint operational assessment (OA) planned for the FY 2007-2010 timeframe. The J-UCAS concept incorporates the next generation family of demonstrator air vehicles, together with common subsystems (e.g. sensors, payloads, communications) and a Common Operating System to achieve the system's diverse mission functionality. These common system elements will maximize mission flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint OA. The J-UCAS Office operates in close coordination with Service users and other operational components. The program is focused on demonstrating capabilities that support both Services and enable an operational system development decision by the end of the decade. PE 0604400D8Z is for J-UCAS Advanced Component and Prototype Development. These funds are used for the development of the common systems and technologies as well as the Boeing and Northrop Grumman demonstrator programs. In addition, these funds are used to conduct the joint operational assessment including modeling and simulation and flight testing.

B. Accomplishments/Planned Program

	FY 2004	FY 2005	FY 2006	FY 2007
Accomplishment/Effort/Subtotal Cost	0.000	217.401	0.000	0.000

Planned Program:

- Continue development of J-UCAS systems, specifically the Boeing and Northrop Grumman demonstrator programs as well as the common operating system and sensors.
- Prepare for joint Operational Assessment (OA).

C. Other Program Funding Summary:

	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
PE 0603400D8Z, OSD	0.000	354.794	0.000	0.000	0.000	0.000	0.000
PE 0603114N, Navy	117.865	0.000	0.000	0.000	0.000	0.000	0.000
PE 0604731F, Air Force	160.551	0.000	0.000	0.000	0.000	0.000	0.000
PE 0207256F, Air Force	2.305	0.000	0.000	0.000	0.000	0.000	0.000
PE 0603285E, DARPA	41.385	0.000	0.000	0.000	0.000	0.000	0.000
PE 0603400F, Air Force	0.000	0.000	77.800	0.000	0.000	0.000	0.000
PE 0604400F, Air Force	0.000	0.000	272.300	400.100	554.100	780.500	955.200

D. Acquisition Strategy:

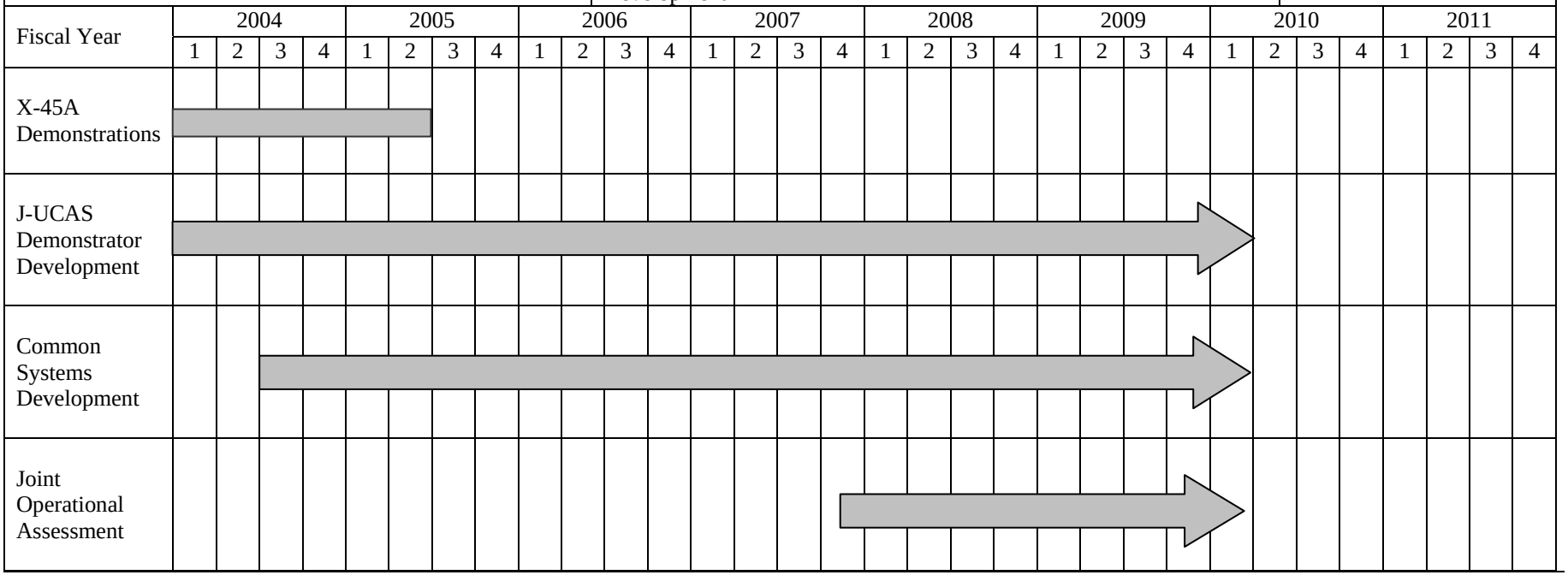
The J-UCAS Advanced Component and Prototype Development acquisition strategy is to build on the work being conducted under PE 0603400D8Z (J-UCAS Advanced Technology Development and Risk Reduction) and prove the operational value of the J-UCAS concept in the joint operational assessment. The J-UCAS program blends the advantages of both the Advanced Technology Demonstration (ATD) and the Advanced Concept Technology Demonstration (ACTD) concepts to facilitate rapid development and integration of advanced technologies in an experimental system that addresses operational needs. Using the next generation of demonstrator air vehicle families, together with common subsystems and a Common Operating System, this nontraditional approach also incorporates key acquisition considerations (i.e., user requirements, comprehensive system lifecycle perspective, and rigorous risk mitigation processes) to provide the necessary insights, operational data and identified options for the services to make an informed decision for accelerated acquisition near the end of the decade.

E. Major Performers:

The Boeing Company, St. Louis, MO

The Boeing Company, Seattle, WA
Northrop Grumman Corporation, El Segundo, CA
Northrop Grumman Corporation, Rancho Bernardo, CA
Northrop Grumman Corporation, Palmdale, CA
Lockheed Martin, Palmdale, CA
The John Hopkins University, Baltimore, MD

Exhibit R-4, Schedule Profile			Date: February 2005
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. 4	Program Element Number and Name PE 0604400D8Z – J-UCAS Advanced Component and Prototype Development		Project Number and Name J-UCAS



R-4 Schedule Profile – Item No. 20-3 of 20-4

Exhibit R-4a, Schedule Detail		Date: February 2005	
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. 4	Program Element Number and Name PE 0604400D8Z – J-UCAS Advanced Component and Prototype Development		

	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	FY2011
Common Systems Development Begins	3Q							
X-45A Flight Demonstrations Conclude		2Q						
J-UCAS Demonstrator Development Begins	1Q							
Joint Operational Assessment Begins				4Q				

R-4a Schedule Profile - Item No. 20-4 of 20-4

Exhibit R-2, RDT&E Budget Item Justification				Date: February 2005					
Appropriation/Budget Activity RDT&E, Defense Wide/BA-4				R-1 Item Nomenclature Joint Capability Technology Demonstration (JCTD), PE 0604648D8Z					
Cost ($ in Millions)		FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
JCTD		0.000	0.000	3.000	3.000	3.000	3.000	3.000	3.000

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: Beginning in FY 2006, a new Advanced Concept Technology Demonstration (ACTD) business process will be initiated which will take the successful ACTD program and update it to meet the Department's transformational goal of becoming capability vice threat based in its focus. The program will be referred to as the Joint Capability Technology Demonstration (JCTD) program. The JCTD program will include many of the positive aspects of the ACTD program, but will be revamped to meet the defense challenges of the 21st century. The new process will integrate the ACTD program with the new Joint Integration and Development System (JCIDS) developed by the Joint Chiefs of Staff (JCS). Beginning in FY 2006, the Department estimates a three to five year transition period from the current ACTD process to the improved JCTD program. Eventually, JCTDs will replace ACTDs, providing an even faster process that focuses on joint and transformational technologies that are initiated in Science and Technology (S&T) and carried through the difficult transition stage, sometimes referred to as the "S&T valley of death."

In seeking ways to speed transition and fielding of innovative joint capabilities, the JCTD Program will pioneer a transformational new model for Department of Defense acquisition with the addition of funding in BA-4, B-A5 and Procurement to provide a path for those capabilities that are so vital to the CoCom and/or potentially transformational to the Department, that they must be put on a "fast track" to acquisition rather than face budgetary delays that are built into the standard Planning, Programming, Budgeting, and Execution (PPBE) process. The JCTD Program will be aligned with the Joint Capabilities Interoperability Development System (JCIDS) seeking to enhance CoCom inputs throughout the JCIDS process. The Defense Wide RDT&E funding managed by the Deputy Under Secretary of Defense for Advanced Systems and Concepts (DUSD(AS&C) will support demonstration of military utility and deployment of interim capability including an "extended user evaluation." If military utility is successfully proven through an independent test, then DUSD (AS&C) will ensure the mission needs validation remains valid and move the successful JCTD/ACTD into this Budget Activity four (BA-4) program element for Advanced Component Development and additional Prototypes (ACD&P) to facilitate transition to the warfighter. Completion of Technical Readiness Levels 6 and 7 is anticipated as a logical progression.

B. Program Change Summary

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	0.000	0.000	0.000	0.000
Current FY 2006 President's Budget	0.000	0.000	3.000	3.000
Total Adjustments:	0.000	0.000	-3.000	-3.000
Congressional program reductions				
Congressional Rescissions				
Congressional Increases				
Reprogrammings				
SBIR/STTR Transfer				
ACTD Transfer (0603750D8Z)			-3.000	-3.000

A. **Other Program Funding Summary ($M):** The new JCTD Program provides a "cradle to grave" path for transformational joint capabilities. The initial funding lines are outlined in the table below. Refer to the specific Budget Exhibit for more details on each funding line.

ACTD and JCTD Program Funding Summary	APPN	BA	PE	LINE #	**FY 2004**	**FY 2005**	**FY 2006**	**FY 2007**
Advanced Concept Technology Development (ACTD)	RDT&E	3	0603750D8Z	44	212.570	212.915	163.649	163.744
Joint Capability Technology Demonstration (JCTD)	RDT&E	3	0603648D8Z	36	0	0	35.000	35.000
Joint Capability Technology Demonstration (JCTD)	RDT&E	4	0604648D8Z	83	0	0	3.000	3.000
Defense Acquisition Executive (JCTD Pilot Program)	RDT&E	5	0605648D8Z	99	0	0	1.000	1.000
Procurement (JCTD Pilot), Major Equipment-OSD Def Wide	Proc	1	0902198D8Z		0	0	1.000	1.000
Total:							40.000	40.000

C. Acquisition Strategy: Two programs are currently under review for including in this Budget Activity—these include the Urban Recon ACTD and the Joint Automated Deep Operations Coordination System (JDOCS). Urban Recon is under the Program Management of USSOCOM while JDOCS is under the purview of the Joint Precision Strike Demonstration (JPSD) program office.

D. **Performance Metrics:**

- Fifty percent of the products from at least 80% of all completing JCTDs will transition to acquisition programs of record, a GSA schedule, CoCom sustainment or, in the case of software-based products, into operationally-sustained systems (such as the Global Command and Control System (GCCS).
- JCTD/ACTDs completing ACD&P will be at TRL 6 or 7 and a logical progression of program phases to include development and funding will be established via a documented transition plan.

Exhibit R-2a, RDT&E Project Justification				Date: February 2005					
Appropriation/Budget Activity RDT&E, Defense Wide/BA-4				R-1 Item Nomenclature Joint Capability Technology Demonstration (JCTD), PE 0604648D8Z					
Cost ($ in Millions)		FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
JCTD		0.000	0.000	3.000	3.000	3.000	3.000	3.000	3.000

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: : Beginning in FY 2006, a new Advanced Concept Technology Demonstration (ACTD) business process will be initiated which will take the successful ACTD program and update it to meet the Department's transformational goal of becoming capability vice threat based in its focus. The program will be referred to as the Joint Capability Technology Demonstration (JCTD) program.

JCTDs will be phased in over a period of three to five years in order to integrate technology, concepts, tactics and procedures into prototypes or demonstrations that provide new or enhanced joint capabilities to the warfighter in a manner that makes transition more seamless. Funding in this PE will be used for efforts necessary to further develop selected JCTD/ACTDs in a more realistic operating environment for transition into Programs of Record. Acquisition Program Managers and the Test and Evaluation community become more involved in development during this phase of JCTDs.

JCTD Selection Process:

The JCTD Program will use a deliberate process for selecting the transitioning ACTDs into this program element. Successful MUAs will be balanced against the top priorities of the CoComs. Defense Components, industry and coalition partners. The proposed transitioning JCTD candidates will be briefed to the JCS Functional Capability Boards to ensure mission needs remains intact.. The principal management tool for the transitioning JCTD will be the Transition Plan (TP), crafted during the initial JCTD program. Each approved JCTD will be described in these top-level documents which provide details of the demonstration/evaluation, the main objectives, approach, critical events, measures of success, transition options, participants, schedule, and funding.

B. PROGRAM ACCOMPLISHMENTS AND PLANS – FY 2004 THROUGH FY 2007:

FY 2004/2005 General Program Accomplishments
Not applicable.

FY 2006 and FY 2007 General Program Plans:

DUSD (AS&C) will initiate the JCTD program. Prior to FY 2006 a decision will be reached on which successful JCTD/ACTD will be funded in this Budget Activity. The two candidates under consideration are the Urban Recon ACTD and the Joint Automated Deep Operations Coordination System (JDOCS), which is a product resulting from an older ACTD called Theater Precision Strike Operations (TPSO). Urban Recon is under the Program Management of USSOCOM while JDOCS is under the purview of the Joint Precision Strike Demonstration (JPSD) program office. These projects have high CoCom interest and support and are considered viable candidates for the JCTD BA-4, BA-5, and procurement program elements.

B. **C. Other Program Funding Summary:** The new JCTD Program provides a "cradle to grave" path for transformational joint capabilities. The initial funding lines are outlined in the table below. Refer to the specific Budget Exhibit for more details on each funding line.

ACTD and JCTD Program Funding Summary	APPN	BA	PE	LINE #	**FY 2004**	**FY 2005**	**FY 2006**	**FY 2007**
Advanced Concept Technology Development (ACTD)	RDT&E	3	0603750D8Z	44	212.570	212.915	163.649	163.744
Joint Capability Technology Demonstration (JCTD)	RDT&E	3	0603648D8Z	36	0	0	35.000	35.000
Joint Capability Technology Demonstration (JCTD)	RDT&E	4	0604648D8Z	83	0	0	3.000	3.000
Defense Acquisition Executive (JCTD Pilot Program)	RDT&E	5	0605648D8Z	99	0	0	1.000	1.000
Procurement (JCTD Pilot), Major Equipment-OSD Def Wide	Proc	1	0902198D8Z		0	0	1.000	1.000
Total:							40.000	40.000

~~D.~~D. -Acquisition Strategy: Two programs are currently under review for including in this Budget Activity—these include the Urban Recon ACTD and the Joint Automated Deep Operations Coordination System (JDOCS). Urban Recon is under the Program Management of USSOCOM while JDOCS is under the purview of the Joint Precision Strike Demonstration (JPSD) program office.

E. Major Performers: The majority of funding from this Program Element will be forwarded directly to the Services/Defense Agency program office which will provide the appropriate acquisition oversight, including the management of contracting and other support requirements.

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E, Defense-wide BA 4			R-1 Item Nomenclature: Joint Service Education & Training Development, 0604722D8Z					
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total Program Element (PE) Cost	0.954	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This program supports development of tools and applications of Advanced Distributed Learning (ADL) technologies. At the direction of Congress, funds were added in FY 2003 to sponsor advanced development of several technologies applicable to both Defense training and higher education. Through an outreach program at the University of Wisconsin, partnerships with more than 60 academic groups make reusability of sharable content objects and the interoperability of learning content and management systems available to higher education for areas such as health care training. At the direction of Congress, funds were added in FY 2004 to extend the reuse of sharable content objects for a proof of principle demonstration in multiplayer online gaming environments for training and education related to net centric warfare.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	0.987	0	0	0
Current President's Budget	0.954	0	0	0
Total Adjustments	- 0.033	0	0	0
SBIR / STTR Transfer	-0.028	0	0	0
Reprogrammings	-0.005	0	0	0

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Performance Metrics: Seventy academic partnerships were created through the University of Wisconsin to extend ADL technologies to higher education. A prototype immersive learning environment that extends the power of ADL reusable content was developed for NORAD (North American Aerospace Defense Command)/United States Northern Command (USNORTHCOM).

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2005		
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4			R-1 ITEM NOMENCLATURE REDUCTION OF TOTAL OWNERSHIP COST			PE 0605017D8Z		
COST ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost-0605017D8Z	0.000	0.000	24.824	24.896	25.598	25.115	25.626	26.210
ARMY								
Aircraft Metal Hydraulic Fluid Filters			1.550					
High Reliability Apache Cooler/Dewar			0.995					
60mm Celluloid MICs			0.683					
Clean Water Generating Unit			1.750					
H-60 Input Module Gearbox			0.709					
H-60 SAS Actuators			0.940					
CGA Core Gunnery Elements Development			1.647	0.761				
NAVY								
Fuel Management Control Panel			0.400					
Midrange FLIR			0.600					
Rudder Actuator Hydraulic Seals			0.104	0.036				
Stabilizer Actuator Hydraulic Seals			0.116	0.042				
Ship’s Material Condition Model			0.425	0.075				
H-60 Antenna Gaskets			0.782					
V-22 EAPS Blower Seal			0.290					
T-1 Fuel System Upgrade			0.363	0.450				
EFV Aft Hydraulic Manifold			0.500	0.150				
F/A-18 BIT Maturation			1.151	1.949				
Whitehouse Duct RAMEC			0.096					
AFCS Actuator			0.112	0.037				
Flaperon Actuator Seals			0.312	0.046				
Forward Cooling Turbine			0.204					
Hydraulics Reservoir Endcap			0.196					
V-22 COANDA Tube			0.600					
Self Cleaning Oil Filter			0.480	0.480				
Digital Electronic Control Unit (DECU)			0.569	0.055				
PSS II Mechanical Seals			0.315	0.315				
Ceramic Bearings			0.660	0.400				

AIR FORCE								
Engine Component Repair			1.270	1.130				
Engine Reliability Centered Maintenance (RCM)			3.539	3.388				
MILSTAR Radome Replacement			0.623	0.200				
Fuel System Icing			1.450	2.100				
Aircrew Bladder Relief			1.393	0.807				
Reliability Improvements				4.242	8.703	8.539	8.713	8.912
Maintainability Improvements				5.364	11.007	10.799	11.019	11.270
Supportability Improvements				2.869	5.888	5.777	5.894	6.028

A. Mission Description and Budget Item Justification:

The Acting USD(AT&L)-defined mission for the Reduction in Total Ownership Cost (R-TOC) program is the reduction of ownership costs for defense systems. The R-TOC program provides funding for initiatives that will:

1. increase the reliability, maintainability, supportability and thus increase readiness of new or existing defense systems;
2. reduce logistics footprint; and
3. generate future cost reductions in total ownership cost.

These individual initiatives are complete efforts within themselves that yield complete redesigns that the Services are committed to put into production and operation. The initiatives optimize cost avoidance, ultimately reducing the operating and support costs for systems.

The USD(AT&L) has set an FY 2010 R-TOC goal of reducing the total defense systems inflation increase in Operations and Support (O&S) cost by 30 percent between FY 2004 and FY 2010. This Program Element (PE) provides a major portion of the program funding to achieve this goal. The successful demonstration of the R-TOC program initiatives should stimulate additional initiatives by the Services to achieve even greater cost avoidances.

The OSD R-TOC program lead is OUSD(AT&L) Defense Systems, Systems Engineering, Deputy Director for Enterprise Development. This office is supported by the Institute for Defense Analyses (IDA). Individual R-TOC Project Management rests with the Services and their Project Managers. Each Service has an active R-TOC Point of Contact (POC) for the initial interface between OSD and the R-TOC Project Managers.

The FY 2006 initiatives require two years of funding through FY 2007. The remaining FY 2007 funding and out year funding has been grouped into three project areas: Reliability Improvements, Maintainability Improvements, and Supportability Improvements. These three areas have proven to be the highest payoff areas for cost reductions and corresponding increases in system readiness. The average Return on Investment (ROI) for these initiatives (based on discounted cash flow calculations) is approximately 13:1 with

$489 million in cost avoidance across the FYDP. The ROI is approximately 67:1 with $3.471 billion in cost avoidances across the life cycle of the affected systems. Through quarterly R-TOC Forums, best practices and lessons learned are shared across the Services to produce greater cost avoidances.

B. Program Change Summary: (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2004	FY 2005	FY 2006	FY2007
Previous President's Budget	0.000	27.351	25.145	25.159
Current FY 2005 President's Budget	0.000	0.000	24.824	24.896
Total Adjustments	+0.000	-27.351	-0.321	-0.263
Congressional program reductions		-27.351		
Congressional rescissions				
Congressional increases				
Reprogrammings				
SBIR/STTR Transfer				
Other			-0.321	-0.263

C. Other Program Funding Summary:

N/A

D. Acquisition Strategy:

There is an annual USD(AT&L) call for proposed project plans in December. Projects are submitted by the Services annually in January. The project plan format is provided with the call for submission of Service projects. Each project plan contains:

1. problem statement,
2. impact statement,
3. technical description,
4. risk analysis,
5. proposed phases,
6. expected deliverables and results or outcomes,
7. program management,
8. cost/benefit analysis,
9. schedule, and
10. implementation plan.

The project evaluation criteria are also provided as part of the call for use by the Services in arriving at their prioritized project list. There are eleven categories for evaluation:

Objective measures:

1. ROI (Future Years Defense Program), Score 10, 5, or 3 points, respectively for high (>10:1), medium (between 10:1 and 5:1), low (<5:1)
2. ROI (System's or Program's Life Cycle), Score 10, 5, or 3 points, respectively for high (>20:1), medium (between 20:1 and 10:1), low (<10:1)
3. Service ranking, Score 10, 5, 1 points, respectively for top 1/3, middle 1/3, and bottom 1/3
4. crossover year (return greater than investment), Score 5, 3, 1 points, respectively for <5 years, 3 years, >3 years
5. payback year (total return greater than total investment), Score 5, 3, 1 points, respectively for <4 years, 4 years, >4 years

Subjective measures:

1. operational readiness improvement, 10, 5, 1 points, respectively strong, medium, weak discussion of operational readiness improvements
2. benefits credibility, 5, 3, 1 points, respectively strong, medium, weak discussion of projected benefits
3. technology maturity, 3, 2, 1 points, respectively strong, medium, weak discussion of technology maturity
4. schedule confidence, 3, 2, 1 points, respectively strong, medium, weak discussion of schedule confidence
5. budget confidence, 3, 2, 1 points, respectively strong, medium, weak discussion of budget confidence
6. management support, 3, 2, 1 points, respectively strong, medium, weak discussion of management support

The Services receive project plans and make a Service priority ranking based on detailed analysis of each proposed initiative against the eleven evaluation criteria. This priority ranking is sent to the OSD lead. Upon acceptance and approval of the projects by OSD, the projects are briefed to the R-TOC Forum and Congressional staff, as required. Funding is distributed equally between the Services based on priority and the evaluation process results.

Upon final funding approval, MIPRs are prepared by OSD to transfer individual project funding to the appropriate funding sites. These funding sites are provided by the Services. After receiving the project funding, the Services are responsible for the funding and management of the projects. OSD retains oversight and direction of the R-TOC Initiative through the OSD lead office.

A quarterly project report (QPR) format has been defined, approved by the Services, and is required for each funded project. These reports require:

1. a statement of progress,
2. outstanding issues,
3. upcoming events,
4. schedule status,
5. current investment status, and
6. current estimate of savings or cost avoidance.

These QPRs are submitted to the OSD R-TOC Initiative lead office. OSD analyzes project status, progress and project statistics and informs the Service POCs of any project problems. Projects are also required to report verbally at the quarterly R-TOC Forums, as appropriate.

E. Performance Metrics:

The objective of each of the projects is the reduction of operations and support (O&S) costs for the affected systems. ROI is the primary performance metric for the projects and for the R-TOC initiative. Each project plan includes a cost/benefit analysis, which is based on discounted cash flow calculations of project investment costs and projected cost avoidances. OMB discount rates are used to provide real comparisons of future value against current uses of resources. Projected cost avoidances are based on engineering estimates of the benefits provided by project implementations. Sources of cost avoidances are defined as part of the project submittal and come from any O&S cost source (fewer spares, lower maintenance hours, faster turnaround times, reduced scheduled maintenance, etc.). Updated ROI calculations are part of the required quarterly project reports to provide tracking of this metric.

The average projected ROI for these projects (based on discounted cash flow calculations) is approximately 13:1 with $489 million in cost avoidance across the FYDP and approximately 67:1 with $3.471 billion in cost avoidance for the life cycle of the affected systems. Thus, the critical performance metric for this effort is the resulting O&S cost reductions. Gains in reliability, maintainability, supportability, and thus readiness are the by-products of the projects. Cost avoidances will be measured and tracked for each project, summed to the Service level, and totaled at the OSD level.

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2005	
Appropriation/Budget Activity RDT&E Defense Wide, BA 4				R-1 Item Nomenclature: Joint Electromagnetic Technology (JET) Program PE 0303191D8Z				
Cost ($ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total PE Cost	14.877	14.925	3.566	3.615	3.539	3.564	4.025	4.118

A. Mission Description and Budget Item Justification:

The JET Program supports the Defense Community in general with a particular emphasis on the requirements of Special Forces and Intelligence. Details of the program are classified. This program is funded under Budget Activity 4, Demonstration and Validation.

Program Accomplishments and Plans:

FY 2004 Accomplishments: ($14.877 million)

- Program planning and support.

FY 2005 Plans: ($14.925 million)

- Program planning and support.

FY 2006 Plans: ($3.566 million)

- Program planning and support.

FY 2007 Plans: ($3.615 million)

- Program planning and support

B. **Program Change Summary:** (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	14.877	6.679	6.751	6.860
Current President's Budget	14.877	14.925	3.566	3.615
Total Adjustments		8.246	-3.185	-3.245
Congressional program reductions				
Congressional rescissions, Inflation Adjustments		-0.354	-0.027	-0.029
Congressional increases		8.600	0.218	0.214
Reprogrammings				
Transfer			-3.376	-3.430

Change Summary Explanation:
FY2004: N/A
FY2005: Congressional Add 8.600 million; IT Reduction -0.046 million; General Reduction -0.093 million; FFRDC -0.067 million
CAAS -0.148 million.
FY 2006: Transfer to Air Force –3.376 million; Non-Pay Purchase Inflation 0.218 million; Contracting Support -0.027 million.
FY 2007: Transfer to Air Force –3.430 million; Non-Pay Purchase Inflation 0.214 million; Contracting Support -0.029 million.

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Performance Metrics:

- Numbers of operational field demonstrations.
- Numbers of false-positive results.
- Successful technology transfer to service component.
- Number of service requirements satisfied.