

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E/Defense Wide BA#1				R-1 Item Nomenclature: Government/Industry/Co-Sponsorship of University Research PE 0601111D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Total PE Cost	8.240	6.696	0.000	0.000	0.000	0.000	0.000	0.000
<p><b>A. Mission Description and Budget Item Justification:</b></p> <p>(U) Program is a shared commitment between industry and Government to sponsor next generation semiconductor electronics research via the Government/Industry Co-sponsorship of University Research (GICUR) program. It capitalizes on university-based research, education and training in technologies of strategic importance to national defense and also to industry. It provides an emphasis on ground-breaking research with a long-term horizon, and education and training in selected research areas which are vital to advancement of technologies. The commitment is a jointly formed pool of funding and a shared management structure for sponsoring this sort of long-term basic research at universities. This provides the military with leading-edge technologies as well as reduces vulnerabilities of industries involved, increases long-term technical growth in these areas, infuses new ideas and approaches, all of which are important for national security. Industry and government share responsibility for research focus area selection and overall direction. Mechanisms have been established for personnel exchange and interactions to provide for continuing education of highly qualified researchers already working in leading edge and emerging S&amp;T. One of the areas emphasizes basic concepts for DoD needs in high frequency applications such as radars, millimeter/microwave communications and radiometry, with special attention to devices fabricated from compound semiconductors, such as gallium arsenide.</p> <p><b>Program ends in FY 2004.</b></p>								

Exhibit R-2, RDT&E Budget Item Justification						Date February 2004	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 7				R-1 Item Nomenclature: Net Centricity PE 0305199D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost			214.222	216.015	219.464	231.226	236.086
Horizontal Fusion			206.422	207.815	210.864	222.126	226.586
GIG Evaluation Facility			7.800	8.200	8.600	9.100	9.500
<p><b>A. Mission Description and Budget Item Justification:</b>                      This program element will support information management and information technology activities focused on the development, integration and assessment of capabilities or applications in support of joint and coalition warfighter needs. Resources will support network-centric collaborative operations to improve situational awareness and operational planning efforts. This program is funded under Budget Activity 7, Operational System Development, because it supports engineering development of an RDT&amp;E program.</p> <p><b><u>Program Accomplishments and Plans:</u></b></p> <p>FY 2003 Accomplishments: N/A</p> <p>FY 2004 Plans: N/A</p> <p>FY 2005 Plans: (\$7.800 million)</p> <ul style="list-style-type: none"> <li>• Provides engineering, integration and hardware and fiber optic connectivity that are necessary to validate the performance for key transformational Communication programs.</li> <li>• Provides resources needed to test key systems in an end-to-end manner, including providing for ten system engineers, test-bed hardware, software and fiber optic connectivity at the Naval Research Laboratory and several other test locations in the U.S. The evaluation facility will be used to demonstrate interoperability of multiple Transformational Communications programs including the Joint Tactical Radio System (JTRS), Global Information Grid Bandwidth Expansion (GIG BE), Teleport, and the Transformation Communication Study (TCS). For these systems the lab would:                             <ul style="list-style-type: none"> <li>-Perform tests that physically demonstrate technical performance.</li> <li>-Provide an independent, overarching review of technology and interface standards.</li> <li>-Ensure technical issues are identified early and schedules synchronized to produce a jointly interoperable, timely</li> </ul> </li> </ul>							

and cost-effective architecture development.

-Prevent costly program reworks and restructuring, and more importantly, head off delays in providing joint warfighter connectivity.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget			-
Current BES			214.222
Total Adjustments			214.222
Congressional program reductions			
Congressional rescissions			
Congressional increases			206.422
Reprogrammings			
DERF Adds			
Program Increase			7.800

**Program Change Summary:**

FY 2005: Funding transferred from PE 0305190D8Z to PE 0305199D8Z to implement the restructuring of Defense Intelligence – 206.422 million, Program Decision Memorandum adjustment –7.800 million.

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy: N/A**

Exhibit R-2a, RDT&E Project Justification							Date: February 2004		
Appropriation/Budget Activity RDT&E, Defense-Wide, BA 7				Project Name and Number: Horizontal Fusion/0305199D8Z					
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009		
Project Name: Horizontal Fusion			200.122	204.615	209.264	220.496	224.925		
GWOT - Horizontal Fusion			6.300	3.200	1.600	1.630	1.661		
<b>A. Mission Description and Budget Item Justification:</b>									
<p>The Horizontal Fusion program overcomes acknowledged limitations in Joint Force operations caused by the inability to rapidly adjust plans and tactics for situational awareness while taking advantage of the explosion in battlefield intelligence and information sources such as advanced sensor equipped UAVs, improved Special Reconnaissance capabilities and ongoing developments and deployment of digitized support systems. The HF portfolio breaks with the platform-centric operations in favor of a more effective net-centric approach that provides increased capability to the edge of the network. Horizontal Fusion provides Joint Force Commanders and their Battle Staffs with needed capabilities for increasing the speed of Command of widely dispersed Joint Forces to operate against a wide range of threats and to support new methods of war fighting – emphasizing more rapid and effective integration of operational intelligence planning by providing operators on the edge with the applications and data access to effectively achieve situational awareness without latency and ensure that the entire chain of command can simultaneously view events as the unfold. This portfolio promotes a shortened timeline to implement the Global Information Grid (GIG) architecture and addresses capabilities to enable time sensitive, net-centric collaborative operations among operational and selected elements of a Coalition/Joint Task Force by examining existing intelligence community and DoD programs to determine how quickly they can be extended to a net-centric operational environment, how well they can exchange services and operate effectively together, and the impact it will have on the advancement of decision support capabilities for the battle-field commander and Communities of Interest. The ability to “customize” the information space to support specific operational needs represents a major improvement over systems that rely on single viewpoint, information push. Most of the program’s objectives are achievable via integration of commercially available leading edge capabilities for collaboration, information fusion and mission rehearsal. While these capabilities are largely commercial in nature, the interoperability and information security challenges presented will require new approaches to large-scale integration. The HF portfolio represents a comprehensive solution and encompasses the selection, procurement, and deployment of leading edge commercial IT components (hardware and software), security services, procedures and training. The program synchronizes and integrates evaluated IT into selected programs of platforms identified for their Joint operational value and compatibility with the Global Information Grid architecture. The portfolio will maintain an alignment with the Services objectives, integration initiatives and requirements issues but maintain an approach that values finding feasible solutions to the problems of net-centric warfare.</p>									
<b>Accomplishments/Planned Program</b>									

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	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost			206.442
RDT&E Articles Quantity *(as applicable)			
<p>FY 2003 Accomplishments: N/A</p> <p>FY 2004 Plans: N/A</p> <p>FY 2005 Plans:</p> <ul style="list-style-type: none"> <li>• Continue commercial technology investigation and evaluation</li> <li>• Continue net-centric implementation of GIG architecture</li> <li>• Coordinate with Combatant commanders for their attaching to “the net”</li> <li>• Continue expansion of sense-making tools (i.e., speech translation, multi-language translation, complex pattern recognition)</li> <li>• Continue to locate and incorporate information sources (both tactical and national for bi-lateral information sharing)</li> <li>• Continue to refine the HF environment and services (i.e., Collaboration tool suite interoperability)</li> <li>• Deliver additional enterprise services consistent with the Net Centric Enterprise System (NCES) activity</li> <li>• Leverage GIG Bandwidth expansion to refine information sharing and net-centric processes</li> <li>• Investigate ways of incorporating GIG-BE and Wide-band SATCOM proof-of-concept activities into the annual Horizontal Fusion demonstrations</li> <li>• Investigate and incorporate multiple end users platforms (low end – palm computing to high-end desktops and servers)</li> <li>• Investigate Secure Wireless technology to promulgate net-centric capability as far into the operational field as possible.</li> <li>• Continue to address streamlined security policy implementation with evaluation and testing of security technologies emphasizing cross-domain information exchange</li> <li>• Address tactics, techniques and procedures for net-centric operations within the Service schools and exercises</li> <li>• Continue to evaluate the parameters of the physical and logical edge of tactical data environments</li> </ul>			

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**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy.** N/A

**E. Major Performers:** DIA, DISA, NGA, NSA, NRO, ARMY Research Laboratory, Army HQ/G2, Navy CEC program, SPAWAR Support Center – Charleston, Pennsylvania State University Applied Research Laboratory, John Hopkins University Applied Physics Laboratory, Patrick AFB, Ft. Benning, GA, SOCOM, PACOM, CENTCOM, USFK, Ft. Bragg, Ft. Belvoir, USMC Quantico, JFCOM, STRATCOM, NATO, NGIC, Naval Research Laboratory, Hanscom AFB, CECOM, Department of State, Office of Naval Research, Wright Patterson AFB, INSCOM

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 7				R-1 Item Nomenclature: TECHNOLOGY DEVELOPMENT PE 0305191D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	225.789	245.536					
<p><b>A. Mission Description and Budget Item Justification:</b></p> <p>Technology Development is a classified program. Program details are provided in the classified Congressional Justification Book. This program is funded under Budget Activity 7, Operational System Development because it supports intelligence efforts that involve engineering development.</p> <p><b><u>FY 2003 Accomplishments:</u></b></p> <ul style="list-style-type: none"> <li>Mission Support \$225.789 million</li> </ul> <p><b><u>FY 2004 Accomplishments:</u></b></p> <ul style="list-style-type: none"> <li>Mission Support \$245.536 million</li> </ul> <p><b><u>FY 2005 Plans:</u></b></p> <ul style="list-style-type: none"> <li>Not applicable</li> </ul>							

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**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	120.458	249.152	106.598
Current BES/President's Budget	225.789	245.536	0
Total Adjustments	105.331	- 3.616	-106.598
Congressional program reductions	-3.231	- 3.616	
Congressional rescissions, inflation	-1.938		
Congressional increases			
Reprogrammings			
DERF Transfer	110.500		

**Change Summary Explanation:**

FY 2003: Non-pay purchase inflation adjustments -1.938; Congressional program reductions -3.231; DERF Transfer +110.500

FY 2004: Congressional program reductions -3.616

FY 2005: Program transferred to the Air Force

**C. Other Program Funding Summary:** Not Applicable

**D. Acquisition Strategy.** Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 7				R-1 Item Nomenclature: C3I Intelligence Programs PE 0305190D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	106.672	130.178					
Horizontal Fusion	62.601	127.320					
C3I Intelligence Program Support	44.071	2.858					
<p><b>A. Mission Description and Budget Item Justification:</b>                      This program element supports intelligence activities focused on the development, integration and assessment of systems or applications in support of non-traditional and contingency warfare. Resources will also support network-centric collaborative operations to improve situational awareness and operational-intelligence planning efforts. This program is funded under BA-7, Operational Systems Development, because it supports intelligence efforts that involve engineering development.</p> <p><u>FY 2003 Accomplishments: (\$44.071 million)</u></p> <p><u>Project Picket Fence</u></p> <ul style="list-style-type: none"> <li>• Provided support for Picket Fence initiatives.</li> </ul> <p><u>JTF-CNO Joint Threat Incident D/B</u></p> <ul style="list-style-type: none"> <li>• Provided limited capability for the cataloging of specific foreign Computer Network Operations threats to DoD's command and control infrastructure.</li> <li>• Produced intelligence reports on computer network attacks against US systems.</li> <li>• Provided overall incident assessments analyzed within the context of operationally relevant information from affected commands.</li> <li>• Supported the development of appropriate response options and detailed courses-of-action in defense of protected networks.</li> </ul> <p><u>GWOT - Information Operations (IO-21, EW Improvements)</u></p> <ul style="list-style-type: none"> <li>• Advanced electronic attack capabilities to detect, isolate and attack selected C2 and information systems.</li> <li>• Advanced technologies to derive targeting quality locations.</li> <li>• Advanced testing and training to conduct EW test and evaluation, mission data software optimization, mission rehearsal.</li> <li>• Improved missile flyout models/simulations, post mission data processing, and integrating new threat systems with test range.</li> </ul> <p><u>GWOT - Information Operations (IO-14, Pre-Conflict Management)</u></p>							

- Developed methods of anticipating potential conflicts and tools to determine effective courses of action.
  - Identify potential alternatives that could preclude or reduce the likelihood of an event.
  - Identify potential alternatives that could reduce the intensity and/or duration of potential conflict.
- Developed a CONOPS for Interagency participation in conflict avoidance.

GWOT - HDBT

- Provided secure communication and collaboration services between and among the Defense Intelligence components and some private sector and academia partners to develop these targets.
- Developed new analytical, data mining, and target visualization tools to characterize targets.
- Developed new sources and methods of intelligence collection, research and analysis, and production.
- Augment traditional intelligence sources and methods with subject matter experts as required (e.g. micro tunneling, hydrologic engineering, spoil/tailing spectroscopy/hyper spectral analysis, etc.)

GWOT - CENTRIX

- Established a combined network control center providing secure coalition information sharing connectivity between Combatant Commanders.
- Established virtual private network for coalition partner use in maritime interdiction operations in support of GWOT.
- Initiated certification and accreditation efforts for secure coalition information networks.

FY 2004 Plans: (\$2.858 million)

GWOT - CENTRIX

- Provides for development of multi-level thin client solution needed for ships and air operations centers.
- Implements improved metadata tagging and search capabilities on coalition information sharing networks
- Provides for completion of CENTRIXS network interoperability certification.

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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	106.779	132.094	191.645
Current BES/President's Budget	106.672	130.178	-

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Total Adjustments	-107	-1.916	-191.645
Congressional program reductions			
Congressional rescissions, inflation adjustments	-107	-1.916	
Congressional increases			
Reprogrammings			-191.645
Change Summary Explanation:			
FY 2003: Inflation reduction -.107 million.			
FY 2004: FFRDC Reduction -.513 million; Management Improvements -.280 million; Management Efficiencies -1.123 million.			
FY 2005: Realigned to ASD(NII) PE 0305199D8Z to implement restructuring of Defense Intelligence -191.645 million.			
C. Other Program Funding Summary: N/A			
D. Acquisition Strategy: N/A			

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Exhibit R-2a, RDT&E Project Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E.A BA # 7				Project Name and Number: Horizontal Fusion/ 0305190D8Z C3I Intelligence Programs			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project Name: Horizontal Fusion	57.001	22.787					
GWOT - Horizontal Fusion	5.600	4.533					
<p><b>B. Mission Description and Budget Item Justification:</b> The Horizontal Fusion program overcomes acknowledged limitations in Joint Force operations caused by the inability to rapidly adjust plans and tactics for situational awareness while taking advantage of the explosion in battlefield intelligence and information sources such as advanced sensor equipped UAVs, improved Special Reconnaissance capabilities and ongoing developments and deployment of digitized support systems. The HF portfolio breaks with the platform-centric operations in favor of a more effective net-centric approach that provides increased capability to the edge of the network. Horizontal Fusion provides Joint Force Commanders and their Battle Staffs with needed capabilities for increasing the speed of Command of widely dispersed Joint Forces to operate against a wide range of threats and to support new methods of war fighting – emphasizing more rapid and effective integration of operational intelligence planning by providing operators on the edge with the applications and data access to effectively achieve situational awareness without latency and ensure that the entire chain of command can simultaneously view events as the unfold. This portfolio promotes a shortened timeline to implement the Global Information Grid (GIG) architecture and addresses capabilities to enable time sensitive, net-centric collaborative operations among operational and selected elements of a Coalition/Joint Task Force by examining existing intelligence community and DoD programs to determine how quickly they can be extended to a net-centric operational environment, how well they can exchange services and operate effectively together, and the impact it will have on the advancement of decision support capabilities for the battle-field commander and Communities of Interest. The ability to “customize” the information space to support specific operational needs represents a major improvement over systems that rely on single viewpoint, information push. Most of the program’s objectives are achievable via integration of commercially available leading edge capabilities for collaboration, information fusion and mission rehearsal. While these capabilities are largely commercial in nature, the interoperability and information security challenges presented will require new approaches to large-scale integration. The HF portfolio represents a comprehensive solution and encompasses the selection, procurement, and deployment of leading edge commercial IT components (hardware and software), security services, procedures and training. The program synchronizes and integrates evaluated IT into selected programs of platforms identified for their Joint operational value and compatibility with the Global Information Grid architecture. The portfolio will maintain an alignment with the Services objectives, integration initiatives and requirements issues but maintain an approach that values finding feasible solutions to the problems of net-centric warfare.</p>							

<b>Accomplishments/Planned Program</b>				
	FY 2003	FY 2004	FY BY <sup>1</sup>	FY BY <sup>2</sup>
Accomplishment/ Effort/Subtotal Cost	57.001	122.787		
GWOT – Horizontal Fusion	5.600	4.533		
<p>FY 2003 Accomplishments:</p> <ul style="list-style-type: none"> <li>Improved situational awareness by deploying the prototype collateral information space to establish and manage common data holdings for Combatant Command warfighter and intelligence analysts using the Intelligence Community System for Information Sharing (ICSIS).</li> <li>Prototyped initial set of net-centric horizontal fusion services to enable warfighters to achieve improved situational awareness by faster access to data.</li> <li>Integrated "edge applications" to enable imagery, networked language translation and sense making capabilities into selected warfighting C2 systems.</li> <li>Completed the initial design and development leading to the ability to post weapons system surveillance and reconnaissance data on the Global Information Grid (GIG).</li> <li>Selected a set of best of breed" fusion algorithms to support net-centric intelligence fusion and time sensitive targeting of hard targets.</li> <li>Conducted initial set of technology trade studies under "EdgeWarrior" leading to a tactical fusion capability for small SOF units of action and integration into the Army's Future Combat System (FCS).</li> </ul> <p>FY 2004 Plans:</p> <ul style="list-style-type: none"> <li>Expand number of populated COI's within the HF environment (i.e., Coalition, HLS/D, etc.)                             <ul style="list-style-type: none"> <li>Expand number of ISR collection platforms that provide tactical data feeds into the HF environment (air, ground, marine. etc.)</li> <li>Improve ISR/NTM interoperability and cross-functional operational processes at the JTF and below level</li> <li>Refine and add capability to edge applications/tools</li> <li>Identify and incorporate other applications to further enable information sense making</li> <li>Continue assessment of security policy implementation and possible solutions for MLS/MSL utilizing commercially available tools.</li> <li>Expand set of enterprise services provided to the users/COI's/applications</li> <li>Expansion of fusion algorithms to address all intelligence data feeds</li> </ul> </li> </ul>				

- Investigate commercially available products for secure wireless communications
- Investigate participation in DoD and Service live-fire and exercise events.

**C. Other Program Funding Summary:** N/A

Acquisition Strategy.

**E. Major Performers:** DIA, DISA, NIMA, NSA, NRO, ARMY Research Laboratory, Army HQ/G2, Navy CEC program, SPAWAR Support Center – Charleston, Pennsylvania State University Applied Research Laboratory, John Hopkins University Applied Physics Laboratory, Patrick AFB, Ft. Benning, GA, SOCOM

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 7				R-1 Item Nomenclature: Defense Joint Counterintelligence Program PE 0305146D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	66.500	30.312					
Counterintelligence Field Activity	66.500	12.744					
Joint Threat Incident Database	0	.830					
Horizontal Fusion	0	16.738					

**A. Mission Description and Budget Item Justification:** This program element includes resources that protect Defense critical technology, critical infrastructure, personnel, and operations from foreign intelligence service, terrorist, and other covert or clandestine threats.

**B. Program Change Summary:**

	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>
Previous President's Budget	66.508	6.482	18.592
Current BES/President's Budget	66.500	30.312	0
Total Adjustments	-.008	23.830	-18.592
Congressional program reductions			
Congressional rescissions, inflation	-.008		
Congressional increases			
Reprogrammings		23.830	-18.592

**Change Summary Explanation:**

FY2003: Inflation adjustment -.008 million

FY2004: .830 million for Joint Threat Incident Database, \$16.738 million for Horizontal Fusion

FY2005: Transfer out to program element 0305199D8Z

**C. Other Program Funding Summary:** Not applicable

**D. Acquisition Strategy:** Not applicable

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>							Date: February 2004
Appropriation/Budget Activity RDT&E,DW BA 7				Project Name and Number: Defense Joint Counterintelligence Program (PE 0305146DZ)			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Counterintelligence Field Activity (CIFA)	66.500	12.744	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Quantity	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<p><b>Mission Description and Budget Item Justification:</b> The CIFA is a Defense Counterintelligence risk assessment activity that supports the protection of Defense critical technologies, critical information infrastructure, personnel, and operations from foreign intelligence service, terrorist, and other covert or clandestine threats. Functions include top-level horizontal CI threat, vulnerability and operational assessments in support of DoD CI elements identifying and neutralizing foreign intelligence espionage as well as DoD CI elements that are helping to protect forces and critical infrastructures. Because these missions are dependent on the latest technology this effort uses leading edge information technologies and data harvesting and storage capabilities to support tactical, operational, and strategic risk and threat assessments.</p>							
<b>B. Accomplishments/Planned Program</b>							
	FY 2003	FY 2004	FY 2005				
Accomplishment/ Effort/Subtotal Cost	66.500	12.744	0.000				
RDT&E Articles Quantity	N/A	N/A	N/A				
<p>FY 2003 Accomplishments:</p> <ul style="list-style-type: none"> <li>- Fielded the Advanced Analytic Center, which consolidated lessons learned from the JCAG Analytic Center and spiral new technologies, capabilities, and data sources into an Advanced Information System.</li> <li>- Established the CI Operations Center in Colorado Springs, as a compliment to the Advanced Analytic Center and as a key support facility in case of emergency.</li> <li>- Continued support to FTTTF with additional and improved analytic and storage capabilities and infrastructure.</li> <li>- Continued Technology/Operations Beta site activities which provided the capability to assess, integrate, and test the applicability of commercial and government technologies that supported the CIFA mission, and provided to the analysts the ability to evaluate potential analytical tools and evolve analytical processes.</li> <li>- Provided support to the CI community in the areas of exploiting commercial data from 200 million container data, digitizing all CI and investigative files for exploitation (AFOSI), specialized analysis in regard to state-sponsored terrorism (JS/J2-CI), supporting FIS-related task force (FBI-DIA-OSI-NSA-NCIX-DoC-Army), WMD Asymmetric Threat Options Analysis (NCIS), suspicious reporting, law enforcement, and counterintelligence threat analyses (JS/J34 and HLS), DoD foreign visitor tracking system (Cornerstone), DoD offensive counterespionage operations analyses, and assisting in identification and definition of Critical</li> </ul>							

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National Assets.

FY 2004 Accomplishments:

- Design, develop, test, and field the CIFA Collaboration and Data Storage Center between and among the Defense Intelligence components, private sector, and academia partners.
- Continue to provide support to the CI community in the areas of exploiting commercial data from 200 million container data, digitizing all CI and investigative files for exploitation (AFOSI), specialized analysis in regard to state-sponsored terrorism (JS/J2-CI), supporting FIS-related task force (FBI-DIA-OSI-NSA-NCIX-DoC-Army), WMD Asymmetric Threat Options Analysis (NCIS), suspicious reporting, law enforcement, and counterintelligence threat analyses (JS/J34 and HLS), DoD foreign visitor tracking system (Cornerstone), DoD offensive counterespionage operations analyses, and assisting in identification and definition of Critical National Assets.

FY 2005 Plans: N/A

**C. Other Program Funding Summary:**

To

Total

<u>Complete</u>	<u>Cost</u>	<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>
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Not applicable

**D. Acquisition Strategy.** The JCAG program follows a Systems Development Life Cycle methodology using existing GSA and DoD contract vehicles to ensure schedule, budget, technology insertion and risk mitigation goals are met.

**E. Major Performers:**

- DoD Data Analysis and Engineering Contract, Harris Technical Services Corporation, Alexandria, VA, provides analysis of all source data and provides system design support to the data analysis function.
- Gray Hawk Systems, Inc., Alexandria, VA, provides Systems Engineering and Technical Assistance (SETA).
- SYtex Inc., Doylestown, PA, provides systems development and engineering support, and Threat Analysis support.
- Oracle Inc., Bethesda, MD, provides technical research, development, and test support.
- White Oak Technologies, Silver Spring, MD, provides data harvesting and extraction support
- MZM Inc., provides data acquisition and storage support
- UNISYS Inc., provides technical exploration and development support

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>					Date: February 2004		
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Appropriation/Budget Activity RDT&E,DW BA 7				Project Name and Number: Defense Joint Counterintelligence Program (PE 0305146DZ)			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Horizontal Fusion	0	16.738	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Quantity	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**A. Mission Description and Budget Item Justification:** The Horizontal Fusion program overcomes acknowledged limitations in Joint Force operations caused by the inability to rapidly adjust plans and tactics for situational awareness while taking advantage of the explosion in battlefield intelligence and information sources such as advanced sensor equipped UAVs, improved Special Reconnaissance capabilities and ongoing developments and deployment of digitized support systems. The HF portfolio breaks with the platform-centric operations in favor of a more effective net-centric approach that provides increased capability to the edge of the network. Horizontal Fusion provides Joint Force Commanders and their Battle Staffs with needed capabilities for increasing the speed of Command of widely dispersed Joint Forces to operate against a wide range of threats and to support new methods of war fighting – emphasizing more rapid and effective integration of operational intelligence planning by providing operators on the edge with the applications and data access to effectively achieve situational awareness without latency and ensure that the entire chain of command can simultaneously view events as the unfold. This portfolio promotes a shortened timeline to implement the Global Information Grid (GIG) architecture and addresses capabilities to enable time sensitive, net-centric collaborative operations among operational and selected elements of a Coalition/Joint Task Force by examining existing intelligence community and DoD programs to determine how quickly they can be extended to a net-centric operational environment, how well they can exchange services and operate effectively together, and the impact it will have on the advancement of decision support capabilities for the battle-field commander and Communities of Interest. The ability to “customize” the information space to support specific operational needs represents a major improvement over systems that rely on single viewpoint, information push. Most of the program’s objectives are achievable via integration of commercially available leading edge capabilities for collaboration, information fusion and mission rehearsal. While these capabilities are largely commercial in nature, the interoperability and information security challenges presented will require new approaches to large-scale integration. The HF portfolio represents a comprehensive solution and encompasses the selection, procurement, and deployment of leading edge commercial IT components (hardware and software), security services, procedures and training. The program synchronizes and integrated evaluated IT into selected programs of platforms identified for their Joint operational value and compatibility with the Global Information Grid architecture. The portfolio will maintain an alignment with the Services objectives, integration initiatives and requirements issues but maintain an approach that values finding feasible solutions to the problems of net-centric warfare.

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<b>B. Accomplishments/Planned Program</b>									
	FY 2003	FY 2004	FY 2005						
Accomplishment/ Effort/Subtotal Cost	0	16.738	0.000						
RDT&E Articles Quantity	N/A	N/A	N/A						
FY 2003 Accomplishments: Not applicable									
FY 2004 Accomplishments: <ul style="list-style-type: none"><li>- Improved ISR/NTM interoperability and cross-functional operational processes at the JTF and below level</li><li>- Expanded fusion of algorithms to address all intelligence data feeds</li><li>- Investigated participation in DoD and Service live-fire and exercise events</li></ul>									
FY 2005 Plans: Not applicable									
<b>C. Other Program Funding Summary:</b>									
		To	Total						
<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>Complete</u>	<u>Cost</u>
Not applicable									
<b>Acquisition Strategy.</b> Not applicable.									

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<b>Exhibit R-2a, RDT&amp;E Project Justification</b>					Date: February 2004																																			
Appropriation/Budget Activity RDT&E,DW BA 7				Project Name and Number: Defense Joint Counterintelligence Program (PE 0305146DZ)																																				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009																																	
Joint Threat Incident Database	0	.830	0.000	0.000	0.000	0.000	0.000																																	
RDT&E Articles Quantity	N/A	N/A	N/A	N/A	N/A	N/A	N/A																																	
<p><b>A. Mission Description and Budget Item Justification:</b> Funds provide intelligence support efforts for the JTF-CNO Joint Threat Incident Database, which assists in the development of appropriate response options and detailed course of actions in defense of protected networks. Details are provided in the Congressional Justification Book.</p> <p><b>B. Accomplishments/Planned Program</b></p> <table border="1"> <thead> <tr> <th></th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> </tr> </thead> <tbody> <tr> <td>Accomplishment/ Effort/Subtotal Cost</td> <td align="center">0</td> <td align="center">.830</td> <td align="center">0.000</td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td align="center">N/A</td> <td align="center">N/A</td> <td align="center">N/A</td> </tr> </tbody> </table> <p><b>FY 2003 Accomplishments:</b> Not applicable</p> <p><b>FY 2004 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Cataloged limited sets of foreign CNO specific threat information to DoD's command and control infrastructure, to include intentions and capabilities.</li> <li>- Produced intelligence reports on computer network attacks against US systems.</li> <li>- Provided overall incident assessments analyzed within the context of operationally relevant information from affected commands.</li> <li>- Drove development of appropriate response options and detailed courses of action in defense of protected networks.</li> </ul> <p><b>FY 2005 Plans:</b> Not applicable</p> <p><b>C. Other Program Funding Summary:</b></p> <table border="0"> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>To</td> <td>Total</td> </tr> <tr> <td></td> <td><u>FY02</u></td> <td><u>FY03</u></td> <td><u>FY04</u></td> <td><u>FY05</u></td> <td><u>FY06</u></td> <td><u>FY07</u></td> <td><u>FY08</u></td> <td><u>FY09</u></td> <td><u>Complete</u></td> <td><u>Cost</u></td> </tr> </table> <p>Not Applicable</p> <p><b>D. Acquisition Strategy.</b> Not Applicable</p> <p><b>E. Major Performers:</b> Northrop Grumman/TASC, Lorton, VA.</p>									FY 2003	FY 2004	FY 2005	Accomplishment/ Effort/Subtotal Cost	0	.830	0.000	RDT&E Articles Quantity	N/A	N/A	N/A									To	Total		<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>Complete</u>	<u>Cost</u>
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Accomplishment/ Effort/Subtotal Cost	0	.830	0.000																																					
RDT&E Articles Quantity	N/A	N/A	N/A																																					
								To	Total																															
	<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>Complete</u>	<u>Cost</u>																														

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE				
RDT&E, Defense Wide BA-7					0305125D8Z/CRITICAL INFRASTRUCTURE PROTECTION (CIP)				
COST (\$ in Millions)	FY 03*	FY 04*	FY 05	FY 06	FY 07	FY 08	FY 09	Cost to Complete	Total Cost
Total PE Cost	0	2.023	28.021	11.108	11.952	12.214	12.474	Continues	Continues
Critical Infrastructure Protection	0	2.023	28.021	11.108	11.952	12.214	12.474	Continues	Continues

\* Previous funding in the Navy RDT&E. This is not a new start.

A. Mission Description and Budget Item Justification

The DoD Critical Infrastructure Protection (CIP) program encompasses the identification of assets critical to DoD missions, vulnerability/risk assessment of critical Department of Defense (DoD) assets, and ensuring continued service of critical assets via remediation, mitigation, and emergency response.

The CIP program will conduct focused research to fully implement the capability to consistently identify critical COCOM assets; determine operational impacts of their loss; track the interdependencies of Defense Infrastructures (DI); assess vulnerabilities of critical assets; recommend courses for mitigation of vulnerabilities; exchange asset and criticality data; and combine these efforts into a standardized architecture for the DoD CIP program.

The CIP program's key requirements are: the establishment of consistent guidance, direction, and training related to CIP Analysis and Assessment (A&A); continued support of the Joint Chiefs of Staff (JCS) mandated Combatant Commander identification of critical missions/capabilities; establishment and operation of the CIP Common Operational Picture (COP) throughout DoD world-wide; establishment of CIP focused vulnerability assessments to be called "Full Spectrum Vulnerability Assessments" (FSVA); testing FSVA CONUS and OCONUS; documenting CIP A&A processes and procedures; and the inclusion of the Defense Industrial Base in the CIP program.

B. Program Change Summary:

Change Summary Explanation: This program is not a new start. The difference in funding from the President's Budget PB04 and PB05 reflect the change of sponsorship from the Navy to the ASD(HD) per the Secretary of Defense direction.

	FY 2003	FY 2004	FY 2005
Previous President's Budget	0	0	0
Current President's Budget	0	2.023	28.021
Total Adjustments:	0	2.023	28.021
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR Transfer			
Other		2.023	28.021

Exhibit R-2a, RDT&E Project Justification								Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT		PROJECT NAME AND NUMBER				
RDT&E, D BA-7 Operational Systems Development			0305125D8Z		CRITICAL INFRASTRUCTURE PROTECTION				
Cost (\$ in Millions)	FY 03*	FY 04*	FY 05	FY 06	FY 07	FY 08	FY 09	Cost to Complete	Total Cost
Critical Infrastructure Protection	0	2.023	28.021	11.108	11.952	12.214	12.474	Continues	Continues
* Previous funding in the Navy RDT&E. This is not a new start.									
A. Mission Description and Budget Item Justification									
<u>FY 03 JUSTIFICATION</u> N/A									
FY03 efforts are funded with Navy resources. Assistant Secretary of Defense (Homeland Defense) became the sponsor for these activities in September 2003. The CIP Program funding will be fully transitioned in FY05.									
<u>FY 04 JUSTIFICATION:</u>									
FY04 efforts are funded with Navy resources. Assistant Secretary of Defense (Homeland Defense) became the sponsor for these activities in September 2003. The CIP Program funding will be fully transitioned in FY05.									
(U) (\$1.016) CIP OPERATIONAL SUPPORT (CRISES MANAGEMENT):									
The program requires a capability to field, staff, and/or operate CIP/Mission Assurance-related crises management response operations centers. These operation centers can be expected to require support 24 hours per day/7 days a week during periods of crises management. The program will develop and maintain the capability to ensure that a dedicated CIP/Mission Assurance-focused operations center is capable of 24/7 operations for periods required by the program. The program will support the manning and operations of key operations centers, e.g., the Executive Support Center (ESC), in order to ensure that key leaders have access to CIP/Mission Assurance-related completed analysis. To ensure that appropriate non-DoD intelligence information is available to CIP/Mission Assurance Operations Centers, and to support ASD(HD) directed operations, exercises, and events, the program will liaise with appropriate non-DoD homeland security organizations, as directed to the program office by the ASD(HD) and Joint Staff.									
• (U) (\$1.007) OPERATIONAL SUPPORT (DAY TO DAY):									
The program will develop and maintain the capability to ensure that a designated CIP/Mission Assurance Operations Center (MAOC) is staffed and equipped for 8/5 receipt of operational taskings, action tracking of CIP workload, and information exchanges. To support "Drill of the Day", the program will respond to CIP/Mission Assurance (MA)-related information requests on a timely, effective basis. This requirement directly supports the ASD(HD), Joint Staff, and other designated organizations, ability to obtain quick response, accurate infrastructure analysis, assessment, status, and CIP relationships to emerging threat information.									
<u>FY 05 JUSTIFICATION</u>									
• (U) (\$5.604) COMBATANT COMMAND MISSION CHARACTERIZATION:									
The program office will continue the development and maintenance of the capability to perform Mission Area Analysis (MAA) for all Combatant									

## Exhibit R-2a, RDT&amp;E Project Justification

Date: February 2004

Commanders (CC), ensure the MAA processes will accommodate differences in CC areas of responsibility (AOR) and planning processes, and will focus on identifying the mission assets critical to performance of CC missions, operations, or taskings. Initial identification of combatant commander critical missions/capabilities will be completed in FY04. Focus in FY05 will be institutionalization of CIP MAA throughout DoD with formal approval by Joint Staff and ASD(HD). Defense Infrastructure (DI) sector characterization in support of MAA for CC's and DI Analysis and Assessment (A&A) will be formalized and instituted throughout DoD DI lead agencies. DI characterizations will be expanded to encompass services, components and component commands supporting CIP. Additionally, characterization of Defense Industrial Base (DIB) functions, systems and assets will be substantively performed in FY05. Commercial Infrastructure (CI) A&A will be performed in accordance with (IAW) program office tasking for (1) designated on-site assessments, (2) designated National Security Special Events, (3) taskings from or validated by the ASD(HD), (4) requests from CC, and (5) quick response taskings. Identification of the interdependencies of military assets, intra- and inter-dependencies of DoD sector/supporting assets, and commercial infrastructure assets will be developed and applied to CIP taskings. CIP A&A will focus on deriving impacts to DoD mission and will fully integrate CC, DI, installation, and CI critical asset disruption impacts for all taskings relative to military missions. Discrete remediation and response measures will be identified for all vulnerabilities identified. All CIP A&A results, remediation and response measures will be entered in the appropriate databases CIP databases.

- (U) (\$8.406) DEVELOP AND APPLY CIP VULNERABILITY/RISK ASSESSMENTS (V/RA):

The CIP program will implement standards for CIP FSVA. The program will initiate the application of (1) detailed standards for the full range of scaleable CIP FSVA, (2) CIP FSVA to DoD critical assets, (3) an ASD(HD) CIP FSVA Instruction, and (4) CIP FSVAV/RA users manual for training and certification of CIP assessment teams. CIP FSVA participants will be trained and certified to perform CIP FSVA. CIP FSVA will be performed IAW a scaleable assessment capability that permits less-than-full-up assessments to be performed with smaller teams and in shorter timeframes, and in greater quantity than full-up CIP FSVA. FY05 capability of all assessment teams to perform CIP FSVA will be not less than 40, and not more than 60, CIP FSVA per year. Additional CIP FSVA capability will be provided thru O&M funding. The program will manage and maintain the DoD CIP Vulnerability Assessment Catalog (VAC) to encompass inclusion of all assessments applicable to CIP. The program office will manage the CIP FSVA scheduling, assignment, performance, completion, information exchange, and customer response to ensure quality control of CIP V/RA products, services, and data exchange.

- (U) (\$2.802) CIP INDICATIONS AND WARNING (I&W):

The program requires the development of methods and information exchange systems to assess appropriate threat/intelligence information and will therefore establish on-going, working relationships with DoD and non-DoD INTEL organizations as well as exchange protocols with INTEL organizations. The program office will continue the establishment of the ASD(HD) mandated CIP I&W or monitoring and reporting (M&R) capability. This capability must (1) support daily infrastructure threat analysis and trend monitoring for the program and ASD(HD), Joint Staff and other designated users and, (2) ensure that threat analysis, either developed by appropriate DoD or non-DoD intelligence organizations, is included in CIP operational decision support.

- (U) (\$1.401) CIP OPERATIONAL SUPPORT (CRISES MANAGEMENT):

The program requires a capability to field, staff, and/or operate CIP/Mission Assurance-related crises management response operations centers. These operation centers can be expected to require support 24 hours per day/7 days a week during periods of crises management. The program will develop and maintain the capability to ensure that a dedicated CIP/Mission Assurance-focused operations center is capable of 24/7 operations for periods required by the program. The program will support the manning and operations of key operations centers, e.g., the Executive Support Center (ESC), in

order to ensure that key leaders have access to CIP/Mission Assurance-related completed analysis. To ensure that appropriate non-DoD intelligence information is available to CIP/Mission Assurance Operations Centers, and to support ASD(HD) directed operations, exercises, and events, the program will liaise with appropriate non-DoD homeland security organizations, as directed to the program office by the ASD(HD) and Joint Staff.

- (U) (\$1.401) OPERATIONAL SUPPORT (DAY TO DAY):

The program will develop and maintain the capability to ensure that a designated CIP/Mission Assurance Operations Center (MAOC) is staffed and equipped for 8/5 receipt of operational taskings, action tracking of CIP workload, and information exchanges. To support “Drill of the Day”, the program will respond to CIP/Mission Assurance (MA)-related information requests on a timely, effective basis. This requirement directly supports the ASD(HD), Joint Staff, and other designated organizations, ability to obtain quick response, accurate infrastructure analysis, assessment, status, and CIP relationships to emerging threat information.

- (U) (\$5.043) STANDARDIZED CIP ARCHITECTURE:

CIP systems architecture development and documentation is essential to ensure that all appropriate CIP data, data exchange, data brokering, and results reporting meets valid, documented requirements and meets CIP interoperability goals. The program will establish a comprehensive systems architecture strategy, concept of operations (ConOps), and implementation plan for CIP systems architecture. The program will ensure that the DoD Information Technology Security Certification and Accreditation Process (DITSCAP) certification and accreditation requirements are met for all CIP systems and architecture. The program office will maintain the capability to perform and coordinate brokering of relevant infrastructure/CIP data with DoD and non-DoD, government and private organizations. The program office will serve as the DoD data brokering agent for CIP-related data and/or information. The program will (1) further develop CIP databases in support of program requirements, (2) establish and maintain configuration management of all CIP data/databases controlled by the program, and (3) integrate the CIP Mission Assurance Asset Database (MAAD) into CIP systems architecture. The program office will acquire and maintain CIP databases, systems, and connectivity. For a consistent, reliable information system presenting a Common Operating Picture (COP) for the CIP/MA community, development of the "CIP COP"/"HD MAP" and configuration management and change control will continue.

- (U) (\$1.961) COORDINATION AND INTEGRATION OF CIP R&D:

Integrated requirements determination will be achieved by (1) identifying CC requirements related to CIP, including R&D requirements, (2) working with appropriate DoD elements to obtain CIP-related requirements information, and (3) communicating these DoD requirements R&D proposals for funding consideration. The program will conduct technical evaluations of CIP-related R&D proposals (formal and informal). New CIP-related concepts will continue to be evaluated and developed. Areas of focus for new concept development will be (1) military mission assurance, (2) commercial infrastructure mission assurance, (3) vulnerability assessment tools and methods, (4) MIS, (5) GIS, (6) decision support systems, (7) CIP-focused operations centers, (8) CIP/asymmetrical threat analysis and assessment, (9) new techniques for mitigation, remediation, and response to infrastructure disruptions, (10) infrastructure threat red teaming, and (11) multi-level security systems for advanced information sharing. R&D related to CIP/MA will be appropriately tracked and reported. The program will engage in information gathering and regular reporting of CIP/MA-related R&D. The program must engage, through appropriate security channels, with DoD special programs to ensure that “special technologies” developments are known and included in CIP planning and activities. The nature of “special programs” and “special technologies countermeasures” requires that R&D and countermeasures developments be appropriately classified. The program office will ensure that such development is appropriately integrated with other CIP/MA development.



• (U) (\$1.403) METHODOLOGY DEVELOPMENT AND DOCUMENTATION:

The program must continue to (1) further develop CIP A&A methodologies, processes, procedures, tools, and models, (2) update documentation of all A&A methodologies, processes, procedures, tools, and models development, (3) maintain configuration control of all CIP documentation, and (4) perform continuing experimentation to refine, improve, and validate CIP A&A methodologies, processes, procedures, tools, and models. In addition to CIP A&A, the program must (1) ensure the consistent application of CIP response methodologies, processes, and procedures, (2) document CIP response methodologies, processes, and procedures, and (3) incorporate appropriate CIP response methodologies, processes, and procedures in ongoing CIP work.

B. Other Program Funding Summary: Funding provided to the DPO-MA (formerly JPO-STC) to support continued development of the capability to provide Combatant Commanders, military services and DoD mission planners with the ability to assess their infrastructure dependencies and interdependencies and the potential impact on military operations resulting from disruptions to key infrastructure components.

Defense Emergency Response Funding (DERF) was provided to identify mission critical infrastructure assets; coordinate critical infrastructure analysis, assessment, and protection recommendations; accelerate development of methods and technologies to continuously assess asset and infrastructure health; and accelerate development of a CIP Common Relevant Operation Picture visualization capability.

	<u>FY02</u>	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>FY06</u>	<u>FY07</u>	<u>FY08</u>	<u>FY09</u>	<u>TO COMPLETE</u>
RDT&E,N P.E. 0603235N	15.0	6.5	12.2						
RDT&E,N P.E. 0603734N	20.2	13.1	10.2						
RDT&E,N P.E. 0605116D	1.3	6.7							
Defense Emergency Response Fund DERF	7.4								

C. Acquisition Strategy: N/A

## D. Schedule Profile:

	<u>FY03</u>	<u>FY04</u>	<u>FY05</u>	<u>TO COMPLETE</u>
<u>Infrastructure Assurance</u>				
CONUS Locations	1-4QFY03	1-4QFY04	1-4QFY05	Continuing
OCONUS Operational Assessments	1-4QFY03	1-4QFY04	1-4QFY05	Continuing
Network Interdependency Assessments	1-4QFY03	1-4QFY04	1-4QFY05	Continuing
CINC Appendix 16				
PACOM				
EUCOM		1-4QFY04		
CENTCOM			1-4QFY05	
ODIN	1-4QFY03	1-4QFY04	1-4QFY05	Continuing
CROP	1-4QFY03	1-4QFY04	1-4QFY05	Continuing

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Exhibit R-3 Cost Analysis									Date: February 2004			
APPROPRIATION/BUDGET ACTIVITY RDT&E, D BA-7 Operational Systems Development				PROGRAM ELEMENT 0305125D8Z					PROJECT NAME AND NUMBER CRITICAL INFRASTRUCTURE PROTECTION			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost**	FY03 Cost	FY03 Award Date	FY04 Cost	FY04 Award Date	FY05 Cost	FY05 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development	N/A											
Subtotal Product Development	N/A											
Remarks: N/A												
Development Support												
Combat Command Mission Characterizations	WR/MIPR	NSWCDD, Dahlgren, VA						3.510	10/1/04	Cont.	Cont.	N/A
	SS/CPFF	Booz Allen & Hamilton, McLean, VA						500	1/24/05	Cont.	Cont.	N/A
	GO	Argonne Nat'l Lab, Argonne, IL						844	10/01/04	Cont.	Cont.	N/A
	C/CPFF/IDIQ	Arinc, Inc., Panama City, FL						598	3/28/05	Cont.	Cont.	N/A
	SS/CPFF/IDIQ	Envisioneering, Dahlgren, VA						152	8/29/05	Cont.	Cont.	N/A
		Subtotal						5.604				
CIP Vulnerability Risk Assessments	WR/MIPR	NSWCDD, Dahlgren, VA						4.950	10/01/04	Cont.	Cont.	N/A
	C/CPFF/IDIQ	Arinc, Inc., Panama City, FL						3.456	1/26/05	Cont.	Cont.	N/A
		Subtotal						8.406				
Integrated CIP Indications & Warnings (I&W)	WR/MIPR	NSWCDD, Dahlgren, VA						684	10/01/04	Cont.	Cont.	N/A
	SS/CPFF/IDIQ	Booz Allen & Hamilton, McLean, VA						2.118	2/20/05	Cont.	Cont.	N/A
		Subtotal						2.802				
Operational Support (Crisis Management)	WR/MIPR	NSWCDD, Dahlgren, VA						502	10/01/04	Cont.	Cont.	N/A
	C/CPFF/IDIQ	Raytheon, Arlington, VA						899	2/5/05			
		Subtotal						1.401				
Operational Support (Day to Day)	WR/MIPR	NSWCDD, Dahlgren, VA						1.218	10/01/04	Cont.	Cont.	N/A

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	SS/CPFF/ IDIQ	Raytheon, Arlington, VA						183	2/5/05			
		Subtotal						1.401				
Standardized CIP Architecture	WR/MIPR	NSWCDD, Dahlgren, VA						2.013	10/01/04	Cont.	Cont.	N/A
	C/CPFF/ IDIQ	Booz Allen & Hamilton, McLean, VA						1.913	11/1/04	Cont.	Cont.	N/A
	C/CPFF	IDS, Inc. Arlington, VA						1.117	2/1/05	Cont.	Cont.	
		Subtotal						5.043				
CIP RDT&E	WR/MIPR	NSWCDD, Dahlgren, VA						1.895	10/01/04	Cont.	Cont.	N/A
	GO	Argonne Nat'l Lab, Argonne, IL						66	8/31/05	Cont.	Cont.	N/A
		Subtotal						1.961				
Methodology Development & Documentation	SS/CPFF/ IDIQ	Raytheon, Arlington, VA						1.403	12/1/04	Cont.	Cont.	N/A
		Subtotal						1.403				
<b>Total</b>								<b>28.021</b>				
Remarks:												

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 7				R-1 Item Nomenclature: Program Element (PE) Name and Number Information Systems Security Program PE 0303140D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost		14.576	11.135	12.262	12.563	12.781	13.219
<b>A. Mission Description and Budget Item Justification:</b>							
<p>The NII Information Systems Security Program (ISSP) provides focused research, development, testing and integration of technology and technical solutions critical to the Defense information assurance program (10 USC 2224) through pilot programs and technology demonstration; investment in high leverage, near-term programs that offer immediate Information Assurance (IA) benefit; federal and multi-national initiatives; and short-term studies and research critical to protecting and defending information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. These efforts focus on Computer Network Defense (CND) and the restoration of information systems by incorporating protection, detection, analysis and reaction and response capabilities; emerging cryptographic technologies; technology transition and IA research capabilities. This program is designed to meet the requirements of 10 USC 2224 (Defense Information Assurance Program), 44 USC 3544, (Federal Information Security Management Act of 2002), OMB Circular A-130, and DoD Directives 8500.1, and 0-8530.1.</p> <p>FY2003 Accomplishments (N/A):</p> <p>FY2004 Plans (\$14.576 million):</p> <ul style="list-style-type: none"> <li>• Continue development of the Digital DITSCAP an automated security certification and accreditation process for DOD information systems. Begin expansion of Digital DITSCAP design into a more robust web-based design called the Enterprise Mission Assessment Support System (eMASS) using shared information to deliver improved functionality over all the core IA processes by interconnecting all data transactions via a common database.</li> <li>• Develop IA architecture, policy and identify IA capabilities necessary to support and “end-to-end” IA capability for the GIG – including Transformational Communications, GIG Bandwidth Expansion, JTRS, and GIG Enterprise Services (GES)/Net Centric Enterprise Service (NCES) capabilities such as discovery, collaboration, messaging, mediation, data tagging, etc.</li> <li>• Development of information assurance techniques/processes for allied and coalition operations, including continued research and testing with Combined Communications Electronics Board (CCEB) with Australia, Canada, New Zealand and the U.K.,</li> </ul>							

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the Multinational Interoperability Council (MIC) with Australia, Canada, France, Germany and U.K., and with the international test bed at the Joint Battle Center. Develop alternative network design and security concepts for improved coalition operations.

- IA research process improvement with NSA, Service IA laboratories, and leveraging venture capital models such as In-Q-Tel; development of a Commercial Innovation Integration (CII) process to better leverage commercial research activities for DoD Information Assurance.
- PKI and PKE. Exploration of design alternatives to current PKI tokens (PC and SmartCard) for the tactical and classified environment. Analysis of design and policy changes needed for multiple security domain tokens (one token for both unclassified/classified use). Support for software development necessary to enable mission critical programs for use with PKI. Continue support for the Defense Cross-credentialing Information System (DCIS) pilot, which is focused on identifying and resolving interoperability issues between the electronic credentials of the Defense Department and its commercial partners.
- Support for improved detection of the “insider threat” (DPG 04 task). Research and Analysis of new and enhanced attribution and trace back tools on enterprise level (local enclave through Service CERT to DoD CERT/JTF-CNO). Develop design requirements for improved auditing capabilities to identify, alert and analyze anomalous insider activities.
- Research and analyze enhanced Computer Network Defense (CND), vulnerability management and situational awareness tools that can be used and integrated throughout the DoD enterprise.

FY2005 Plans (\$11.135 Million):

- Continue development of eMASS into a deployed enterprise information assurance management tool. Develop capability to map IA policy to IA metrics to standard validation methods; standardize and integrate IA processes (traceability, resourcing, vulnerability management, ports and protocols management, incident management, and decision support); integrate the C4ISR architectural overlay into IA data exchange standards.
- Continue development of IA architecture, policy and identify IA capabilities necessary to support and “end-to-end” IA capability for the GIG – including Transformational Communications, GIG Bandwidth Expansion, JTRS, and GIG Enterprise Services (GES)/NetCentric Enterprise Service (NCES) capabilities such as discovery, collaboration, messaging, mediation, data tagging, etc.

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- Continue development of the Commercial Innovation Integration (CII) process to leverage commercial research activities for DoD Information Assurance.
- Insider Threat (DPG 04 task). CND/Information Assurance/Information Operations Attribution Capability Initiative. Leveraging work done in FY2003 and FY2004, prototype and test enterprise attribution and trace back tools.
- Develop and prototype enterprise CND, vulnerability management and situational awareness tools identified in FY2003/FY2004.
- Design and test prototype networks to improve information assurance and information sharing on coalition networks (CCEB, MIC, etc.); develop design criteria for improved “guards” for connection between differing security domains; selected prototype development of high priority guarding solutions.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget		14.790	15.178
Current BES	-	14.576	11.135
Total Adjustments			-4.043
Congressional program reductions			
Congressional rescissions, Inflation adjustments		-214	-.043
Congressional increases			
SBIR/STTR Transfer			
Reprogrammings			-4.000

Change Summary Explanation:

FY 2004: FFRDC Reduction -.057 million; Management Improvement -.031 million; Management Efficiencies -.126 million.  
 FY 2005: Realignment to O&M - 4.000 million; Non-pay Purchase Inflation -.043 million.

Exhibit R-2, RDT&E Budget Item Justification							February 2004	
DEFENSE-WIDE, RDT&E (400) BUDGET ACTIVITY 6				DEVELOPMENTAL TEST AND EVALUATION PE 0605804D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cont'g
Total PE Cost	46.944	8.808	8.882	8.962	9.143	9.311	9.529	Cont'g
<p><b>* FY 2003 appropriation is under Defense-Wide, RDT&amp;E (0400) for FY 2003 and prior years. Beginning with FY 2004, the JT&amp;E portion of this appropriation will be transferred to Director, Operational Test and Evaluation (0460).</b></p> <p><b>A. <u>Mission Description and Budget Item Justification:</u></b> This Research Category 6.5 Program Element supports technical analysis and evaluation by Developmental Test &amp; Evaluation (DT&amp;E) of the Department's weapons systems to determine the adequacy of system test program structure and development plans, substantiation of technical performance requirements achievement, identification of weapon system cost performance trade-offs / design risks, system certification for Operational Test &amp; Evaluation, and ensures DT&amp;E Programs are sound, well-executed and sufficiently address system's ability to meet Warfighter's needs.</p> <p>Joint Test &amp; Evaluation (JT&amp;E) programs are process, rather than product, focused Test and Evaluation (T&amp;E) activities conducted in a joint military environment. These multi-Service programs, chartered by OSD and coordinated with the Joint Staff and Services, provide improvements in interoperability of Service systems, improvements in technical and operational concepts, solutions to joint operational issues, development and validation of joint test methodologies, and data for validating models, simulations and test beds. JT&amp;E programs solve relevant Warfighter issues in a joint T&amp;E environment, develop and improve Joint Test Capabilities and Methodologies. Beginning with FY2004, the JT&amp;E portion of this appropriation will be transferred to Director, Operational Test and Evaluation (0460).</p>								



**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	49.252	8.938	8.903
Current FY 2005 President's Budget	46.944	8.808	8.882
Total Adjustments	-2.308	-.130	-.021
Congressional program reductions	-1.775		
Congressional rescissions			
Congressional increases			
Reprogrammings	-0.309	-0.130	-0.021
SBIR / STTR Transfer	-0.224		

**C. Other Program Funding Summary: N/A****D. Acquisition Strategy: N/A\***

Exhibit R-2a, RDT&E Project Justification							February 2004									
DEFENSE-WIDE, RDT&E (400) BUDGET ACTIVITY 6				DEVELOPMENTAL TEST AND EVALUATION PE 0605804D8Z												
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cont'g								
Developmental Test and Evaluation	46.944	8.808	8.882	8.962	9.143	9.311	9.529	Cont'g								
<p><b>* FY 2003 appropriation is under Defense-Wide, RDT&amp;E (0400) for FY 2003 and prior years. Beginning with FY 2004, the JT&amp;E portion of this appropriation will be transferred to Director, Operational Test and Evaluation (0460).</b></p> <p><b>A. <u>Mission Description and Budget Item Justification:</u></b> This PE funds Developmental Test &amp; Evaluation (DT&amp;E) support to the acquisition process, and DT&amp;E oversight of over 220 Programs from the OSD T&amp;E Oversight List. DT&amp;E is the Focal point for DT&amp;E policy as outlined in Section 133, Title 10, USC, and Test and Evaluation Master Plan approval within OSD. DT&amp;E is the USD(AT&amp;L) lead for test/training range activities and DT&amp;E education &amp; training of the T&amp;E workforce. DT&amp;E monitors program status, including on-going testing, and advises OSD senior leadership on test program adequacy.</p> <p>Joint Test &amp; Evaluation (JT&amp;E) program management responsibilities include program nomination, senior/technical program review, and approval of JT&amp;E test plans and reports.</p> <p><b>B. <u>Accomplishments/Planned Program:</u></b></p> <table border="1"> <thead> <tr> <th></th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> </tr> </thead> <tbody> <tr> <td>Accomplishment/Effort /Cost</td> <td>46.944</td> <td>8.808</td> <td>8.882</td> </tr> </tbody> </table> <p><b>(U) FY 2003 Accomplishments:</b></p> <p><b>T&amp;E Independent Activities:</b></p> <ul style="list-style-type: none"> <li>- Review, coordination, and approval of 48 Test and Evaluation Master Plans (TEMPs) (Draft and Service Approved).</li> <li>- Review and coordination on all significant program documentation to include: 30 Defense Acquisition Executive Summaries (DAES); 46 Acquisition Decision Memoranda</li> </ul>										FY 2003	FY 2004	FY 2005	Accomplishment/Effort /Cost	46.944	8.808	8.882
	FY 2003	FY 2004	FY 2005													
Accomplishment/Effort /Cost	46.944	8.808	8.882													

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(ADM); and, 1454 Other Documents Reviewed.

- Analyses of programs for compliance with DT&E policies identified in the DoD 5000 acquisition policy and monitoring of on-going DT&E program activities through participation in 862 local and 368 out-of-town developmental test program fora.
- Closely monitored F-22 test program, providing frequent assessment of program progress and software stability issues.
- Conducted detailed analysis to ensure JSF test resources are adequate based on F-22 lessons learned.
- Prepared thorough transition plan to transfer JT&E program from AT&L to DOT&E, including transfer of funding.
- Implemented congressional direction and stand-up of the DoD Test Resource Management Center (TRMC), resulting in assured accomplishment of CY2003 tasks required in the FY03 National Defense Authorization Act (NDAA).
- Provided across-the-board assessment of V-22 program progress, enabling the DAE to determine program was on track and satisfactorily resolving previously identified technical problems.
- Supported USAF working group on space programs, advising on T&E best practices and investigating alternatives to supporting T&E of space programs after transfer to USAF.
- Supported DAU-led study on the capabilities of the T&E workforce of the DoD, as directed by congress in section 234 of the NDAA.
- Managed the conduct of a congressionally-directed report on the capabilities of the test ranges and the capabilities of modeling and simulation technique, resulting in a strategy on how best to integrate the two and make weapon system testing more efficient and effective.

**JT&E Program:**

- Completed Joint Close Air Support (JCAS) and Joint Shipboard Helicopter Integration Process (JSHIP) Joint Tests, conduct outbriefings, distribute the final reports, and transition legacy products.
- Continued ; Joint Battle Damage Assessment (JBDA), Joint C2 Intelligence, Surveillance and Reconnaissance (JC2ISR), Joint Cruise Missile Defense (JCMD), Joint Global Positioning System Combat Effectiveness (JGPSCE), Joint Logistics/Planning Enhancement (JLOG/PE), Joint Methodology to Assess C4ISR Architecture (JMACA), Joint UAV for Time Sensitive Operations (JUAV-TSO), and Joint Data Link Information Combat

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R-1 Shopping List Item No. 131

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Execution (JDICE).

- Initiated Joint Space Control Operations (Negation) (JSCO (N)), Joint Integration and Interoperability of Special Operations (JIISO), and Joint Urban Fires and Effects (JUFE) which were FY2003 SAC directed Joint Feasibility Studies.
- Initiated one "Quick Start" short-term test to look assess potential solutions and make recommendations to reduce tactical vehicle casualties in Operation Iraqi Freedom. This test is named Joint Survivability (JSURV) and is expected to be a six-month effort.

**(U) FY 2004 Plans:**

T&E Independent Activities: Includes funding for technical analysis and evaluation of the developmental testing of the more than 180 major weapon acquisition programs. Specifically, the DT&E organization, within Defense Systems, is the USD(AT&L) focal point for all activities related to developmental test and evaluation as outlined in Section 133, Title 10, United States Code. T&E Independent Activities include funding for:

- Analyses of programs for compliance with DT&E policies identified in the DoD 5000 acquisition policy.
- Determination of the adequacy of system test program structure and development plans and substantiation of technical performance requirements achievement, identification of weapon system cost performance trade-offs/design risks.
- Supports the Director, Defense Systems in OIPTs (and comparable organizations), DAES, DABS.
- Review, coordination, and approval of Test and Evaluation Master Plans (TEMPS).
- Monitoring of on-going Developmental Test and Evaluation program activities.
- Review and coordination on all significant program documentation.
- Recommending improvements to strengthen DT&E and provide necessary information/advice to DoD Acquisition decision-makers.
- Developing "New" corporate philosophy to improve Department-wide DT&E adequacy through test and evaluation process improvements that ensure readiness to initiate OT&E.
- Supporting DoD Business Initiative Council (BIC) IPT consisting of representatives from the Services, USD(AT&L) and DOT&E to evaluate current TEMP preparation, staffing and approval process, and recommend improvements for implementation by the Services and OSD.

- Fully supporting the DT&E planning of DoD space Major Defense Acquisition Programs, and other space programs on the OSD T&E Oversight List.
- Educate and train T&E workforce by leading T&E functional working group and Support and monitor update of Defense Systems Management College Test 101 / 202 / 301 Courses.
- Publishing DT&E lessons learned and best practices (Acquisition. Guidebook).
- Assessing system technical maturity and readiness for OT, based on DT; and system certification of OT&E.
- Developing DT&E outreach strategy and implementation plan.

**(U) FY 2005 Plans:**

T&E Independent Activities: Includes funding for technical analysis and evaluation of the developmental testing of the more than 220 major weapon acquisition programs. Specifically, the DT&E organization, within Defense Systems, is the USD(AT&L) focal point for all activities related to developmental test and evaluation as outlined in Section 133, Title 10, United States Code. T&E Independent Activities include funding for:

- Analyses of programs for compliance with DT&E policies identified in the DoD 5000 acquisition policy.
- Determining the adequacy of system test program structure and development plans and substantiation of technical performance requirements achievement, identification of weapon system cost performance trade-offs/design risks, and system certification of OT&E.
- Review, coordination, and approval of Test and Evaluation Master Plans (TEMPS).
- Monitoring of on-going developmental test program activities.
- Review and coordination on all significant program documentation.
- Recommend improvements to strengthen DT&E and provide necessary information/advice to DoD Acquisition decision-makers.

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy. N/A\***

**E. Major Performers:** The following contractors received \$10.0 million or more in funding for support in FY 2003: **SRC:** Support to the JT&E Program Office, Alexandria, VA; JGPSCE, Kirtland AFB, NM; JBDA, Suffolk, VA; JC2ISR, Hurlburt Field, FL; JMACA, Suffolk, VA

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OFFICE OF FORCE TRANSFORMATION  
FY 2005 President's Budget  
Exhibit R-2, RDT&E Budget Item Justification

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2004																																									
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide, Office of Force Transformation/BA 6				R-1 ITEM NOMENCLATURE PE: 0605799D8Z Force Transformation																																													
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost																																								
Total PE Cost	9.416	19.388	19.591	19.479	19.498	19.683	20.145	Continuing	Continuing																																								
<p>Mission Description and Budget Item Justification: The Office of Force Transformation was officially opened in Nov 01 with the encouragement from Congress to be the principal advisor to the SecDef on transformation within the DoD. The foremost goal of the Office is to ensure that transformation efforts directly link to the broad elements of national and military strategy. This funding request supports the Director's five organizational objectives outlined below. This program is intended to perform general support of RDT&amp;E activities. Within these activities the office is sponsoring groundbreaking research and prototyping in selected areas that are considered vital to the advancement of transformation within the Department. Funding will be used to catalyze transformational activities such as experimentation and exploration of the ramifications of new concepts and technologies. Activities include; research, testing, studies, analysis and development of transformation articles ("prototype-like" system surrogates), which will enable advanced experimentation for the co-evolution of concepts and technologies. Examples of such activities include 1) the development of an operationally responsive, tailorable, space capability, with two major and distinct parts – the launch vehicle and the payload. Characteristics of the launch vehicle desired include low-cost and launch on-demand. The payload seeks to be highly modular, contain highly automated micro-satellite buses, common interfaces, and tasking and data dissemination using SIPRNET protocols — a concept now known as Operationally Responsive and Experimental Adaptability for Space Based Systems; and 2) the advancement of an adaptive method for maintaining operational availability of units by managing their end-to-end support network — a concept now known as "Sense and Respond" logistics.</p> <p>A. The Office will seek to guide the U.S. military transformation efforts through the following objectives:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><u>FY 2003</u></th> <th style="text-align: center;"><u>FY 2004</u></th> <th style="text-align: center;"><u>FY 2005</u></th> <th style="text-align: left;"><u>Description</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">\$484K</td> <td style="text-align: center;">\$928K</td> <td style="text-align: center;">\$979K</td> <td>Objective 1: To make force transformation an integral element of DoD corporate and national defense strategy effectively supporting the four strategic pillars of national military strategy.</td> </tr> <tr> <td style="text-align: center;">\$2.89M</td> <td style="text-align: center;">\$5.843M</td> <td style="text-align: center;">\$5.881M</td> <td>Objective 2: To change the force and its culture from the bottom up through the use of experimentation, operational prototyping and the creation of new knowledge.</td> </tr> <tr> <td style="text-align: center;">\$1.93M</td> <td style="text-align: center;">\$3.883M</td> <td style="text-align: center;">\$3.921M</td> <td>Objective 3: To implement Network Centric Warfare (NCW) as the theory of war for the information age and the organizing principle for joints concepts, capabilities, and systems.</td> </tr> <tr> <td style="text-align: center;">\$970M</td> <td style="text-align: center;">\$1.903M</td> <td style="text-align: center;">\$1.951M</td> <td>Objective 4: To get the decision rules and metrics right and cause them to be applied enterprise wide.</td> </tr> <tr> <td style="text-align: center;">\$3.142M</td> <td style="text-align: center;">\$6.831M</td> <td style="text-align: center;">\$6.859M</td> <td>Objective 5: To discover, create or cause to be created new military capabilities to broaden the capabilities base and to mitigate risk.</td> </tr> <tr> <td style="text-align: center;">\$9.416M</td> <td style="text-align: center;">\$19.388M</td> <td style="text-align: center;">\$19.591M</td> <td>Total</td> </tr> </tbody> </table> <p>B. Program Change Summary: No Change.</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;"><u>FY 2003</u></th> <th style="text-align: center;"><u>FY 2004</u></th> <th style="text-align: center;"><u>FY 2005</u></th> </tr> </thead> <tbody> <tr> <td>FY 2004 President's Budget</td> <td style="text-align: center;">9.654</td> <td style="text-align: center;">19.388</td> <td style="text-align: center;">19.591</td> </tr> <tr> <td>FY 2005 Budget Estimate</td> <td style="text-align: center;">9.654</td> <td style="text-align: center;">19.388</td> <td style="text-align: center;">19.591</td> </tr> </tbody> </table>										<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>Description</u>	\$484K	\$928K	\$979K	Objective 1: To make force transformation an integral element of DoD corporate and national defense strategy effectively supporting the four strategic pillars of national military strategy.	\$2.89M	\$5.843M	\$5.881M	Objective 2: To change the force and its culture from the bottom up through the use of experimentation, operational prototyping and the creation of new knowledge.	\$1.93M	\$3.883M	\$3.921M	Objective 3: To implement Network Centric Warfare (NCW) as the theory of war for the information age and the organizing principle for joints concepts, capabilities, and systems.	\$970M	\$1.903M	\$1.951M	Objective 4: To get the decision rules and metrics right and cause them to be applied enterprise wide.	\$3.142M	\$6.831M	\$6.859M	Objective 5: To discover, create or cause to be created new military capabilities to broaden the capabilities base and to mitigate risk.	\$9.416M	\$19.388M	\$19.591M	Total		<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	FY 2004 President's Budget	9.654	19.388	19.591	FY 2005 Budget Estimate	9.654	19.388	19.591
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APPROPRIATION/BUDGET ACTIVITY

R-1 ITEM NOMENCLATURE

RDT&amp;E, Defense Wide, Office of Force Transformation/BA 6

PE: 0605799D8Z Force Transformation

C. Other Program Funding Summary: Not Applicable.

D. Acquisition Strategy: Not Applicable.

E. Schedule Profile: Not Applicable.

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**OFFICE OF FORCE TRANSFORMATION**  
**FY 2005 Budget Estimates**  
**Exhibit R-2a, RDT&E Project Justification**

Exhibit R-2a, RDT&E Project Justification								Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide, Office of Force Transformation/BA 6			PROGRAM ELEMENT: 0605799D8Z		PROJECT NAME AND NUMBER Supporting Department of Defense Transformation				
Cost (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total PE Cost	9.416	19.388	19.591	19.479	19.498	19.683	20.145	Continuing	Continuing
<p>A. <u>Mission Description and Budget Item Justification</u>. The Office of Force Transformation (OFT) is the principal advisor to the SecDef on transformation within the DoD and is tasked to be the catalyst for transformation within the Department. This funding request supports the Director's five organizational objectives outlined in R-2 Exhibit for this office. This program is designed to provide general support to the overall DoD transformation effort through the implementation of a variety of RDT&amp;E activities. Within these activities the office is sponsoring groundbreaking research and prototyping in selected areas that are considered vital to the advancement of transformation within the Department. Funding will be used to catalyze transformational activities such as experimentation and exploration of the ramifications of new concepts and technologies. Activities include; research, testing, studies, analysis and development of transformation articles ("prototype-like" system surrogates), which will enable advanced experimentation for the co-evolution of concepts and technologies. In FY03 this funding supported activities such as:</p> <ol style="list-style-type: none"> <li>1) The development of an operationally responsive, tailorable, space capability, with two major and distinct parts – the launch vehicle and the payload. Characteristics of the launch vehicle desired include low-cost and launch on-demand. The payload seeks to be highly modular, contain highly automated micro-satellite buses, common interfaces, and tasking and data dissemination using SIPRNET protocols — a concept now known as Operationally Responsive and Experimental Adaptability for Space Based Systems;</li> <li>2) The advancement of an adaptive method for maintaining operational availability of units by managing their end-to-end support network — a concept now known as "Sense and Respond" logistics;</li> <li>3) The creation of an architecture engine for a JTF Headquarters that permits the exploitation of "executable" operational and system architectures associated with multi-service execution of Joint Task Forces (JTFs); and</li> <li>4) The exploration of the feasibility of an innovative new concept and technology application for generation of signals with operational relevance to military missions.</li> </ol> <p>In FY04 and beyond, the office will continue to provide major support to the areas of Sense and Respond Logistics and Micro-Satellites (two areas showing tremendous potential), as well as in the areas of inter-modal theater lift, re-directed energy, and ultra-large airlift technology.</p> <p>B. <u>Other Program Funding Summary</u>. N/A</p> <p>C. <u>Acquisition Strategy</u>: This program represents a continuing level of effort supporting the research, the study and analysis, and the development of a wide range of new concepts and technologies that directly support the transformation vision and goals of the Secretary of Defense and the Department. The deliverables from each project represent a keen understanding of the national and military strategies and the linkages with the transformation effort, and what new capabilities, if discovered and delivered, better support the execution of those strategies.</p> <p>D. <u>Schedule Profile</u>. The RDT&amp;E will be spent during various quarters of each fiscal year.</p>									



Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6				R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D8Z			
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	1.965	1.997	1.999	2.004	2.058	2.154	2.200
SBIR/Challenge Admin No.P-518	1.965	1.997	1.999	2.004	2.058	2.154	2.200

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT:** The Small Business Innovation Research (SBIR) Program and the Small Business Technology Transfer (STTR) Program fund approximately \$.900 million annually in mission oriented research and development projects at small technology companies. The purpose of the program is to stimulate the development of new technologies to improve U.S. military and economic capabilities. The SBIR/STTR Program is mandated by public laws (PL) 97-219, PL 99-443, PL 102-564, PL 106-554, and PL 107-50. The Department of Defense (DoD) SBIR/STTR Program strives to encourage scientific and technical innovation in areas specifically identified by participating DoD components.

DoD components participating in the SBIR/STTR Program include the: Army , Navy, Air Force, Defense Advanced Research Projects Agency (DARPA), Missile Defense Agency (MDA), Defense Threat Reduction Agency (DTRA), U.S. Special Operations Command (SOCOM), Chemical-Biological Defense Program, National Geospatial-Intelligence Agency (NGA), and the Office of Secretary of Defense (OSD). DoD components participating in the STTR Program include the: Army, Navy, Air Force, DARPA, and MDA.

The SBIR/STTR Program is executed in three phases. The purpose of Phase I is to determine, insofar as possible, the scientific technical and commercial merit, and feasibility of ideas submitted under the SBIR/STTR Program. Phase II awards are made to firms that have been awarded a Phase I contract on the basis of the results of their Phase I effort and the scientific, technical, and commercial merit of the Phase II proposal. Phase II is the principal research or research and development effort and is expected to produce a well-defined

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deliverable prototype. Phase III SBIR/STTR efforts are not funded with SBIR/STTR funds and can be considered "follow-on" contracts to Phase II efforts. Under Phase III, companies participating in the SBIR/STTR Program are expected to obtain funding from the private sector and/or non-SBIR/STTR government sources to develop the prototype into a viable product or non-R&D service for sale in military and/or private sector markets.

Since PL 102-564 prohibits the use of any of the SBIR budget to fund administrative costs of the program, program element (PE) 0605790D8Z is the only source of funds for the coordination, administration and execution of the Department's SBIR/STTR Program. In addition to funding costs for program administration, coordination and execution, PE 0605790D8Z funds essential elements of the SBIR/STTR Program that are required by law including: (a) the development and maintenance of information systems and software required for the measurement, evaluation, and effective management of the Department's SBIR/STTR R&D Program (b). outreach to small technology companies, potential investors in such companies, SDBs WOSBs HBCU/MIs and others, to encourage and facilitate their participation in the SBIR/STTR Programs (e.g. conferences, trade shows, etc.) (c) preparation of the SBIR/STTR R&D solicitations and related publications; (d) support efforts such as administration of the various SBIR/STTR process action teams; (e) development and promulgation of guidance and reference materials to DoD contracting officers, technical monitors, and other personnel involved in administering the SBIR/STTR Programs; and (f) responding to requests for information relative to DoD's SBIR/STTR Program.

<b>B. <u>Program Change Summary</u></b>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	2.018	2.026	2.003
Current FY 2005 President's Budge	1.965	1.997	1.999
Total Adjustments	-.053	.029	-.004
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other	-.053	.029	-.004

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C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Schedule Profile N/A

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R-1 Shopping List Item No.126

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Exhibit R-2, RDT&E Budget Item Justification					Date: February 2004		
Appropriation/Budget Activity RDT&E Defense-Wide, BA 6				R-1 Item Nomenclature: Classified Programs C3I PE 0605710D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	75.066	41.541					
<p><b>A. Mission Description and Budget Item Justification:</b>                      Funding provides for accomplishment of studies, assessments and technical evaluations of C3I programs. Resources support efforts including the integration of C3 and intelligence programs and activities and the identification and resolution of national and tactical interoperability issues. Funding also supports several initiatives to structure a network of analytical efforts addressing the full range of analytical processes and intelligence necessary to support the conduct of information operations. This program is funded under BA-6, Management Support, because it includes studies and analyses in support of R&amp;D efforts.</p> <p><b><u>Program Accomplishments and Plans:</u></b></p> <p>FY 2003 Accomplishments: (\$75.066 million)</p> <ul style="list-style-type: none"> <li>Intelligence Mission Support</li> </ul> <p><u>Information Assurance</u></p> <ul style="list-style-type: none"> <li>Completed database development needed to manage critical information assurance and IT personnel.</li> <li>Expanded the Digital DITSCAP certification and accreditation software to an “Enterprise Mission Assessment Support System (eMASS) by including additional modules on configuration management and control, IAVA management, etc.</li> <li>Provided an enterprise suite for PKI testing – provides testing in an environment similar to the actual enterprise operation of PKI – necessary to test scalability of issue solutions (security/performance, etc) and ensure stability of the PKI infrastructure.</li> <li>Implemented a reallocation of PKI verification official authentication functions and automated load balancing between the PKI Certificate Authorities in Chambersburg and Denver.</li> <li>Began development of Tactical PKI (extension of PKI capabilities, services and applications into deployed environments) architecture, CONOPS, prototypes/pilots and implementation plans.</li> <li>Implemented Phase I of the Defense Cross-Credentialing Information System (DCIS) pilot, which is examining the ability of DoD and its commercial partners (e.g., major defense contractors) to use each others electronic credentials for identification, access control, etc.</li> <li>Supported, in coordination with DISA and STRATCOM, development and piloting of a DoD network mapping capability</li> </ul>							

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using three dimensional visualization techniques to depict network topologies, server locations, operating system deployments, single points of failure, and other critical network information.

- Began development, in coordination with DISA and STRATCOM, of a database to support DoD Computer Network Defense configuration, asset accounting, and capabilities. Piloted the integration/interoperability of the VCTS Compliance Database, the IT Registry Database, the Ports and Protocols Registration and CM databases, and the NIPRNet Connection Approval database
- HFAC - Continued support to the Human Factor Analysis Center – to include research and analysis, employing experts in academia, government laboratories, and the private sector, including the compilation and development of critical data sources. Supports development of analytic training programs and curricula. Detailed plans are classified and are provided in the Congressional Justification Book.
- E-Space and Network Analysis Center - Continued support to E-Space Analysis Center – Detailed plans are classified and are provided in the Congressional Justification Book.
- IO Indications and warnings - Detailed plans are classified and are provided in the Congressional Justification Book.

Critical Infrastructure Protection (CIP)

- Development of a methodology for electrical service outage area estimation for application site assessments
- Conduct of electrical infrastructure analysis at the regional operating system level as well as the local level for CONUS and OCONUS areas of interest
- Release of the electric power analysis tool, complete with an ArcGIS extension enabling analysts to compare different contingency scenarios by manipulating data layers within ArcMap (a GIS-based analysis and display software environment).
- Support of sector characterization and dependency analysis activities for the Logistics (DLA), Transportation (USTRANSCOM), Public Works (USACE), and the Defense Industrial Base (OUSD(AT&L)).
- Continued development of software and computer systems to enable web application development, geographic information system (GIS) application integration, and visualization tools integration into mission assurance products for the CIP program.
- Assisted performance of telecommunications network and nodal infrastructure analysis and assessment of both CONUS and OCONUS installations.
- Furthered development of a relational database management system supporting rapid and clear visualization of dependency links and critical assets of operational users

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- Global Infrastructure Data Capture - Developed a massive storage capability to maintain raw data for rapid access co-resident with processed data for analytic products. Increased data storage facilitated new requirements for investigative support operations.
- Automated Speech Recognition Technology - Supported the DoD's Voice Command and Control Automated Speech Recognition (ASR) effort for implementation in existing fleet inventory. Determined the potential to implement speech and data signal coding and compression using Independent Component Analysis (ICA) technology into an operational environment.

GWOT Collaborative Planning Tools

- Developed & implemented improved version of the Defense Collaboration Tool Suite (DCTS) (v 2 phase 1).
- Provided quick reaction fielding for CENTCOM and supporting combatant commands during Iraqi Freedom.
- Supported the fielding of DCTS at command level and used by operational and tactical users.
- Supported the establishment of DoD wide test program to certify commercial products for interoperability with DoD designated standards.
- GWOT NIPC - Crucial Player Project which supports members of the Defense, intelligence and law enforcement communities through cyber counterintelligence analysis and operations support.

FY 2004 Plans: (\$41.541 million)

- Intelligence Mission Support.
- HFAC - Continue support to the Human Factor Analysis Center – Detailed plans are classified and are provided in the Congressional Justification Book.
- E-Space and Network Analysis Center - Detailed plans are classified and are provided in the Congressional Justification Book.
- IO Indications and warnings - Detailed plans are classified and are provided in the Congressional Justification Book.
- Automated Speech Recognition Technology - Supported the DoD's Voice Command and Control Automated Speech Recognition (ASR) effort explore and develop technologies to improve crewman voice communications in Light Armored

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Vehicles and Ground Combat Systems.

Foreign Supplier Assessment Center

- Conduct analysis of prime DoD contractors in order to identify foreign suppliers of services and products.
- Using Open source data, conduct a survey of contractors claiming they provide supplies and services to DOD, analyze these suppliers and compare in an attempt to identify foreign content and assess vulnerabilities inherent in that content.
- Using all-source intelligence sources determine if foreign suppliers or potential suppliers supporting DOD programs have attempted or will attempt to control, influence or illegally acquire technologies critical to U.S. warfighting capabilities.
- Conduct threat assessments of specific foreign suppliers identified by DOD.
- Recommend communications and AIS systems and infrastructure to support the successful receipt and delivery of information, the tools and software applications necessary to support the required analytic process, and the dissemination of information to the DOD customer.
- Develop and maintain a comprehensive database of foreign suppliers and involvement.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President’s Budget	106.727	20.556	21.656
Current BES/President’s Budget	75.066	41.541	-
Total Adjustments	-31.661	20.985	-21.656
Congressional program reductions			
Congressional rescissions	-.086	-.615	
Congressional increases		21.600	
Reprogrammings	-31.575		-21.656
DERF Adds			

Program Change Summary.

FY 2003: Non-pay purchase inflation adjustment -.086 million; Reprogrammed –31.575 million.

FY 2004: Congressional add 21.600 million; FFRDC Reduction -.168 million; Management Improvements -.089 million; Management Efficiencies –.358 million.

FY 2005: Transferred to USD (Intelligence) to implement the restructuring of Defense Intelligence –21.656 million.

**C. Other Program Funding Summary: N/A**

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**D. Acquisition Strategy: N/A**



Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 6				R-1 Item Nomenclature: Program Element (PE) Name and Number General Support to USD(Intelligence) PE 0605200D8Z				
Cost (\$ in millions)		FY2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost				4.830	5.164	5.326	5.397	5.511
Intelligence Support				.742	.743	.822	.832	.850
Resource Database Support				.267	.273	.277	.282	.288
IO Program				3.821	4.148	4.227	4.283	4.373

**A. Mission Description and Budget Item Justification:**

General Support to USD(Intelligence) is a new program element for this submission. It was created due to the disestablishment of the OASD(C3I) organization in May 2003.

**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)

	<u>FY 2003</u>	<u>FY2004</u>	<u>FY 2005</u>
Previous President's Budget	0	0	0
Current BES/President's Budget			4.830
Total Adjustments			
Congressional program reductions Adjustment			
Congressional rescissions, inflation			
Congressional increases			
Undistributed reductions			

**Change Summary Explanation:**  
FY 2003: Not applicable  
FY 2004: Not applicable  
FY 2005: new program element.

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C. **Other Program Funding Summary:** Not Applicable

D. **Acquisition Strategy.** Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 6				R-1 Item Nomenclature: Support to Networks and Information Integration PE 0605170D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost			11.490	11.541	11.760	11.892	12.179
<p><b>A. Mission Description and Budget Item Justification:</b>                      This program element supports studies in the areas of networks, information integration, defense-wide command and control (C2), and communications. This program is funded under Budget Activity 6, RDT&amp;E Management Support because it includes studies and analysis in support of RDT&amp;E efforts.</p> <p><b><u>Program Accomplishments and Plans:</u></b></p> <p>FY 2003 Accomplishments: (N/A)</p> <p>FY 2004 Plans: (N/A)</p> <p>FY 2005 Plans: (\$11.490 million)</p> <ul style="list-style-type: none"> <li>• Continue efforts to research the nature of networked organizations and the implications for command and control, military operations, and organizations.</li> <li>• Continue to work with the DoD community and international partners to improve the understanding of Information Age command and control related concepts, technologies, and experiments.</li> <li>• Conduct workshops to explore command and control related issues.</li> <li>• Continue publications and outreach programs.</li> <li>• Continue to enhance functionality of the Information Technology Management application.</li> <li>• Continue Senior Leadership Communications System (SLCS) efforts: monitor and oversight of SLCS assets, liaison to White House for SLCS assets</li> <li>• Continue NII COOP/COG/ECG efforts: develop plans and procedures for COOP/COG/ECG within NII, support NII/C2P interfaces with the Defense Continuity Program Office (DCPO) and working groups.</li> <li>• Continue Unified Command Structure (UCS) development, establish program office, establish budgetary lines, and develop architectures.</li> </ul>							

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- Continue NPR Implementation: track C4ISR/NPR \* ETE implementation, participate in SCA assessments, oversight of nuclear C2 assets and systems.
- Continue C2 Policy/Governance, C2 Roadmap and directives development (DoDD 5100.44 – Master Plan for National Military Command System (NMCS), DODD 5100.3 UCS policy, DODD 5210.81 – track NSPD 281 implementation)
- Continue to define/develop relationships between the Global Command System, Theater/Tactical Command System, Joint Battle Management Command and Control, and Joint Command and Control.
- Plan for forum to host discussions on nuclear thin-line by Blue-ribbon panel.
- Continue analytic research support for DoD National C2 Policy issues including Information Operations (IO), Information Security (IS) programs, Missile Defense C2, Offensive Defensive integration.
- Investigate tactical and Joint Task Force C2 policies, ongoing development and production programs, ACTDs and experimental programs for applicability to national programs.
- Analyze the use of Common Relevant Operational Pictures applicability across mission areas, upward for use by national and senior leaders including the President, in all contingency situations from dispersed locations.

CISA

- Complete Net Centric Operations and Warfare (NCOW) Reference Model (RM) v3.0 (an expanded version, building on version 2.0).
- Implement the NCOW RM Compliance Analysis program under the GIG, and across unified commands.
- Complete GIG 3.0 Enterprise Architecture.
- Integrate Joint Operational Architecture with GIG linking functional (logistics, health affairs, etc) and warfighting architectures.
- Expand Homeland Defense architectures integrated with other federal agencies.
- Integrate architectures for strategic applications of space-based capabilities.
- Automate architecture design and integration processes, producing executable architectures at unified commands.
- Develop enterprise architectures that reflect trans-AOR network centric operations.
- Use ETTP for the execution of AGILE RESPONSE 05.
- Use the Command Enterprise Communications Architecture (CECA) to completely document the Command's end-to-end C2 information flow and as a routine tool to model the Command's on-going transformation efforts.

JCAPS

- Enhance the functional Architecture Tool Kit with multiple types of applications (requirements, budget, modeling and simulation, interoperability, etc.)

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- Complete data repository with fully functional knowledge portal.
- Continue to expand DoD-wide training program.
- Implement executable architectures from validated authoritative architectures.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget			-
Current BES/President's Budget			11.490
Total Adjustments			11.490
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			11.490
SBIR/STTR Transfer			
DERF Adds			

Program Change Summary:

FY 2005: Funding transferred from PE 0605116D8Z to implement restructuring of Defense Intelligence – 11.490 million.

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy. N/A**

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<b>Fiscal Year (FY) 2005 Budget Estimates</b>					<b>DATE</b>		
<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>					February 2004		
<b>APPROPRIATION/BUDGET ACTIVITY</b>				<b>R-1 ITEM NOMENCLATURE</b>			
Defense Wide RDT&E (0400)				Foreign Comparative Testing (FCT)			
Budget Activity 6				PE 0605130D8Z			
<i>COST (In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total Program	29.319	36.464	35.633	36.126	36.750	37.618	38.388
Element (PE) Cost							

**A. Mission Description and Budget Item Justification**

The mission of the FCT program is to test and evaluate foreign non-developmental items (NDI) identified by the Services and Combatant Commanders in order to avoid costly and time-consuming U.S. new start acquisition programs. The FCT program is Congressionally mandated in Title 10, USC, Section 2350a. FCT tests and evaluates conventional defense equipment, munitions, and technologies manufactured and developed by major allies of the United States and other friendly foreign countries to determine the ability of such equipment, munitions, and technologies to satisfy United States military requirements or to correct operational deficiencies. While the testing of NDI and items in the late state of the development process are preferred, the testing of equipment, munitions, and technologies may be conducted to determine procurement alternatives. FCT projects are nominated by the Services and U.S. Special Operations Command (SOCOM) each year and submitted to Congress for approval prior to obligation of funds.

Since the program's inception, 500 projects were initiated under the FCT Program; 415 have been completed to date. Of these completed projects, 225 successfully meet the sponsor's requirements, 153 led to procurements worth approximately \$6.2 billion in FY 2004 constant years dollars. With an OSD investment of about \$870 million, the FCT Program has realized an estimated RDT&E cost avoidance of \$4.3 billion.

The FCT program is frequently a catalyst for teaming or other business relationships between

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foreign and U.S. Industries; many successful FCT projects result in arrangements for the production of the qualified foreign item in the U.S. Other nations recognize the long-term value of such practices for competing in the U.S. defense market and the resultant strengthening of the "two-way street" in defense procurement. For the U.S., the result often means the creation of jobs and contributions to local economies. The list below provides a sample of states that benefit from these relationships:

Arizona, California, Florida, Georgia, Illinois, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Virginia, Vermont, Washington, West Virginia, and Wisconsin.

This Research Category 6.5 is assigned and identified in this descriptive summary in accordance with existing DoD policy.

**B. Program Change Summary**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	26.873	34.873	35.705
Current FY 2005 President's Budget	29.319	36.464	35.633
Total Adjustments	+ 2.446	+ 1.591	-0.072
Congressional program reductions			
Congressional rescissions		-0.509	
Congressional increases			
Reprogrammings	+2.700	2.100	
SBIR/STTR Transfer			
Other	-0.254		-0.072

**C. Other Program Funding Summary:** N/A

<b>Fiscal Year (FY) 2005 Budget Estimates</b> <b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)</b>						<b>DATE</b> <b>February 2004</b>			
<b>APPROPRIATION/BUDGET ACTIVITY</b> Defense Wide RDT&E (0400) Budget Activity 6						<b>R-1 ITEM NOMENCLATURE</b> Foreign Comparative Testing (FCT) PE 0605130D8Z			
<i>COST (In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.319	36.464	35.633	36.126	36.750	37.618	38.388	Continue	Continue

**A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:**

The mission of the FCT program is to test and evaluate foreign non-developmental items (NDI) identified by the Services and Combatant Commanders in order to avoid costly and time-consuming U.S. new start acquisition programs. The FCT program is Congressionally mandated in Title 10, USC, Section 2350a.

**B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>High Rate of Fire .50 Caliber Machine Gun (joint with Air Force)</b>	Marine Corps	1.104	0	0

This project, initiated in FY 2003, is evaluating a cost-effective, high-rate-of-fire .50 caliber machine gun manufactured by FN Herstal, for use by Marine Corps UH-1N and CH-53E helicopters, to replace the obsolete .50 caliber machine gun currently in use.

**FY 2003 (Accomplishments):** Completed technical and operational testing. Successfully integrated the M3M .50 caliber machine-gun on CH-53E and UH-1N helicopters. 100% of FY



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2003 FCT funds have been obligated. A favorable procurement decision is projected for 2nd Quarter FY 2004.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>40mm Dud-Reducing M430A1E1 HEDP Cartridge</b>	Army	0.267	0.606	0.048

This project, initiated in FY 2002, is evaluating dud-reducing ammunition fuzes developed by Chartered Ammunition Industries Pte, Ltd., of the Republic of Singapore and Dixi Microtechniques SA of Switzerland. The current fuze experiences a relatively high dud rate when fired against soft targets, such as sand or snow, which creates a dangerous unexploded ordnance situation for friendly forces as well as for innocent civilians. This project will result in greatly increased operational efficiency and safety for our soldiers on the battlefield, help eliminate civilian casualties, and greatly decreased cleanup costs on the training ranges, amounting to tens of thousands of dollars annually.

**FY 2003 (Accomplishments):** Contract prep and award. Bid samples received.

**FY 2004 (Plans):** Bid samples validation. Test items procurement. Begin live fire testing.

**FY 2005 (Plans):** Complete/report live fire testing. Milestone III IPR.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>40mm Enhanced Grenade Launcher for M4 Carbine</b>	USSOCOM	0.232	0.778	0

This project, initiated in FY 2003, is evaluating grenade launchers from Heckler and Koch of Germany and Istech of the United Kingdom, along with domestic sources, to find a technical solution to the requirement for a more accurate and reliable weapon for Special Forces as a potential replacement for the current M203 40mm grenade launcher, which is over 30 years old and becoming logistically unsupportable.

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**FY 2003 (Accomplishments):** Published solicitation requesting data on potential technical solutions to requirement; Developed performance specification based on draft updates to Capability Development Documents; Ordered and received a remote firing test fixture to mount and remotely fire a 40mm grenade launcher; Conducted integrated product team conference and vendor conference; Ordered 40mm accuracy testing rounds.

**FY 2004 (Plans):** Complete safety certification of test fixture; Validate Capability Development Document and in turn the performance specification; Publish Enhanced Grenade Launcher solicitation and receive test samples; Conduct technical and operational testing.

**FY 2005 (Plans):** Compile test results; Complete final source selection / procurement decision.

	Service	FY 2003	FY 2004	FY 2005
105mm Preformed Fragments	Army	1.121	1.112	0

This project, initiated in FY 2003, is evaluating the potential increased lethality and range of the conventional 105mm Field Artillery ammunition, developed by Denel-Naschem, over the current U.S. 105mm ammunition. If successful, the project will greatly enhance the lethality of U.S. Army light combat forces, giving them near the same fire support capability as with our current 155mm Artillery ammo, in operations where those heavier combat forces are not readily deployable.

**FY 2003 (Accomplishments):** Completed safety assessment. Obtained long lead time test items/facilities. Fabrication.

**FY 2004 (Plans):** Test item delivery. Complete all remaining pre-test analyses and assessments. Conduct live fire testing.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>155mm Ammunition</b>	Army	2.092	1.112	0

This project, initiated in FY 2003, is evaluating the potential increased range of the family of 155mm Field Artillery projectiles, developed by Denel-Naschem, over current U.S. 155mm ammunition. If successful, the project will greatly increase the fire support provided to U.S. Army ground combat forces, by allowing them to engage hostile targets at ranges greater than what it currently can, utilizing our current 155mm Artillery weapon systems. This will result in their greater lethality and survivability.

**FY 2003 (Accomplishments):** Completed safety assessment. Obtained long lead-time test items/facilities. Fabrication.

**FY 2004 (Plans):** Test item delivery. Complete all remaining pre-test analyses and assessments. Conduct live fire testing.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Demolition Weapons</b>	USSOCOM	0.349	0	0

This project, initiated in FY 2001 with a two phase approach, is evaluating candidate shoulder-fired weapons developed by Diehl/Dynamit Nobel of Germany and Bofors of Sweden. The first phase (Anti-Tank 4 Confined Space High Penetration (AT4CS HP)) provided the urgent confined space capability to SOCOM users. The second phase (AT4CS RS, RS for Reduced Sensitivity) made significant improvements to the phase I systems (AT4CS HP) with fuze and explosive upgrades to meet safety review board requirements. Both phases of this project provide a critical capability to Special Operations Forces missions, including, engagement of targets from a confined space, Military Operations in Urban Terrain, anti-armor, and direct engagement of targets in protected/covered areas.

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**FY 2003 (Accomplishments):** Completed all safety tests and limited safety confirmation obtained; Testing demonstrated the system to be effective and can be safely fired from confined spaces; Systems were procured and immediately deployed to Afghanistan and Iraq; Milestone C production approval received in August 2003.

	Service	FY 2003	FY 2004	FY 2005
<b>Assault Breacher Vehicle Mine Plow and Lane Marking System</b>	Marine Corps	0.291	0	0

This project, initiated in FY 2002, is evaluating Full-Width Mine Plows and Lane Marking Systems manufactured by Pearson Engineering of the United Kingdom and Israel Aircraft Industries, RAMTA Division. These subsystems will be integrated into the Marine Corps' Assault Breacher Vehicle and tested to verify vendor performance claims and to satisfy the requirement for in-stride breaching capability, operational suitability, and shock and mine blast.

**FY2003 (Accomplishments):** Twenty (20) Full Width Mine Plows and twenty (20) Lane Marking Systems were procured on an urgent basis from the UK manufacturer, Pearson Engineering. The MP and LMS FCT evaluation provided the required background information and enabled the Marine Corps to rapidly procure these systems, integrate onto the M1A1 main battle tank, meeting urgent requirements of the Operating Forces in support of Operation Iraqi Freedom (OIF). The procurement value in support of OIF was \$11.7 million. Additional procurements of Mine Plows and Lane Marking Systems for the ABV program are programmed for FY 2006 and FY 2007 and will exceed \$16 million. Additional procurement decision is scheduled for 2nd Quarter, FY 2004.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Ballistic Armor for Aviators</b>	Army	0.244	0	0

This project, initiated in FY 2003, is evaluating lightweight ballistic armor, by Australian Defence Apparel Pty Ltd and Craig International Ballistics of Australia; Advanced Ferrite Technology GMBH of Germany; ACERAM Technologies of Canada; and Meggitt Armour Systems of the United Kingdom, for use on the RAH-66 Comanche Helicopter. If successful, the project would provide increased ballistic protection over the current armor and greatly reduce the overall weight of the aircraft. This is critical, because in addition to the increased survivability provided, the reduced weight will result in greatly increased operational aircraft performance (vertical climb/lift and payloads), and a greatly increased RDT&E cost avoidance.

**FY 2003 (Accomplishments):** Market survey complete. Contract prep/award.

**FY 2004 (Plans):** Conduct/complete/report technical/operational testing/evaluation. IPR decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Body Armor Flotation Vest</b>	USSOCOM	0.174	0	0

This project, initiated in FY 2003, is evaluating inflatable body armor systems developed by International Safety Products Ltd of the United Kingdom. The systems protect against bullets and fragmentation, while providing the wearer with increased range of movement and comfort.

**FY 2003 (Accomplishments):** Body Armor Flotation Vest requirements were refined to be compatible with the releasable body armor features of the Body Armor Load Carrying System; Evaluated candidate system designs and down selected to a single foreign vendor; Procured test articles and began technical testing.

**FY 2004 (Plans):** Complete technical and operational testing; Compile test data and

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prepared the decision packet; Obtain procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Body Worn Radar Warning Receivers</b>	USSOCOM	0.325	0	0

This project, initiated in FY 2003, is evaluating commercially available radar warning receivers developed by Filtronic Components and Spectrum Solutions, both from the United Kingdom, to determine if either provides critical threat warning and situational awareness to meet Special Forces requirements.

**FY 2003 (Accomplishments):** Awarded contract for test articles; Established agreements with test organizations and completed test planning.

**FY 2004 (Plans):** Receive equipment from vendors and begin technical and user evaluations; Compile test data, prepare decision packet, and obtain procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Bradley Fighting Vehicle Long-Life Roadwheels</b>	Army	0.232	0	0

This project, initiated in FY 2001, is evaluating polyurethane coatings for combat vehicle roadwheels, developed by Elastochem Specialty Chemicals of Canada, Allthane Technologies of the Republic of South Africa, and Winfield Industries of Buffalo, New York, to upgrade the Bradley Fighting Vehicle (BFV) and extend its service life for a potential three-fold O&S cost savings over the current rubber roadwheels. This O&S cost savings could be quite significant given the life cycle of the BFV, and the fleet of other tracked combat vehicles that this could have potential application to.

**FY 2003 (Accomplishments):** Completed all testing/evaluation of the two foreign candidates.

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**FY 2004 (Plans):** Complete testing/evaluation of the US candidate. Publish final report. IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Communications Distribution System</b>	Navy	0.843	0	0

This project, initiated in FY 2002, is evaluating a digital voice and data distribution system developed by Computing Devices and fielded in Marine Corps ground command and control systems, when integrated with the KC-130 aircraft for command post complexes ranging from Marine Expeditionary Force headquarters to squadron level.

**FY 2003 (Accomplishments):** Completed test and evaluation of system. The USMC procured CDS equipment valued at \$1.25 million in October 2002. A second production option was recently activated in September 2003 for \$1.35 million. Additional follow-on production options provide the potential for additional CDS suites to be procured by the Marine Corps.

	Service	FY 2003	FY 2004	FY 2005
<b>Corona Monitoring System for High Power VLF/LF Communications</b>	Navy	0.279	0	0

This project, initiated in FY 2003, is evaluating commercially available daylight corona cameras manufactured by OFIL, Ltd. of Israel, and the Centre for Integrated Sensing Systems (CSIR) of the Republic of South Africa. Providing early detection of damaging corona formation will allow necessary corrective action, and prevent unplanned outages in communications to submerged submarines.

**FY 2003 (Accomplishments):** Comparative testing of the two candidate cameras was

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completed to determine if either camera was suitable for use in detecting corona at VLF/LF frequencies. Several tests were conducted. The tests included: side by side tests at VLF that show the cameras can detect several phases of the corona phenomena; outdoor tests to determine the effectiveness of the cameras in detecting corona on antenna elements at varying distances; side by side tests at VLF and LF to determine if either camera is impacted by electric field electromagnetic interference; and side by side tests of the candidate cameras inside the tuning building (helix house) that were monitored remotely via cable to determine if there is magnetic field electromagnetic interference. A procurement decision is pending.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Deployable Instrumentation for Marine Air Ground Task Force (MAGTF) Training System</b>	Marine Corps	0.872	1.668	0.585

This project, initiated in FY 2003, is evaluating mobile Range Instrumentation Systems developed by Saab Training Systems of Sweden and RUAG of Switzerland to meet Marine Corps requirements to integrate current training devices, which provide deployable force-on-force training for the Marine Air Ground Task Force.

**FY 2003 (Accomplishments):** Contract awarded to Saab Training Systems (Sweden) and Ruag (Switzerland) for test articles and associated technical efforts.

**FY 2004 (Plans):** Conduct preliminary system integration tests and operational evaluation. Initiate field evaluation (user-jury).

**FY 2005 (Plans):** Complete field evaluation and make procurement decision.



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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Digital Flight Control System for EA-6B</b>	Navy	1.162	0.556	0

This project, initiated in FY 2002, is evaluating a digital flight control system (DFCS) developed by British Aerospace (BAE) Systems Avionics Ltd. for the Eurofighter, to replace the increasingly obsolete automatic (analog) flight control system in the Navy's EA-6B "Prowler" aircraft. The project follows successful integration of the BAE DFCS into the Navy's F-14 "Tomcat" aircraft.

**FY 2003 (Accomplishments):** The project completed safety and reliability assessments. An independent cost estimate was performed to determine the necessary funding to execute the flight control systems upgrade. BAE Systems issued a ROM to the program office.

**FY 2004 (Plans):** Award BAE contract to modify F-14 DFCS computers into EA-6B DFCS configuration. Perform lab and ground testing of prototype EA-6B DFCS.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Eagle Vision Satellite Imagery Receiving and Processing Station Sensor Upgrade</b>	Air Force	0.874	0	0

This project, initiated in FY 2002, is evaluating the improvement in Eagle Vision performance achieved by incorporating 2.5-meter resolution imagery from the French SPOT 5 satellite. The use of the most advanced commercial imagery products in aircrew mission planning and rehearsal systems provides a dramatic increase in aircrew/aircraft survivability and mission effectiveness. Eagle Vision is the Department of Defense's only deployable commercial satellite imagery receiving and processing ground station.

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**FY 2003 (Accomplishments):** Used to provide imagery to forces engaged in combat in both Iraq and Afghanistan in Operations SOUTHERN WATCH, ENDURING FREEDOM and IRAQI FREEDOM. Most recently, Eagle Visions proved its multifunctional role by providing badly needed imagery to FEMA in support of disaster relief for hurricane Isabel. Anticipate contract in December for \$20M for SpotV system for Hawaii, upgrade system I to the level of Spot V.

	Service	FY 2003	FY 2004	FY 2005
<b>Eye-Safe Laser Rangefinder for M1A1 Main Battle Tank</b>	Marine Corps	1.464	0.612	0.053

This project, initiated in FY 2003, will evaluate eye-safe lasers developed by Zeiss of Germany and Thales (formerly AVIMO) of the United Kingdom, for range, beam divergence, output energy, shot life, receiver field of view, sustained rate of ranging, and other parameters used to locate distant targets for the M1A1 Firepower Enhancement Program. The eye-safe laser is expected to increase the range performance by 2000 meters.

**FY 2003 (Accomplishments):** Awarded contract for test articles. Received foreign test data. Complete test planning and Preliminary Design Review (PDR) with both foreign vendors. Conducted weekly system and integration working group meetings.

**FY 2004 (Plans):** Receive test articles and conduct M1A1 integration tests. Conduct system testing at the Aberdeen Proving Ground, MD. Conduct user evaluation tests.

**FY 2005 (Plans):** Complete data analysis and evaluation. Make procurement decision (projected 2<sup>nd</sup> Quarter).

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	Service	FY 2003	FY 2004	FY 2005
<b>Fiber Optic Security Fence</b>	Air Force	0.058	0	0

This project, initiated in FY 2002, is evaluating a perimeter fence developed by Zinus, Inc. of the Republic of Korea that continuously monitors laser pulses to detect and locate physical intrusion with high alarm reliability and a low false-alarm rate. The system provides intrusion detection and requires minimal maintenance. It can be placed on existing fences or walls or used as a stand-alone fence.

**FY 2003 (Accomplishments):** Completed equipment installation and testing at the Test Site, Eglin AFB. Due to both hardware and software deficiencies the tests were not favorable. The mechanical failure was corrected by changing a metal fastener and the software anomaly was identified and corrected. The equipment will be retested in 1<sup>st</sup> Qtr FY 2004 at vendors expense.

	Service	FY 2003	FY 2004	FY 2005
<b>Floating Smoke Pot System</b>	Marine Corps	0	0.683	0

This project, initiated in FY 2001, is evaluating a Floating Smoke Pot manufactured by Diehl Munitionssysteme (formerly Comet Pyrotechnik) to replace the current K867 floating smoke pot for use in training and combat, on land and in water. The current floating smoke pot produces a smoke that possesses carcinogenic properties and a fuze that has experienced reliability problems. The German item adds infrared smoke to screen troops in low-light situations against night-vision devices.

**FY 2003 (Accomplishments):** Diehl successfully completed the production and Initial Operating Test (IOT) of 120 Floating Smoke Pot units.

**FY 2004 (Plans):** Initiate and complete initial functional, insensitive munitions, safety, environmental, durability, hazard and user tests to be conducted at the Naval

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Surface Warfare Center, Crane Division and the US Army Soldier and Biological Command.  
 Make procurement decision (projected for 1st QTR, FY 2005).

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Fuel Cells for Dismounted Soldier Systems</b>	Army	0.912	0.612	0

This project, initiated in FY 2003, is evaluating electrochemical fuel cells developed by Ballard Power Systems and Hydrogenics, both of Canada; NoVars and Smart Fuel Cells, both of Germany; Intelligent Energy, Inc. of the United Kingdom, to meet Army requirements for longer lasting, lighter-weight portable power sources. This project directly supports Army "Transformation" in that it has direct application to the "Landwarrior" program, and potential application to the Future Combat System program, making for a lighter, more mobile, more lethal, yet more survivable fighting force.

**FY 2003 (Accomplishments):** Contract prep/award. Test planning/prep complete. Safety assessment complete.

**FY 2004 (Plans):** Test articles received. Conduct/complete/report lab/environmental/safety/operational testing/evaluation. IPR decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Global Cellular Phone System Optimization</b>	USSOCOM	1.743	0.367	0

This project, initiated in FY 2003, is evaluating commercially available hardware and software that can monitor, exploit, and interrupt portable cellular phone transmissions.

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**FY 2003 (Accomplishments):** Placed delivery orders with companies in three countries to procure equipment and software; Established agreements with test organizations and completed test planning.

**FY 2004 (Plans):** Receive test hardware; Complete technical testing and begin operational/user testing.

**FY 2005 (Plans):** Complete user testing and compile test results; Prepare decision packet and obtain procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>High Frequency Adaptive Antenna Receive System Replacement</b>	Navy	0.256	0	0

This project, initiated in FY 2002, is evaluating a high-frequency adaptive antenna system developed by SED Systems to meet a Navy requirement to improve the quality, range, and anti-jam performance of Link-11, ANDVT, and HF radio communications with maritime patrol and surveillance aircraft.

**FY 2003 (Accomplishments):** Due to the technical circumstances surrounding the development and testing of the PHFARS system, the project will be carried over into FY04. The technical issues that affected the performance of the system, the maintenance, training, and installation requirements have been corrected and are complete. The system was delivered and installed at SSCC Charleston test bed. Factory acceptance test has been completed and discrepancies are being addressed. Antennas' evaluation will be conducted concurrently with system operational evaluation test.

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	Service	FY 2003	FY 2004	FY 2005
<b>High Temperature Protective Coating for Gas Turbine Engines</b>	Navy	0.523	0.851	0.698

This project, initiated in FY 2003, is evaluating a protective coating made by MDS-PRAD, of Ural Works of Russia (PRAD) and MDS Aerospace of Canada, for the high-temperature section of turbine engines. The protective coating reduces hot-gas corrosion, oxidation and thermal fatigue.

**FY 2003 (Accomplishments):** Down selected potential engine candidates based on various factors. MDS (Canada) and PRAD (Russia) met in Moscow in August 2003 to review the FCT HT Coating program objectives and schedule.

**FY 2004 (Plans):** Finalize contract award with MDS-PRAD. Continue planning and coordination with the NAVAIR AV-8B/F402 engine Accelerated Mission Endurance Test (ASMET). Turbine vane sets will be coated for the turbine rainbow wheel. The rainbow wheel will include the MDS-PRAD coated blades as well as uncoated blades and a few other coatings. The ASMET will evaluate the coating system under a realistic engine-operating environment and simulate the full engine duty cycles.

**FY 2005 (Plans):** Import an EB-PVD Coating Machine from Russia and make it operational in Canada. Demonstrate NAVAIR coated engines during ASMET. Work with engine contractors to transition coating system via an engine contract change proposal (ECP) and vendor source qualification plan (funded by the NAVAIR engine Component Improvement Program (CIP)).

	Service	FY 2003	FY 2004	FY 2005
<b>Improved Specific Emitter Identification System</b>	Navy	0.967	0.306	0

This project, initiated in FY 2003, is comparing NSA-compliant alternatives developed by QinetiQ of the United Kingdom to the U.S. specific emitter identification processors for

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passive identification and fingerprinting of emitters in naval applications. The two NSA-compliant systems currently in Navy use will be included in the tests for comparison.

**FY 2003 (Accomplishments):** The I-SEI FCT focused specifically on the operational capabilities of the US and UK systems in a dense electronic environment limited to pulsed maritime and land-based radars. Four specific tests were conducted, using both live emitters from US electronic range facilities and controlled laboratory testing using recorded ELINT signatures. The evaluation focused on a comparative analysis of a series of measurable performance parameters in a real and simulated ELINT environment. Both the hardware and algorithms were examined. The specific test scenarios that were used in order to maximize data collection and observational information include: identification specificity, generated and pre-recorded signals laboratory testing, maritime range testing, and land-based range testing. All test scenarios have been completed and the Center for Naval Analyses (CNA), the I-SEI FCT Test Evaluator, has completed the data analysis.

**FY 2004 (Plans):** Environmental Test Phase: The I-SEI environmental test phase will conclude all phases of the test and evaluation. This testing phase will include the purchase of three I-SEI cardsets for use in shake/rattle/roll testing in case of destruction. The I-SEI final report on the preliminary findings will be completed and distributed upon conclusion of this phase.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Infrared (IR) Decoy</b>	Navy	1.655	0	0

This project, initiated in FY 2002, is evaluating an infrared decoy produced by Magellan Aerospace, the Canadian MJU-5188 liquid pyrophoric decoy, which may have the spectral and spatial characteristics required to provide tactical aircraft with dramatically increased self-protection against IR threat missiles. The MJU-5188 was developed for use on tactical aircraft and has demonstrated excellent effectiveness in Canadian tests against advanced threats.

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**FY 2003 (Accomplishments):** Collected banded calibrated imagery radiometric measurements during flight function testing at Pt. Mugu, CA (NOV 2002). Created a MJU-5188 Flare model for use in the MOSAIC digital model as a tool for optimizing dispense patterns during flight (JUN 2003). Met with Canadian Government officials at MSIC Huntsville for preliminary discussions based on quick look SEP 02 flight test (AUG 2003). Conducted a comprehensive flight function test at China Lake, CA (SEP 2003). Utilized seven F/A-18E missions, which dispensed multiple patterns at various aspects. Fielded 20 captive threat infrared seekers in three Seeker Test Vans (STV's). Collected ground-to-air spectral and banded infrared calibrated imagery. Commenced data analysis. Decoy failed to perform and continuation was cancelled for FY 2004 and beyond.

	Service	FY 2003	FY 2004	FY 2005
<b>Multi-Role Anti-Armor Anti-Personnel Weapon System (MAAWS) Illumination Round</b>	USSOCOM	0.540	0.717	0

This project, initiated in FY 2001, is evaluating illumination ammunition developed by Saab Bofors Dynamics of Sweden for the 84mm Carl Gustaf recoilless rifle. The round has a visible candle with increased burn duration and a dual safe fuse that meets US Army Fuse Safety Review Board Standards.

**FY 2003 (Accomplishments):** Incorporated design changes strengthening the material in the fuze to improve handling qualities and reliability; Ordered test rounds to be used in product qualification testing.

**FY 2004 (Plans):** Receive test hardware; Conduct technical and safety testing; Begin user testing.

**FY 2005 (Plans):** Complete user testing; Receive safety and production certification; Begin production.



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	Service	FY 2003	FY 2004	FY 2005
<b>Man Portable Intrusion Detection System</b>	Air Force	0.151	0	0

This project, initiated in FY 2003, is evaluating a wireless surveillance system developed by Sensor Electronics, Ltd., United Kingdom. This palm-sized, passive infrared detector/sensor system has potential to provide covert or overt, high-value item protection, standoff perimeter approach surveillance, or area protection for airbase ground defense operations.

**FY 2003 (Accomplishments):** The system did not test well, yet NATO/USAFE verbal feedback on the system, one version of which has a NATO stock number, is positive. The detrimental Florida environmental conditions encountered may require a deployment limitation for certain USAF applications. Additional configuration evaluations are being investigated.

	Service	FY 2003	FY 2004	FY 2005
<b>Man Portable Satellite Communications (SATCOM) System</b>	USSOCOM	1.801	0.222	

This project, initiated in FY 2003, is evaluating small, lightweight satellite dishes manufactured by SweDish of Sweden that can provide one-person operation of a turnkey satellite communications solution. Two sizes of small dishes promise to provide secure communications (live video/audio streaming, broadband transmission and automated setup) without sacrificing the identity or location of the user.

**FY 2003 (Accomplishments):** Established infrastructure for long term support of the satellite dish system; Procured test articles; Completed technical testing and began operational user assessment with positive results to date; Assessment has extended to

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operational units deployed in Iraq; Broad interest in procuring systems includes FBI, FEMA, NSA, National Guard and others.

**FY 2004 (Plans):** Complete testing and certification process; Compile test data; Prepare procurement packet and obtain procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Missile Reserve Battery Replacement</b>	Air Force	0.325	0.690	0

This project, initiated in FY 2003, is evaluating battery cells developed by Saft Alcatel of France and Japan Storage Battery, Ltd. (Nippondenchi) for use in missile/booster environments. If testing is successful, Eagle Picher will assemble the batteries with cells from candidate source(s) incorporating the newer technologies.

**FY 2003 (Accomplishments):** An unexpected issue during the 2<sup>nd</sup> quarter with strong advocates for both cell and full up battery testing. This has delayed the project due to funding constraints which preclude testing both. The final result of the study was a return to the original intent of the program to test several individual cells rather than one battery.

**FY 2004 (Plans):** Complete contract actions with the testing facility; draft and provide Test Requirements Document to NSWC Crane, Indiana. Complete acquisition negotiations for test articles.

	Service	FY 2003	FY 2004	FY 2005
<b>NBC Multipurpose Protective Sock</b>	Marine Corps	1.173	0	0

This project, initiated in FY 2002, is evaluating candidate launderable socks developed by Paul Boye of France, Texplorer GmbH and Helsa-Werke GmbH of Germany, and Purification Products, Ltd. of the United Kingdom as integral components of the Joint Service Lightweight

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Integrated Suit Technology (JSLIST) ensemble. The multipurpose protective sock component of the ensemble must provide chemical/biological protection and friction protection to the foot.

**FY 2003 (Accomplishments):** Completed validation and verification of Swatch test fixtures at Dugway Proving Grounds, Utah. Began user tests to include aviator tests by HMX-1.

**FY 2004 (Plans):** Current anti-terror operations caused Test Range unavailability, requiring a shift of effort to FY 2004 (using FY 2003 funds). Receive test articles. Initiate and complete Swatch tests, field durability tests, and selected follow-on chemical tests. Procurement decision is projected for 4<sup>th</sup> Quarter.

	Service	FY 2003	FY 2004	FY 2005
<b>Rayon for Heatshield and Motor Nozzles</b>	Air Force	0.988	0.790	0

This project, initiated in FY 2003, will evaluate high-quality rayon from Lenzing Technik of Austria, Snecma Moteurs of France, Acordis of Germany; and Acordis of the United Kingdom to meet Air Force requirements for use in high temperature applications, such as heat shields and rocket motor nozzles. There are no longer any domestic suppliers of aerospace-grade rayon for rocket nozzles and reentry heat shield thermal protection.

**FY 2003 (Accomplishments):** A final selection of materials was made based on a variety of factors including processing, manufacturing, schedule, and test benefits. The materials selected for processing and testing are Acordis Enka, Acordis Cordenka 610F, Snecma C2, Acordis Tencel, and Fabelta. All of these fibers have been ordered and a couple of the fibers are on hand to start the weaving process.

**FY 2004 (Plans):** The candidate fibers will be processed into carbon phenolic, the test plans will be finalized and the evaluation will be conducted.

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	Service	FY 2003	FY 2004	FY 2005
<b>Replacement Structures for Aircraft</b>	Navy	1.010	1.613	0.308

This project, initiated in FY 2003, will certify and qualify PZL-Swidnik of Lublin, Poland, as an approved source for the manufacture of aluminum honeycomb panels and sub-structures to support in-service, but out-of-production aircraft. Hexcel of Belgium will provide honeycomb sub-cores to PZL-Swidnik for the project. The immediate objective is to provide a cost-effective solution to the warfighter for the replacement of flight control surfaces and sub-structures for the F-14, which is no longer in production and for which parts are no longer available from the original manufacturer.

**FY 2003 (Accomplishments):** Awarded technical support and services contract to PZL-Swidnik for the execution of a certification and subsequent qualification effort to certify the existing facility and qualify the artisans in the production fabrication of metallic- and composite-bonded components. Awarded teaming and consultation services contract to Aurora Flight Sciences for the provisioning of technical and logistics services to PZL-Swidnik and the US Navy/F-14 Program Office for direct assistance in the successful execution of the FCT effort. Established a technical and logistics team to successfully execute the FCT effort.

**FY 2004 (Plans):** Provide manufacturing data package and production representative (non-flyable part) to PZL-Swidnik. Procure necessary raw materials from approved domestic sources in order to execute effort (skins, aluminum core, adhesive, primer, epoxy paint). Disassemble sample part and Fabricate bond form tools and associated holding fixtures required to fabricate new part (reverse engineering effort). Fabricate coupon samples and production representative part for fit check followed by first article destructive evaluation. Conduct first article destruction/qualification testing.

**FY 2005 (Plans):** Submit qualification data package to NAVICP and Defense Supply Center Richmond (DSCR) for acceptance and subsequent inclusion into approved vendors procurement database. Establish production/procurement contract with PZL-Swidnik.

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	Service	FY 2003	FY 2004	FY 2005
<b>Resilient Abrasive Resistant Skirt for Landing Craft Air Cushion (LCAC)</b>	Navy	0.436	1.946	0.399

This project, initiated in FY 2003, is evaluating candidate materials developed by Reeves S.P.A. of Italy, Trelleborg of Sweden, and Northern Rubber of the United Kingdom to determine if they can provide a 50 percent improvement in the LCAC skirt's resistance to abrasion without a weight or cost penalty.

**FY 2003 (Accomplishments):** Conducted site visits to Akron Rubber Dev Labs, Dayton Test Facility, and Westland Aerospace to evaluate test capabilities and obtain information on applicable test procedures. Conducted Deep Skirt finger load characterization testing on LCAC 091. Measured underway finger loads and accelerations. Issued purchase orders to Northern Rubber of U.K. and Trelleborg of Sweden for visit to U.S. and delivery of phase-one evaluation materials. Conducted preliminary review and made revisions to LCAC skirt material Project Peculiar Document to eliminate legacy requirements. Sent current skirt material samples to foreign vendors to assist in their comparisons. Contact made with JHRG, a domestic company interested in supplying test material in conjunction with this FCT. Researched standardized test candidates (ISO and ASTM). Started development of laboratory test plan.

**FY 2004 (Plans):** Issue purchase orders to Reeves of Italy for the meeting/visit to the United States and for delivery of phase one material. Complete laboratory test plan and accomplish lab comparative testing of phase one materials. Perform finger load characterization testing on LCAC 066 for comparison to standard skirt loads. Install test fingers of phase one materials onto LCAC. Procure phase two evaluation materials, perform laboratory comparative testing, and install test fingers on LCAC. Complete evaluation of phase one and two and make final downselect of top three materials.

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**FY 2005 (Plans):** Procure full sets of LCAC fingers made of top three materials and install onto Fleet craft. Start Fleet In-Service evaluation and complete FCT Close-out report. Make final revision to skirt material Project Peculiar Document to reflect performance of top material(s).

	Service	FY 2003	FY 2004	FY 2005
<b>Self Destruct Fuze for Multiple Launch Rocket System (MLRS)</b>	Army	0.295	0.378	0

This project is evaluating the performance, safety, and feasibility of a self-destruct fuze developed by Israeli Military Industries of Israel. The fuze will be integrated into the submunitions of the MLRS system for testing, to the current dud rate of the submunitions from more than 5% to less than 1%. This is critical because that would greatly enhance both the operational capability and safety of our forces maneuvering on the battlefield, environmental cleanup of our training ranges, and future MLRS FMS cases to countries who have a self-destruct/dud-reducing requirement for their own munitions.

**FY 2003 (Accomplishments):** Completed phase I testing/evaluation/analysis. Down-selected to the single foreign candidate.

**FY 2004 (Plans):** Conduct/complete/report phase II testing/evaluation. Production IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Self-Regulating Anti-G Ensemble</b>	Air Force	0.265	0.145	0

This project, initiated in FY 2002, is evaluating an advanced technology liquid-filled g-suit manufactured by the Swiss-German joint venture, Autoflug Libelle GmbH. Gravity-induced loss of consciousness plagues fighters above 6g, and current equipment limits crews from achieving and maintaining sustained high-g maneuvers without significant risk and fatigue.

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**FY 2003 (Accomplishments):** Completed testing at Eglin AFB, FL and the results could not support flight certification. SAGE requires additional study prior to fielding to determine why SAGE is not providing adequate g-protection for all of the FCT test subjects? Are aircrew proficiency training methods inadequate? If so, how can they be changed to achieve 100% usability? And, from a scientific perspective, does SAGE actually reduce fatigue? Does it provide an adequate response to rapid G-onset.

**FY 2004 (Plans):** Began Phase IV, a laboratory study at the AFRL/HEPA acceleration laboratory at Wright-Patterson AFB to resolve issues precluding flight certification of SAGE.

	Service	FY 2003	FY 2004	FY 2005
<b>Shipboard Anti-Jam GPS Antenna</b>	Navy	1.075	0	0

This project, initiated in FY 2003, is evaluating the GAS-1 Global Positioning System (GPS) anti-jam antenna for Navy surface ship applications. The GAS-1 is produced by Raytheon Systems Limited, Harlow, United Kingdom, and is mounted on large U.S. Air Force aircraft. Emphasis will be placed on electromagnetic compatibility in the dense electronic environment of a Navy battle group. The FCT Program recently qualified the smaller GAS-1N anti-jam antenna for tactical aircraft.

**FY 2003 (Accomplishments):** Completed the EMC survey to determine a worst-case ship class, which will present the greatest Blue Force Emitter (BFE) interference to GAS-1. Due to fleet assets unavailability, testing delayed until 2<sup>nd</sup> QTR FY 2004 (using FY 2003 funds). Verify antenna performance within the ship and Battle Group environment. Conduct ship testing at port environmental, EMI, and platform interface for the MCM platform, and the MCM ship testing at sea: Anti-Jam effectiveness performance evaluation. The SAGA blue force emitter test on the identified ship class will be a key

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part of the NAVWAR Ship IPT effort. Its objective will be to demonstrate compatibility with the Navy shipboard environment and provide additional test data on the GPS Anti-jam System (GAS-1) antenna for final evaluation of the antenna performance in the Battle Group environment.

	Service	FY 2003	FY 2004	FY 2005
<b>Silverized Kevlar</b>	Army	0.610	0	0

This project, initiated in FY 2002, evaluated Silverized Kevlar developed by Silverleaf Materials, Ltd. for use on the Army's RAH-66 Comanche helicopter. This material was to enhance the performance characteristics of the structure with regard to conductive ground plane, electro-magnetic interference shielding, and static discharge, and achieve overall weight savings by eliminating layers of parasitic conductive materials. It was important because decreased weight greatly enhances helicopter operational performance and survivability, while greatly increasing RDT&E cost avoidance.

**FY 2003 (Accomplishments):** Conducted/completed/reported on all scheduled test/evaluation activities to date. Based upon results, which showed that the product was not achieving the required results, and not having any fixes, the PM/Service/OSD jointly decided to terminate the project.

	Service	FY 2003	FY 2004	FY 2005
<b>Small Bundle Resupply System</b>	Army	0.267	0	0

This project, initiated in FY 2003, is evaluating compact guidance and control units developed by two of the following three competing vendors: MMist of Canada; and Koable of the Republic of Korea as alternatives to the Parafoil Aerial Delivery System - Extra Light. If successful, the project would provide extremely precise high-altitude delivery of small bundles and airborne troops for missions such as re-supply for military operations in urban, or extremely



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rugged/difficult/remote natural, terrain, delivery of small robots and sensors, counter-terror operations, and humanitarian support missions. This has direct application to many current on-going U.S. Army operations world-wide.

**FY 2003 (Accomplishments):** Project approval. Contract prep/award. Test plan completed.

**FY 2004 (Plans):** Receive test items. Conduct/complete/report on all test/evaluation activities. IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Special Effects Small Arms Marking System (SESAMS)</b>	Marine Corps	0.488	0.367	0

This project, initiated in FY 2003, is evaluating the safety and integration suitability of Simunition's 5.56mm linked low-velocity training munitions for the M249 Squad Automatic Weapon (SAW). The SESAMS is a user-installed weapons modification kit that allows the individual Marine to fire low velocity ammunition with non-toxic primers, and a non-toxic marking medium at short range while precluding the weapon from firing live ammunition.

**FY 2003 (Accomplishments):** Signed contract for test articles. Received foreign test data.

**FY 2004 (Plans):** Complete laboratory technical and safety testing and user tests. Make Procurement decision (projected for 1<sup>st</sup> QTR FY 2005).

	Service	FY 2003	FY 2004	FY 2005
<b>Ultra Light Aero Diesel Engine</b>	USSOCOM	0.682	0.181	0

This project, initiated in FY 2003, is evaluating a non-developmental diesel engine candidate in the 100 hp range for possible use on various Special Forces wind-supported air-delivery platforms.

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**FY 2003 (Accomplishments):** Completed full and open competition leading to selection of Diesel Air Limited of the United Kingdom; Awarded a contract for two engines to be integrated and tested on the Wind Supported Air Delivery System for further testing.

**FY 2004 (Plans):** Integrate test engines into the Wind Supported Air Delivery System; Complete bench testing, safety certification, and operational flight testing.

**FY 2005 (Plans):** Compile and evaluate test results; Complete procurement decision and close the FCT project.

	Service	FY 2003	FY 2004	FY 2005
<b>Underwater Communication and Tracking System for Submarines</b>	Navy	0.930	0.890	0

This project, initiated in FY 2003, is evaluating the suitability of the Nautronix/Maripro underwater digital communication (HAIL) system from Australia for real-time data exchange of positional information between submarines participating in open ocean exercises. The system has been successfully demonstrated in joint U.S.-Australian submarine exercises.

**FY 2003 (Accomplishments):** Awarded contract to Nautronix/ Maripro. Communicated successfully between Advanced SEAL Delivery System (ASDS), Host Submarine (HOSUB), and C-commando SEAL Host Platform. Communicated successfully on Dabob Bay between MK-69 Pinger and test platform. Participated in Lungfish '03 exercises with Australia. Issued Predicted Range Analysis report. Removed HAIL from the USS City of Corpus Christi (SSN 705) in Guam. Trained five crewmembers of ASDS, HOSUB, and C-commando on the installation and operation of HAIL.

**FY 2004 (Plans):** Prepare test plan for Sea Test 2A and Sea Test 2B. Develop Temporary Alterations (TEMPALTs) to support Sea Test 2A and Sea Test 2B. Conduct Sea Test 2A (ST2A). Conduct Sea Test 2B (ST2B) in conjunction with "Assured Access" exercise.

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	Service	FY 2003	FY 2004	FY 2005
<b>Wireless Local Area Network (LAN) Monitoring System</b>	USSOCOM	0.174	0	0

This project, initiated in FY 2003, is evaluating commercial lightweight, portable wireless local area network monitoring systems developed by Wlanbit of Finland to meet Special Forces requirements for a component of the Joint Threat Warning System (JTWS).

**FY2003 (Accomplishments):** Awarded contract for test articles; Established agreements with test organizations and completed test planning.

**FY2004 (Plans):** Receive equipment from vendors and begin technical and user evaluations; Compile test data, prepare decision packet, and obtain procurement decision.

**FY 2004 NEW START PROJECTS:**

The projects identified below were highlighted as FY 2004 FCT new start projects in our Congressional Notification letter dated 20 August 2003.

	Service	FY 2003	FY 2004	FY 2005
<b>20mm Replacement Round</b>	Air Force	0	1.012	0.096

This project will evaluate 20mm ammunition developed by Diehl Munitionssysteme of Germany and Oerlikon of Switzerland to replace current 20mm combat rounds which limit mission effectiveness and expose both pilot and aircraft to unnecessary risk. Although the current PGU-28B meets requirements for employment ranges and target damage, it is currently suspended due to twenty-five in-barrel detonations that caused aircraft damage and could have resulted in pilot death and aircraft loss. The PGU-28B inventory has been declared "For Emergency Wartime Use Only". Alternative M-56 rounds do not present these safety hazards, they require

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the pilot to engage targets at significantly closer ranges without the same expected results and with a resultant increase in vulnerability.

**FY 2004 (Accomplishments):** The Ogden Air Logistics Center Air to Surface Munitions Directorate (OO-ALC/WM) has conducted testing on all likely replacement rounds and is currently in the process of acquiring 2,000 rounds for handling and initial live fire testing. The FCT program will fund further development and operational testing required to field the ammunition.

**FY 2005 (Plans):** Complete Operational Testing and non-nuclear certification and initiate procurement if testing provides favorable results.

	Service	FY 2003	FY 2004	FY 2005
<b>40mm High Explosive Dual Purpose (HEDP) Improvement</b>	Marine Corps (joint w/USSOCOM)	0	0.584	1.703

This project will integrate and evaluate an improved propulsion propellant "after armor" effect technology and a standardized fuze interface into a 40mm HEDP cartridge for use in both the MK19 Grenade Machine Gun and MK 47 Advanced Lightweight Grenade Launcher. NAMMO of Norway developed the warhead and standardized fuze interface, Nico-Pyrotechnik of Germany developed the propulsion system, and Nitrochemie AG of Switzerland developed the propellant for the cartridge to be evaluated.

**FY 2004 (Plans):** Conduct fuze variations, IM compliant warhead, cartridge testing. Initiate integration tests of sub-assemblies.

**FY 2005 (Plans):** Upon successful completion of technical testing, the system integrator (NAMMO) will conduct integration testing of the components to ensure the performance of the cartridge meets the key performance parameters. The testing will include safety and environmental testing as well as an evaluation on production mechanics of the integrated design. Upon completion of the integration testing, the project will conduct testing

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necessary to determine the cartridge's ability to meet the requirements of MIL-STD 2105B. Finally, upon completion of the safety/environmental testing, the project will conduct user evaluations for both the Mk19 and Mk47 weapon systems to ensure the cartridge functions to standard in the intended environment. Procurement decision is projected for 2nd quarter, FY 2006.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Family of Interfaces for Chem Bio Clothing</b>	USSOCOM	0	0.389	0

With the advent of emerging chemical/biological (CB) protective material technologies a need arises for enhanced methods of sealing CB garment interfaces. The vulnerabilities created by the emerging barrier materials are the interfaces at the wrist, ankles, zippers, and the neck of CB garments, as demonstrated in recent vapor and aerosol testing. This project will evaluate new types of CB closures and interfaces developed by YKK Universal Fasteners of Japan and RiRi SA of Switzerland.

**FY 2004 (Plans):** Award contract for test articles; Receive test articles and conduct technical and user testing.

**FY 2005 (Plans):** Compile test results; Prepare decision packet.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Biocular Image Control for M1A1 Main Battle Tank</b>	Marine Corps	0	0.662	0.362

This project will evaluate the Biocular Image Control Unit (BICU developed by Brimar, as part of the Marine Corps' M1A1 Firepower Enhancement Program. The BICU directly supports the tank crew's situational awareness by enabling the 2<sup>nd</sup> generation Forward Look Infrared (FLIR) imagery to be displayed in the Gunner's Primary Sight monocular display and also the biocular display. The BICU will provide eye relief to the gunner that will significantly reduce gunner's fatigue. A successful FCT will enable the crewman to utilize the best features of

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direct view optics and 2<sup>nd</sup> generation FLIR imagery at the same time to acquire and engage targets.

**FY 2004 (Plans):** Conduct laboratory tests at the US Army's Night Vision & Electronic Sensors Directorate (NVESD), Fort Belvoir, VA. Initiate integration of the BICU into the Gunner's Sight of the M1A1 Main Battle Tank at the US Army Research and Development Center (ARDEC), Picatinny Arsenal, NJ.

**FY 2005 (Plans):** Conduct BICU system testing at Aberdeen Proving Ground, MD. Complete User evaluation tests. Make procurement Decision (projected for 4th QTR, FY 2005).

	Service	FY 2003	FY 2004	FY 2005
<b>Biosensors for Explosive Detection</b>	Marine Corps	0	0.180	0.100

This project will evaluate Biosens-E explosive detectors developed by Biosensors Applications of Sweden against improvised explosives devices, and conduct comparison analysis of test results of conventional explosive detection technologies being conducted by the Navy for the past three years.

**FY 2004 (Plans):** Prepare contract for purchase of test items; prepare test equipment; receive test item sensors and initiate testing.

**FY 2005 (Plans):** Complete testing; evaluate results; procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Celluloid Mortar Increment Containers</b>	Army	0	0.840	0.500

This project will evaluate and qualify a second source for nitrocellulose-based belted-fiber Mortar Increment Containers (MIC) for use with 60mm, 81mm and 120mm mortars. Qualification of the celluloid MICs developed by Kaufman & Gottwald GmbH (KAGO), of Austria, will

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significantly reduce procurement cost, thereby reducing overall program production costs, and will improve the robustness of the propulsion charge systems for semi- and auto- loading capabilities required for the Army's Future Combat System. These containers are also more "environmentally friendly" and safer than the current domestic product.

**FY 2004 (Plans):** Contract prep/award. Receive test articles. Begin phase I initial test/evaluation.

**FY 2005 (Plans):** Complete phase I initial test/evaluation. Conduct/complete phase II qualification test/evaluation. Publish report.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY2005</b>
<b>Deployable GSM Cellular Network</b>	USSOCOM	0	0.334	1.911

This project will evaluate a commercially available transportable cellular network developed by Ericsson of Sweden, that can be deployed worldwide (stand-alone) in support of mission requirements in austere environments. If testing is successful, the Swedish equipment will satisfy critical requirements of the Special Operations Forces Tactical Assured Connectivity System and the Joint Threat Warning System.

**FY 2004 (Accomplishments):** Enter agreement with U.S. Army for joint evaluation; Contract for and take receipt of test article, and receive vendor training; Conduct technical testing and begin operational testing.

**FY 2005 (Plans):** Complete operational testing; Compile test data, prepare decision packet and obtain procurement decision.

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	Service	FY 2003	FY 2004	FY 2005
<b>Deployable Multi-Purpose Moving Target System</b>	Marine Corps	0	0.467	0.351

This project will evaluate a deployable moving pop-up automated marking and targeting system developed by Thiessen Training Systems GmbH for range performance, target lifting life, hit indication, and other critical reliability performance parameters. A successful FCT will enable Marines to train as they fight and enhance proficiency with anti-armor engagement tactics.

**FY 2004 (Plans):** Receive test articles and conduct laboratory tests to include: Multiple Integrated Laser Engagement System (MILES) 2000 interface, safety, and integration with the Special Effects Small Arms Marking System (SESAMS) ammunition. Initiate User Tests.  
**FY 2005 (Plans):** Complete User Evaluation Test at Camp Pendleton, CA and Camp Lejuene, NC. Make procurement decision (projected for 1st QTR, FY 2006).

	Service	FY 2003	FY 2004	FY2005
<b>Gamma Titanium Sheets</b>	Army	0	0.710	0.745

This project will evaluate gamma-titanium sheets developed by Plansee of Austria as potential replacement for current structural components used on Army helicopter manifolds and exhaust firewalls. The potential benefits of  $\gamma$ -TiAl are being recognized throughout the aerospace community and this substitution, for example, could increase Vertical Rate-of-Climb performance for Comanche aircraft, which would greatly increase both aircraft operational capability and survivability, while reducing RDT&E costs.

**FY 2004 (Plans):** Contract prep/award. Receive test articles. Integration. Complete test



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plan. Begin phase I technical test/evaluation.

**FY 2005 (Plans):** Complete/report phase I technical test/evaluation. Begin phase II technical test/evaluation.

**FY 2006 (Plans):** Complete/report phase II technical test/evaluation. IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Guidance Components for Missiles</b>	Air Force	0	0.534	0.532

This project will evaluate the performance of missile guidance components developed by Radstone Technology of the United Kingdom, DY4/Force Computers of Canada, Aitech Defense of Israel, Saab Ericsson Space of Sweden, SBS (OR) Technologies of Germany, and Thales Computers of France. Improvements to basic guidance and control (G&C) technology and miniaturization of G&C components have potential to enhance the performance of U.S. non-strategic missile systems. Advanced components have been developed, are being used by foreign suppliers, and are candidates for easy integration into U.S. programs.

**FY 2004 (Accomplishments):** Data received to date indicates that the components are applicable to USAF purposes. This data will be used to plan the FCT testing. Components will be down selected based on an the predicted performance of the components and two sets from the down selected foreign vendor will be evaluated. The down select will be conducted in the first year by the gov't with assistance from Northrop Grumman and the Launch service contractor

**FY 2005 (Plans):** Hardware will be purchased and tested in the second year. One set will be reused for environmental testing for final validation of the capability of the chosen articles.

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	Service	FY 2003	FY 2004	FY 2005
<b>JSLIST Alternative Footwear Solution</b>	Marine Corps	0	0.493	0

This project will evaluate a one-size-fits-all, small packaged chemical-biological protective boot developed by Acton International, Inc. to meet urgent requirements of the Joint Service Lightweight Integrated Suit Technology (JSLIST) program. A successful FCT will enable improved operational suitability for the warfighter, meet urgent needs, and result in at least 25 percent production cost savings.

**FY 2003 (Accomplishments):** Initial FCT project tests were conducted under the Contamination Avoidance at Seaports of Debarkation (CASPOD) Advanced Concept Technology Demonstration (ACTD) Project. The ACTD funds were used to support the purchase of JSLIST Alternative Footwear Solution samples from Acton International to support the CASPOD follow on chemical testing.

**FY 2004 (Plans):** Complete field durability tests and initiate qualification testing. Make procurement decision (project FY 2005).

	Service	FY 2003	FY 2004	FY 2005
<b>JSLIST Block II Glove Upgrade</b>	Marine Corps	0	0.763	0.461

This project will evaluate nuclear, biological, chemical (NBC) protective gloves manufactured by Acton International, Inc. to meet the requirements for a "JB2GU" glove, a component of the Joint Service Lightweight Integrated Suit Technology (JSLIST) ensemble. The JB2GU will provide NBC protective gloves for the Army, Marine Corps, Navy and Air Force military personnel. The JB2BGU will be worn as part of the NBC protective ensemble and allow the warfighter to perform a full range of missions in NBC environments worldwide up to 30 days without performance degradation, by increasing tactility, dexterity, and durability beyond that found in the currently fielded butyl glove.

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**FY 2003 (Accomplishments):** Initial FCT project tests were conducted under the Contamination Avoidance at Seaports of Debarkation (CASPOD) Advanced Concept Technology Demonstration (ACTD) Project. The ACTD funds were used to support the purchase of JSLIST Block II Glove Upgrade samples from Acton International to support the CASPOD follow on chemical testing.

**FY 2004 (Plans):** Complete field durability tests and initiate qualification testing.

**FY 2005 (Plans):** Complete data analysis and qualification testing. Complete operational testing. Make procurement decision (projected for 4th QTR FY 2005).

	Service	FY 2003	FY 2004	FY 2005
<b>Large Scale Display System</b>	Army	0	0.222	0

This project will evaluate very high resolution Flat Screen Displays developed by NEC/Mitsubishi of Japan and Samsung of the Republic of Korea for potential application in Army battlefield C2 requirements. Successful evaluation and fielding will allow the commander and staff to simultaneously view the Command Operational Picture, employ collaborative tools, and directly monitor various feeds from sensors or news services to rapidly gain situational awareness/understanding. This will greatly enhance battlefield C2, thus overall operational effectiveness and survivability for units engaged in combat.

**FY 2004 (Plans):** Contract prep/award. Test items received. Integration. Conduct/complete/report all test/evaluation activities. IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Lightweight Prime Mover</b>	Marine Corps	0	0.556	1.596

The Lightweight Prime Mover Project is an FY04 Out-of-Cycle New Start Project. Separate

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Congressional notification will be forwarded in February 2004. This project will evaluate foreign non-developmental high mobility off-road vehicles manufactured by Automotive Technik Ltd and Supacat Ltd of UK and Krauss-Maffei-Wegman of Germany. These systems will be tested to verify vendor performance claims and to satisfy, at a minimum, the requirement for towing capability, operational suitability, and external transport via MV-22 Osprey. The Lightweight Prime Mover project will incorporate lessons learned from the joint program venture between the US Marine Corps, US Army, and United Kingdom for the LW155 medium howitzer program.

- FY 2004 (Plans):** Receive Test Articles/Prime Mover (2 per vendor), and perform testing.
- FY2005 (Plans):** Upon completion of end user evaluation and Milestone C decision, the program will determine whether to pursue production of 120 vehicles.

	Service	FY 2003	FY 2004	FY 2005
Lightweight Smoke Generator	Army	0	0.594	0.245

This project will evaluate a camouflage smoke generator developed by PZL Rzeszow of Poland that is significantly lighter, and produces a better screen, than the U.S. Army's M56 system. A key aspect of the Polish system is that it uses a combination of fog oil and infrared obscuring particles in one solution to provide visual/IR obscuration. This is in contrast to the M56 system, which uses additional components to separately disseminate fog oil and graphite. If the project is successful, significant weight reduction could be achieved and the Polish system could be incorporated into the Army's M56 production program, the Robotic Obscuration production program and the Future Combat System Obscuration development program. This will greatly enhance both operational effectiveness and survivability on the battlefield, as well as greatly increasing RDT&E cost avoidance. This is the very first U.S. Army FCT project with Poland, a new NATO ally, and active coalition partner in Operation Iraqi Freedom..

- FY 2004 (Plans):** Contract prep/award. Test items delivery. Complete test plan.
- FY 2005 (Plans):** Conduct/complete/report on all test/evaluation activities. IPR

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decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Lithium-Ion Battery Cells</b>	Army	0	2.002	1.838

This project will evaluate the potential for Li-Ion battery cells developed by SKC of the Republic of Korea, E-One Moli Energy Ltd. of Canada, and AGM Batteries, Ltd. of the United Kingdom to satisfy Army and USMC portable electrical power requirements for a high energy density, high cell potential fuel source. The candidates may provide greater energy than present Li-Ion cell-based batteries and have the potential to reduce the logistics burden and enhance cost effectiveness through increased mission times (increases in power), greater shelf life, increases in power, and greater recharging capability. This project is also estimated to result in a \$10 million RDT&E cost avoidance and a \$10 million O&S cost savings.

**FY 2004 (Plans):** Contract prep/award. Receive test items (cells).  
Conduct/complete/report technical test/evaluation.

**FY 2005 (Plans):** Receive test items (batteries). Conduct/complete/report field test/evaluation. IPR production decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Low Probability of Intercept Communications Intelligence Direction Finding</b>	USSOCOM	0	0.356	0.064

This project will evaluate commercially available equipment developed by Elta Electronics, Ltd. of Israel that will detect sideband, spread spectrum/broadband, and other types of low probability of intercept communication signals from potential adversaries to provide threat warning to meet the requirements of the Joint Threat Warning System.

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**FY 2004 (Plans):** Award contract for test articles and receive equipment; Begin technical testing.

**FY 2005 (Plans):** Complete technical and operational testing; Compile test data, prepare decision packet, and obtain production decision.

	Service	FY 2003	FY 2004	FY 2005
<b>MARIA (Congressional Plus Up)</b>	Navy	0	2.100	0.000

The FY 2004 Appropriation included a \$2.1 million plus up for MARIA to the Advanced Concept Technology Demonstration (ACTD) Program under Program Element 0603750D8Z. The ACTD Program did not have an existing MARIA Program in which to execute the FY 2004 funds appropriated. A Below Threshold Reprogramming Action was executed to reprogram these funds into the Foreign Comparative Testing (FCT) Program Element since MARIA was an active FCT project initiated in FY 2001. This project is evaluating a software-based command and control system from Teleplan AS that provides superior battlespace awareness through the rapid display of geographic imagery and positional information on friendly, neutral, and enemy units. The system provides advanced planning and decision aids such as communication and emitter propagation analysis tools. The project has the added benefit of increasing interoperability with U.S. allies. The objective is to integrate Maria into the Navy's Global Command and Control System-Maritime (GCCS-M) or the GCCS Integrated Imagery and Intelligence program. The Space and Naval Warfare Systems Command, San Diego, California, is conducting the test program at the Undersea Warfare Center, Newport, Rhode Island.

The Congressional plus up was reprogrammed under PBD 633 from the ACTD Program (Program Element 0603750D8Z) to the FCT Program. The Navy is currently conducting planning meetings to ensure the intent of this Congressional plus up is satisfied.

**FY 2004 (Plans):** Finalize RDT&E plan to upgrade and integrate MARIA into GCCS-M. MARIA was determined to be a robust mapping application that supports many of the features currently available in the Command and Control Personal Computer (C2PC) application

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fielded as part of the GCCS-M Program of Record (POR). This FCT has been valuable to the Navy Command and Control Systems Program Office in that testing was able to support this Office's "GEOBJECT" initiative. GEOBJECT is designed to introduce "map application independence" to C4ISR systems through adherence to a set of open-source based application program interfaces (APIs). GEOBJECT has been presented to and accepted by the GCCS Family of Systems as part of the way ahead for future C4ISR systems. The Global Information Grid Enterprise Services (GES) and Joint Command and Control (JC2) initiatives are in the process of determining the direction for mapping and visualization applications and technologies in future DOD C4ISR systems.

**FY 2005 (Plans):** Further test and evaluation will be performed to determine the MARIA's capabilities in supporting the GES and JC2 initiatives.

	Service	FY 2003	FY 2004	FY 2005
<b>Micro Electro Mechanical System (MEMS) Inertial Measurement Units (IMUs)</b>	Air Force	0	0.612	1.330

This project will evaluate the currently developed and deployed British Aerospace (BAE) Systems MEMS Inertial Measurement Unit which is reported to represent a significant size, weight, and cost advantage over domestic alternatives. Many current U.S. weapons require an IMU to make them intelligent/precision assets that can strike targets accurately. IMU costs have always been a major contributor to the high overall guidance system cost. Additionally, the IMU's relatively large size has driven the guidance system to be a significant portion of the "payload mass" that is lifted by the propulsion system, thereby reducing the available mass for lethal portion of the payload.

**FY 2004 (Accomplishments):** Technical specification (evaluation data) describing SiIMU01 has been received the Program Office confirmed that the components are suitable for tactical assets. Anticipate acquiring three each SiIMU01/02: one each for testing at the launch service subcontractors (OSC and Draper) and one for environmental testing. The IMUs will be integrated into a hardware-in-the-loop test fixture for evaluation. Efforts and costs are part of the launch service integrators' responsibility

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**FY 2005 (Plans):** Test and assess the SiIMU01/02 to verify its performance and suitability for both strategic and tactical assets. The tests will include verifying input/output throughput capabilities, power consumption, and performance against vendor-supplied specifications. Environmental testing will be conducted and will include testing against vibration, shock, temperature, humidity, and altitude operating environment requirements. The tests are intended to be non-destructive, but destructive tests may be conducted to assess the ultimate capabilities of the unit. Initiate procurement if results are favorable.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Mine Countermeasures Small Unmanned Underwater Vehicle</b>	Navy	0	0.417	0.192

This project will evaluate the capabilities of a small unmanned underwater vehicle, developed by Hafmynd of Finland, in mine countermeasures operations in the very shallow water zone (10 to 40 feet depth). This type of small underwater vehicle can be used to search coastal areas and identify hazards to naval operations in preparation for amphibious assault, force protections and harbor security operations.

**FY 2004 (Plans):** Upon receipt of funding, let the contract for purchase of properly MCM equipped GAVIA UUV with Hafmynd, Ltd.

Initiate manufacturing process, which is expected to take 6-7 months.

**FY 2005 (Plans):** GAVIA UUV will undergo a 2-3 month Very Shallow Water Mine Countermeasure Test and Evaluation by SPAWAR Systems Center San Diego and a User Operational Evaluation conducted by fleet personnel in Naval Special Clearance Team One. Hafmynd, Ltd. to provide technical support during these trials. Consider contract option to purchase up to 10 more GAVIA UUV's with logistical support for incorporation into fleet operations.

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	Service	FY 2003	FY 2004	FY 2005
<b>MK48 (7.62mm Lightweight Machine Gun) Semi-rigid Ammunition Container</b>	USSOCOM	0	0.100	0

This project will evaluate a semi-rigid ammunition container from FN Herstal of Belgium for the MK48 Lightweight Machine Gun, an organic weapon for U.S. Special Forces Teams. The container increases the reliability of the weapon by protecting the ammunition while operating in harsh environments such as surf zones. The container also provides for a better balanced weapon due to its mounting under the centerline, providing greater operational suitability while patrolling.

**FY 2004 (Plans):** Procure test articles; Conduct technical and operational testing; Prepare a decision packet and obtain a procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Mobile Acoustic Support System</b>	Navy	0	0.445	0.160

This project will evaluate a mobile ground-based system developed by General Dynamics Canada to meet a Navy requirement for post flight analysis of sonobuoy (underwater microphone) acoustic data recorded on Maritime Patrol Reconnaissance Aircraft from fixed and rotary wing aircraft and surface and sub-surface units conducting anti-submarine warfare missions. The Mobile Analysis Support System (MASS) is a system that performs Post Flight Analysis (PFA) of recorded sonobuoy (underwater microphones) information from all Anti-Submarine Warfare (ASW) platforms (fixed and rotary wing, surface and subsurface). The MASS would replace the current Fast Time Analysis System (FTAS) system fielded in the fleet, which has been in service for at least 10 years and has reached the end of its projected life cycle. It will provide operational commanders with post-mission acoustic intelligence and provide a scalable system that will keep pace with emerging technology.

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**FY 2004 (Plans):** Evaluate the system against the current specification and assess the following suitability areas: Reliability, Maintainability, Availability, Logistic Supportability, Compatibility, Interoperability, Training, Human Factors, and Safety Documentation.

**FY 2005 (Plans):** Complete all Key Performance Parameters testing. Conduct final data analysis. Complete evaluation.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Mounted Cooperative Target Identification System (MCTIS)</b>	Marine Corps	0	0.556	0.447

This project will evaluate a combat identification system developed by Thales Missile Electronics that may be capable of meeting the requirement for the Marine Corps MCTIS. The British system provides a positive encrypted identification of friend or unknown, bore sighted through the gunner's primary sight on Marine Corps M1A1 Tanks, Light Armored Vehicles (LAVs), and Advanced Amphibious Assault Vehicles (AAVs). As a result, the range at which threat targets may be engaged without fear of misidentification regardless of battlefield obscurants will increase significantly and related incidents of fratricide will decline significantly.

**FY 2004 (Plans):** Initial FCT project tests will have been conducted under the Coalition Combat Identification (CCID) Advanced Concept Technology Demonstration (ACTD) Project at \$0.500 million in the ACTD Program Element in addition to the \$0.500 million shown above. Continue/complete testing to perform design verification to validate the design and performance characteristics against established requirements, to include: performance, environmental, vibration/shock, electromagnetic interference, reliability, and maintainability.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Mortar Propellant</b>	Army	0	0.639	0.532

This project will evaluate a high-performance Extruded-Impregnated (EI) propellant for long-range mortar systems developed by Rheinmetall/Nitrochemie Wimmis AG of Switzerland. Qualification of EI propellant will support the Army's Future Combat System requirements for a 15% increased range over current 120mm mortar systems, will eliminate use of a hazardous/toxic stabilizer, reduce blast overpressure, increase rate of fire, decrease gun tube wear, and increase propellant shelf life.

**FY 2004 (Plans):** Contract prep/award. Receive test items. Begin phase I initial test/evaluation.

**FY 2005 (Plans):** Complete phase I initial test/evaluation. Conduct/complete phase II qualification test/evaluation. Publish reports. IPR decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY2005</b>
<b>Naval Active Intercept and Collision Avoidance</b>	Navy	0	0.667	0.851

This project will evaluate a system developed by Sonartech, to support the submarine force's number one priority of collision avoidance and situational awareness. The Australian system detects and localizes emissions from active sources such as sonar, sonabuys, and active homing torpedoes using sensors already installed on US submarines. System functionality will be tested against the requirements for the AN/WLY-1 currently applicable to SSN688, SSN21, and

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SSN774 class submarines. It will prevent collisions with ships that have occurred in the past.

**FY 2004 (Plans):** Conduct FCT Kick-off meeting with program office and Sonartech (contractor). Obtain and analyze technical data on NAIRCAS hardware and software. Conduct meeting between NAIRCAS personnel and Active Intercept and Ranging (AI&R) personnel at the Washington Navy Yard. Conduct stand-alone test of the Naval Active Intercept and Ranging and Collision Avoidance System (NAIRCAS) followed by a test of a card set integrated into the A-RCI sonar system.

**FY 2005 (Plans):** Conduct two submarine test events and system integration tests. Measure parameters such as bearing, bearing rate, range, range rate, passive detection, false alarm, and false alert rates; gauge against US active intercept and ranging requirements. Test NAIRCAS system at various depth and sound velocity profile (SVP) conditions against multiple platform types. Integrate NAIRCAS functionality into the AN/BQQ-10 (V) (A-RCI) sonar system using PEO SUB (PMS 401) development and integrate funds as part of the established Advanced Processing Build (APB) and Technical Insertion (TI) process.

**FY 2006 (Plans):** Perform Follow-On Test and Evaluation (FOT&E) by the Commander of Operational Test and Evaluation Group (COMOPTEVFOR). Analyze and evaluate results of FOT&E to determine the effectiveness of NAIRCAS with respect to US active intercept and ranging requirements.

	Service	FY 2003	FY 2004	FY2005
Pitch Adaptive Composite Marine Propeller	Navy	0	0.500	1.064

This project will evaluate commercial Contur-series propeller developed by AIR Fertigung Technologies GmbH to improve submarine stealth. The propeller blades are designed to flex in a controlled manner under certain operating conditions, which causes a pitch modification that is claimed to improve vehicle stealth, speed, and propulsion efficiency. In addition, the

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pitch modification reduces cavitation damage, marine growth fouling, and permits in-water blade replacement. This advanced performance is enabled by the use of blades constructed from carbon fibers, instead of traditional metals.

**FY 2004 (Plans):** Gather information and specifications to develop the propeller blades to ensure compatibility with US Navy systems. Develop hydrodynamic and structural design of the new propeller for SSBN/SSGN.

**FY 2005 (Plans):** Acquire a series of Contur Series Propeller blades for evaluations in land-based facilities, and then on the Advanced Swimmer Delivery System (ASDS). Compare USN propeller design cavitation avoidance techniques against those claimed by the vendor. Determine the structural adequacy of the blade material and hub designs, and the non-cavitating acoustic performance anticipated. Determine whether the vendor's product is a viable alternative to the metal propeller that the USN will be developing. Receive test items: ASDS blades (1), ASDS propellers (2), and SSBN sized blades (3) Complete Test and Evaluation plan. Test Plan and evaluation will be completed. Conduct fatigue and water tunnel Large Cavitation Channel Technical tests 1 and 2 (This testing will enable measurement of radiated noise, cavitation avoidance, and unsteady forces as well as permit a long-term operation to demonstrate the durability of the material. Conduct LCC Technical test 3).

**FY 2006 (Plans):** Determine whether to order new propellers in FY 2007. Complete LCC Technical test 3. Complete ship installation and trial along with the FCT Close-out Report and Tech Data package.

	Service	FY 2003	FY 2004	FY 2005
<b>Radarsat II Commercial High Resolution SAR</b>	Air Force	0	0.556	0.511

This project will evaluate the ability of the Canadian Radarsat II, developed by MacDonald-

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Dettwiler, to provide all-weather imaging capability at 3 meter resolution for support of target detection, ocean surveillance, homeland defense, moving target indicators, and disaster response, as an upgrade when integrated with the Air Force's Eagle Vision Deployable Satellite Imagery Receiving and Processing Station. The Canadian Radarsat II satellite is the first commercially available high resolution synthetic aperture radar imaging capability.

**FY 2004 (Accomplishments):** Eagle Vision is an open architecture satellite ground station that will support the interface to Radarsat II with the existing hardware architecture. The FY04 effort will acquire the test article and integrate it into the system. The evaluation will include field operations to collect, process, the data received from Radarsat II to evaluate operational effectiveness and performance.

**FY 2005 (Plans):** Interface to the satellite, operator interface, quality and performance of the imagery products, and operational utility will be evaluated.

	Service	FY 2003	FY 2004	FY 2005
<b>Regenerative Drive System</b>	Army	0	0.883	0.745

This project will evaluate for use in large vehicles, such as the Army's Family of Medium Tactical Vehicles, the capability of a hydraulic hybrid technology developed by Perma-Drive Technologies to recycle wasted power during vehicle deceleration and apply it to acceleration and braking.. The Australian technology, which is easily retrofitted to most military truck platforms, captures normally wasted braking energy, stores it in the form of hydraulic pressure, and releases it to enhance dash capability and braking performance. This greatly enhances fuel economy and brake life. This is estimated to result in an overall O&S cost savings of over \$10,000 per truck, per year, over the life of the truck (typically over 20 years).

**FY 2004 (Plans):** Contract prep/award. Receive test items. Conduct/complete/report technical test/evaluation.

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**FY 2005 (Plans):** Conduct/complete/report operational test/evaluation. IPR decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Special Operations Forces (SOF) Combat Rifle</b>	USSOCOM	0	0.834	0

This project will evaluate advanced 5.56mm rifles developed by FN Herstal of Belgium and Heckler and Koch GmbH of Germany, along with domestic sources, to meet requirements for a highly reliable and modular combat rifle for Special Forces as a replacement for the aging M4A1 carbine.

**FY 2004 (Plans):** Award contract for test samples; Obtain safety release and safety certification; Begin operational assessment.

**FY 2005 (Plans):** Complete operational assessment; Obtain Milestone C production decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Traveling Wave Tube Amplifier</b>	USSOCOM	0	0.237	0.341

This project will evaluate alternative traveling wave tube amplifiers developed by ELTA Electronics, Inc. of Israel, Dornier Satellitensystems GmbH of Germany, and Thomson Tubes Electroniques (Thales) of France for use within the Joint Threat Warning System and Deployable Multi-Channels Satellite Communications (SATCOM) Systems. The objective of this project is to qualify additional sources of amplifiers in order to reduce SATCOM terminal cost and reduce program risk due to reliance on a single source.

**FY 2004 (Plans):** Award contract and procure test articles from one vendor; Conduct technical testing both as a stand alone unit and integrated into the SATCOM terminal.

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**FY 2005 (Plans):** Award contract and procure test articles from remaining two vendors; Conduct technical testing both as a stand alone unit and integrated into the SATCOM terminal; Prepare procurement decision package.

**FY 2005 FCT Program Plans:**

For FY 2005, the FCT program will continue testing activities on 29 projects executing \$18.669 million in FY 2005 funding. Services and USSOCOM are currently developing their requirements for the FY 2005 New Start selection process, which began January 2004. The final selection of the FY 2005 New Start Projects will be determined in August 2004. FY 2005 funding totaling \$16.964 million will support the initiation of these selections. The selected FY 2005 New Start projects will be addressed in a formal notification letter submission to Congress in August 2004.

**(U) PROGRAM CHANGE SUMMARY:**

C. (U) OTHER PROGRAM FUNDING NA



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BUDGET JUSTIFICATION  
FOR PROGRAM ELEMENTS OF THE  
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM  
FISCAL YEAR (FY) 2005 BUDGET EXTIMATES SUBMISSION

PE 0605128D8Z, Classified Program USD(POLICY), is justified in the classified annex.

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Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY RDT&E - Defense Wide/Budget Activity: 6				R-1 ITEM NOMENCLATURE Defense Travel System - PE: 0605124D8Z					
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009		Total Cost
Total Program Element (PE) Cost	30.353	31.342	28.508	19.981	12.310	19.942	11.905		
Defense Travel System	30.353	31.342	28.508	19.981	12.310	19.942	11.905		

**(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The PMO for the Defense Travel System was established to provide procurement management and system fielding support worldwide. The DTS is the standard DoD business travel services system that combines reengineered travel policies and procedures with the best industry practices and technology. The DTS provides full travel management support from arranging for travel and approving travel authorizations, to processing reimbursement vouchers following travel and maintaining appropriate government records. The Defense Travel System is a fully electronic process that leverages technology to speed the coordination of travel, incorporates a digital signature capability, and embraces standard industry Electronic Commerce procedures. DTS was designated as an ACAT IAM Program on May 28, 2002 and is fully compliant with all statutes and regulations for a DoD Major Automated Information System.

**PROGRAM ACCOMPLISHMENTS AND PLANS:** (\$ in Millions)

1. (U) FY 2003 ACCOMPLISHMENTS: (\$30.353)

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Exhibit R-2, RDT&E Budget Item Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E - Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Defense Travel System - PE: 0605124D8Z

**PROGRAM ACCOMPLISHMENTS AND PLANS:** (Continued)

- (\$11.936) Continue development, test, and integration of DADS interfaces and software releases, DADS system changes, MIS Archive, development of Interface Control Documents and Memorandums of Agreement (MOA) .
  - (\$.097) DTS security requirement risk assessment, compliance validation, and PKI certification.
  - (\$11.973) Complete Jefferson software release development and testing. Start Madison software release development.
  - (\$3.735) Engineering Support.
  - (\$.414) Continued development of the MIS/Archive for electronic storage of travel records.
  - (\$2.198) DEBX to DADS mapping.
2. (U) FY2004 PLANS: (\$31.342)
- (\$6.793) Continue development, test, and integration of DADS interfaces and software releases, DADS system changes, MIS Archive, development of Interface Control Document and Memorandums of Agreement (MOA).
  - (\$20.500) Complete Madison software release development and testing. Start Monroe software release development.

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Exhibit R-2, RDT&E Budget Item Justification	Date: February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E - Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Defense Travel System - PE: 0605124D8Z

**PROGRAM ACCOMPLISHMENTS AND PLANS:** (Continued)

- (\$2.888) Engineering Support.
- (\$.270) DTS ST&E
- (\$.891) DEBX to DADS mapping.

3. (U) FY2005 PLANS (\$28.508):

- (\$6.988) Continue development, test, and integration of DADS interfaces and software releases, DADS system changes, MIS Archive, development of Interface Control Document and Memorandums of Agreement (MOA).
- (\$16.934) Complete Monroe software release development and testing. Start Q. Adams software release development.
- (\$2.890) Engineering Support.
- (\$.270) DTS ST&E
- (\$1.426) DEBX to DADS mapping.

(U) B. PROGRAM CHANGE SUMMARY:	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>	<u>Cost to Complete</u>
(U) FY 2004/2005 President's Budget:	30.353	31.806	28.576	Continuing
(U) FY 2005 Budget Estimates:	30.353	31.342	28.508	Continuing
(U) Total Adjustments:		.464	.068	

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Congressional Adjustments

.464

.068

Exhibit R-2, RDT&E Budget Item Justification		Date: February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E - Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Defense Travel System - PE: 0605124D8Z	

(U) C. OTHER PROGRAM FUNDING SUMMARY: (Dollars in Millions)

Project Number & Title	FY2003 <u>Estimate</u>	FY2004 <u>Estimate</u>	FY2005 <u>Estimate</u>	FY2006 <u>Estimate</u>	FY2007 <u>Estimate</u>	FY2008 <u>Estimate</u>	FY2009 <u>Estimate</u>	<u>To Complete</u>
(U) O&M Line - 04WH31 Defense Travel System	58.240	37.718	26.356	23.447	12.017	11.241	9.745	Continuing

(U) D. ACQUISITION STRATEGY: Not Applicable

(U) E. SCHEDULE PROFILE: Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6			R-1 ITEM NOMENCLATURE Export License Control – PE: 0605123D8Z					
COST (\$ In Millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	Cost to Complete	Total Cost
Total Program Element (PE) Cost	.900	7.718	5.882				N/A	Cont.

**(U) A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The program element supports the research, design and acquisition of an automated system by the Director, Policy Automation Directorate (PAD), Office of the Under Secretary of Defense for Policy (OUSDP), for export license processing and analysis. This program is a new start effort. The system will be integrated among all export license regulatory and reviewing agencies (Departments of Defense, Commerce, State, and other agencies) and incorporate connectivity to industry license applicants. The system will improve the quality of the reviews that protect critical military capabilities and support defense cooperation with allies and friends, and reduce review times to meet global marketplace demands. **Program Budget Decision (PBD-753) has extended the program with emphasis on reforming DoD interoperability with federal agencies (Customs, CIA, Homeland and Energy) responsible for export enforcement and compliance.**

**(U) FY 2003 Accomplishments:**

- Phase one System development and initial test completed.
- Data migration test from legacy system completed.
- Preliminary Independent Validation & Verification testing completed with satisfactory results.
- Deployable system code is in test phase.
- Draft user acceptance test plans completed.
- Initial test of data migration from legacy system completed satisfactorily.

**(U) FY 2004 Plans:**

- Complete the baseline system development and field the system for IOC.
- Review and Model the business process for BPR on extended system attributes.

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Export License Control – PE: 0605123D8Z	

- Capture and document user requirements for extended system capabilities.
- Develop prototype for interface with ITDS.
- Validate System Requirements and Design for extended system capabilities.

(U) FY 2005 Plans:

- Develop Unified Logical Data Model for extended capability.
- Validate System Requirements and Design for extended capability.
- Field communications infrastructure improvements.
- Develop and field integrated electronic compliance library.

<b>(U) B. <u>Program Change Summary</u></b>	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>	<u>FY2006</u>	<u>Total</u>
Budget Estimates Submission	3.500	9.000	6.000		<b>continuing</b>
Congressional Directed Undist Reduction	-2.600	-1.282	-0.118		
President's Budget Submission	.900	7.718	5.882		<b>continuing</b>

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

**(U) C. Other Program Funding Summary:** None.

**(U) D. Acquisition Strategy:** FY2001 funds-Contract award 29 Dec 2000 to SRA International via NIH CIO-SP contract # 263-96-D-0327, delivery order # DASW01-01F-0390 for program management and system integration services. FY2002 funds-Contract award 20 Dec 01 to SRA International via NIH CIO-SP contract # 263-01-D-0050, delivery order # DASW01-02-F-0412 for continued program management and system integration services. Anticipate the solicitation and award of a follow-on NIH CIO-SP contract in May 2004 to complete the Advanced Data Analysis and ITDS Interface extended system capabilities.

**(U) E. Schedule Profile:** Initial IOC scheduled for May 2004 with further program milestones to be developed upon award of follow-on contract.

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 6				R-1 Item Nomenclature: FOREIGN MATERIAL ACQUISITION AND EXPLOITATION PE 0605117D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	23.422	33.421	35.572	36.069	36.749	37.186	38.005
<p><b>A. Mission Description and Budget Item Justification:</b></p> <p>This program manages the acquisition and exploitation of foreign weapons systems, military equipment, and military and dual-use technologies for the military services and defense agencies.</p> <p><b><u>FY 2003 Accomplishments:</u></b></p> <ul style="list-style-type: none"> <li>• Mission Support \$23.422 million</li> </ul> <p><b><u>FY 2004 Accomplishments:</u></b></p> <ul style="list-style-type: none"> <li>• Mission Support \$33.421 million</li> </ul> <p><b><u>FY 2005 Plans:</u></b></p> <ul style="list-style-type: none"> <li>• Mission Support \$35.572 million</li> </ul>							



**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	32.382	33.916	35.644
Current BES	23.422	33.421	35.572
Total Adjustments	-8.960	-.495	-.072
Congressional program reductions	-7.900		
Congressional rescissions, inflation	-.162		
Congressional increases			
Reprogrammings	-.898	-.495	-.072
SBIR/STTR Transfer			

**Change Summary Explanation:**

FY 2003: Congressional program reductions (Section 8123) -7.900; Reprogramming adjustments -.898; Non-pay purchase inflation adjustments -.162

FY 2004: Reprogramming adjustments -.495

FY 2005: Reprogramming adjustments -.072

**C. Other Program Funding Summary:** Not Applicable.

**D. Acquisition Strategy.** Not Applicable.

Exhibit R-2, RDT&E Budget Item Justification					Date: February 2004		
Appropriation/Budget Activity RDT&E Defense-Wide, BA 6				R-1 Item Nomenclature: Support to C3I PE 0605116D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	21.853	25.529					
<p><b>A. Mission Description and Budget Item Justification:</b>                      The program element supports technical and analytic efforts to evaluate and improve the management oversight of DoD command and control (C2), communications, space, and information superiority programs. Support is focused on reviewing resources and acquisition issues for existing and planned space programs; exploring new command and control research concepts that exploit emerging technologies to improve DoD’s understanding of the national security implications of the Information Age; integration and overarching requirements/ planning process for national and nuclear C2 capabilities; development and integration of Command Information Superiority Architectures (CISA) to better define command capabilities; oversight of information operation activities; development of the Joint C4ISR Architecture Planning/Analysis System (JCAPS) as the common planning and coordination tool across the Global Information Grid (GIG); This program is funded under Budget Activity 6, RDT&amp;E Management Support because it includes studies and analysis in support of RDT&amp;E efforts.</p> <p><b>Program Accomplishments and Plans:</b></p> <p>FY 2003 Accomplishments: (\$21.853 million)</p> <ul style="list-style-type: none"> <li>• Conducted research into the nature of networked organizations.</li> <li>• Published “Power to the Edge”, describing the NII vision of Information Age Transformation.</li> <li>• Published “Command and Control in the Information Age”</li> <li>• Conducted Command and Control Research and Technology Symposium.</li> <li>• Continued analytic research support for information operations classified program.</li> <li>• Developed a White House Communications Agency requirements process.</li> <li>• Prepared Senior Leadership Communications Systems (SLCS) mission needs statement and capstone requirements document.</li> <li>• Completed critical Presidential modifications to SLCS aircraft and core White House Infrastructure.</li> <li>• Developed DoD Directive 4660.3 Secretary of Defense Communications.</li> <li>• Developed C3I implementer for Nuclear Posture Review (NPR).</li> <li>• Completed the Unified Command Structure (UCS) Roadmap.</li> </ul>							

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IT Database

- Reprogrammed all objects from ASP to secure JSP and to meet other enclave security requirements.
- Developed, Tested, and Implemented Database Collection of Capital Investment Reports to meet Congressional and OMB requirements.
- Implemented Extensible Markup Language (XML) data exchange with OMB. Expanded electronic interfaces to all Services.
- Implemented Air Force Extension of system.

GWOT - CIP

- Identified Combatant Commander critical functional capabilities necessary to support Global Strike mission OPLAN deployment phase.
- Identified commercial infrastructure support to Combatant Commander warfighters.
- Assisted Combatant Commander in identifying and developing Consequence Management initiatives.

GWOT – DERIS

- Established a Homeland Security architecture that improved the timely, integrated and coordinated access to information. The architecture initiatives addressed Border Security, Emergency Response, Weapons of Mass Destruction, and Intelligence Warning.

Pacific Disaster Center

- Completed the architectural design of a distributed information and decision support system for disaster management and humanitarian support. This included a detailed gap analysis for research and development opportunities and a data requirements study.
- Developed a prototype system for transition to the U.S. Southern Command, including a comprehensive training package, for use in the Caribbean Region, and initiated discussions and agreements for incrementally implementing such in the Asia Pacific Region.
- Completed several assessments for the Insular States of the Pacific Region. The “*Natural Hazards Risk and Vulnerability Assessment*” prepared for the Government of American Samoa is being used to create policies for future development on the Island. A tsunami inundation assessment and report was completed for Efate Island, Vanuatu and is being used to help that developing nation protect its citizens. The methodologies used in these efforts were briefed to the Prime Minister of Fiji who expressed keen interest in having similar products developed for his country.
- Continued to support the US Pacific and Southern Commands in exercises dealing with humanitarian relief. Supported other federal, local, and regional organizations in homeland security, disaster management, and human health (disease vector)

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related exercises and activities.

- Organized and conducted several high-level workshops in support of State of Hawaii and Federal Agencies involved in Homeland Security and Homeland Defense focused on the data and information needs of the decision-maker. Led several interagency working groups designing and implementing national conferences in support of Homeland Security and Homeland Defense.

CISA

- Completed Global Information Grid (GIG) Architecture Version 2.0 (an objective architecture that describes strategic, operational, and tactical operations in a future, Net-Centric environment).
- Completed Net Centric Operations and Warfare (NCOW) Reference Model (RM) v0.9 (initial draft version that describes Net-Centricity at the DoD enterprise level).
- Expanded NORTHCOM Homeland Security/Homeland Defense Architecture.
- Initiated the integration of the Federal Enterprise Architecture (FEA) into the GIG.
- Initiated modeling and simulation of architectures for acquisition, requirements, and PPBS.
- Completed the Joint Force Provider architecture.
- Completed integration of CENTCOM coalition architecture into the GIG.
- Developed an overarching DoD architecture configuration management program.
- Established two Enterprise Software Initiatives (ESI) for COTS architecture tool to reduce resources.
- Developed and implemented an enforceable enterprise-level architecture (EA) that supports portfolio management for the Defense Transportation System (DTS) at USTRANSCOM.
- Completed the integration of Operational, Systems and Technical Views for each of the 22 separate OPLAN 5027 architectures into a comprehensive Integrated Operational Architecture.
- Initiated development of a CFC/USFK C4I Integrated Objective Architecture to include coalition partners.
- Developed a USFK Logistics operational architecture.
- Supported the development of a USFK C4ISR Master Plan for future theater intelligence requirements.
- Developed the USCENTCOM CENTRIXS operational architecture.
- Initiated the Joint National Training Capability (JNTC) architecture supporting requirements, budgeting, and M&S that supports all Unified Commands and Services.
- Completed development of the USSTRATCOM Intelligence, Surveillance, and Reconnaissance Architecture-Operational View (ISR-OV).
- Initiated integration of NCOW RM and NCES in the USSTRATCOM ISR-OV.
- Completed USEUCOM-wide expansion of the Electronic Tactics, Techniques, and Procedures (ETTP) for Joint Task Force

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(JTF) and Combined JTF (CJTF) operations that provides web-based JTF/CJTF operational guidance.

- Initiated the Command Enterprise Communications Architecture (CECA) documenting USEUCOM's end-to-end C2 information flow. The CECA embraces several DoDAF compliant tools for data manipulation and modeling.

JCAPS

- Successfully demonstrated the feasibility of using CADM XML to provide an interface between COTS Architecture tools and the DOD Architecture Repository System.
- Determined new database requirements for architecture based on DoD Architecture Framework.
- Completed SIPRNET Accreditation for the DARS.
- Implemented new capability as defined in DoD Architecture Framework.
- Modified data schema to reflect new requirements in CADM.
- Completed graphical capability for preparing architecture products.

FY 2004 Plans: (\$25.529million)

- Continue efforts to research the nature of networked organizations and the implications for command and control, military operations, and organizations.
- Continue to work with the DoD community and international partners to improve the understanding of Information Age command and control related concepts, technologies, and experiments.
- Conduct workshops to explore command and control related issues.
- Continue publications and outreach programs.
- Initiate development and program management of a classified intelligence resource management system which supports the policy and oversight responsibility of the USD (I).
- Continue to enhance functionality of the Information Technology Management application.
- Support classified information operations program.
- Develop Unified Command Structure (UCS) Policy, Architecture and Organizational Framework Report (POAF) for DepSecDef.
- Develop Unified Command Structure (UCS) implementation plan for DepSecDef.
- Develop Unified Command Structure (UCS) Operational Concept.
- Develop ASD(NII) Continuity of Operations Plan (COOP) Integrated Network Capabilities Report.
- Develop ASD(NII) Business Resumption Plan.
- Develop C2 Policy Roadmap and C2 Policy in our ASD(NII) role as PSA for DoD-Wide C2.

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- Includes analytical research support for DoD National C2 policy issues including investigation and development of C2 policy for Information Operations (IO), Information Superiority (IS) Programs, Missile Defense C2, and Offensive Defensive Integration.
- Continue White House and Senior Leaders requirements planning and modernization strategies including network centric operations and integration into the GIG architecture.

CISA

- Complete Net-Centric Operations and Warfare Reference Model Version 1.0 (initial approved version that describes Net-Centricity at the DoD enterprise level).
- Complete initial Net-Centric architecture integration training and development to Unified Commands.
- Initiate GIG 3.0 Enterprise Architecture (develop a GIG Architecture that serves as a complete DoD enterprise architecture and supports integration of all other DoD IT architecture).
- Continue to integrate the NCOW RM into the Federal Enterprise Architecture (FEA) under the GIG.
- Initiate development of a NCOW RM Compliance Analysis program under the GIG.
- Expand DoD Homeland Defense architecture interfaces to other Federal, State, and Local emergency centers.
- Continue to implement the GIG architectures at the Unified Commands by incorporating net centric capabilities and artifacts.
- Expand Counterterrorism architectures to appropriate Unified Commands and other components.
- Expand coalition architectures at the Commands; integrate coalition access for coalition users.
- Initiate Net-Centric capabilities and artifacts in coalition architectures at the commands.
- Develop a new version of CADM that will eliminate unnecessary entities (CADM Streamline).
- Develop an NCES transition plan for all Combatant Commands.
- The Command Enterprise Communications Architecture (CECA) program moved into an advanced phase documenting USEUCOM's end-to-end C2 information flow.
- Increase CECA's role in USEUCOM's transformation efforts, and use to model the effects of Command transformation scenarios to senior decision makers.

JCAPS

- Integrate new architecture data requirements into design.
- Integrate remaining Architecture Framework products into graphical requirements.
- Expand O-O Architecture development within the Framework, CADM, and Tool Kit along with training programs to implement O-O use in architecture development.
- Implement distance learning capabilities and integrate into the training program; implement DoD wide training course for

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repository use.

- Implement NIPRNET version with security guards and permissions.

#### IT Rapid Acquisition Incentives

- A Net Centric pilot application process was designed and implemented and Executive Agent support received from the Department of Navy.
- Selection and evaluation criteria were designed and applied against candidate pilots. Structured templates and guidelines are provided to assist each pilot with developing a Project Charter, Project Plan, and Project Spend Plan.
- The RAI-NC pilot program process and selected pilots are available from the DoD CIO home page (<http://www.dod.mil/nii> ). The site provides information about the program, approved pilots, OSD and EA oversight, program milestones, program documents and project templates, and links to DoD and government sources to assist users in researching, understanding and executing the objectives of net centric transformation goals.
- The first DoD-wide data call for pilot candidates resulted in 120 submitted projects with representation from all Military Services, DoD Agencies, all DoD Domains including technical infrastructure. The DoD CIO office was provided a list of 12 recommended pilot projects for final approval.
- Four pilots supporting the Military Departments and AT&L were selected and funds provided by DoD CIO:
  - Virtual Mission Operations Center - The pilot will deploy a web based global, enterprise-level interface allowing the warfighter access to satellite information if available, or provide the ability to directly request information from a satellite. It will provide an IP based satellite C2 system that provides survivability and rapid reallocation and prioritization of C2 bandwidth configuration in response to operational changes.
  - Implementation of WEBLOG Technology to Accelerate Test/Eval Programs - This pilot will develop a secure community of interest to exchange proprietary technology data. It will apply multi-role security to permit free communication of proprietary technologies among industry partners on the same team and to accelerate DoD use of cutting edge technology..
  - Enterprise Spend Analysis Pilot - To develop and deploy a web based global, enterprise-level business intelligence tool for integrating procurement contract, acquisition and financial data across the DoD Acquisition Community. Using a common data model and a service oriented architecture and an improved business decision making processes the pilot will provide data with differing characteristics from multiple systems and locations into a common enterprise understanding.
  - Standard Access Functions for Common Access Card (CAC) - The pilot will develop a standard set of CAC enterprise basic services that include calls to encryption, authentication, and digital signature. Additional functionality will be based on a user survey. It will accelerate new security capabilities for DoD applications using the CAC by enabling the secure ID, encryption and signature features of the CAC and DoD PKI.

- The results of each pilot project will be documented in the Opportunity Analysis (OA). The OA includes metrics data to calculate Return on Investment, qualitative results to show values in a balanced scorecard format, lessons learned from the pilot, a business case analysis as represented by the OA document template, an implementation plan as part of the OA, and post-pilot actions. The Domain owners then review pilots with successful business cases to develop functional deployment plans.
  - Each of the four pilots will execute project plans under EA oversight and CIO review.
  - An estimated 200 candidate pilots for FY05 RDT&E funds will be nominated and evaluated against formal selection criteria.
  - Selection of 20 pilot proposals for funding in FY2005.
  - Measure FY 2004 pilots against established metrics

Pacific Disaster Center

- Expand the concept, architectural development, and implementation of a distributed information network in the PACOM and SOUTHCOM AORs.
- Work with major funding entities (World Bank, Asian Development Bank, etc.) to develop natural hazard mitigation strategies and enabling policies in the development plans of emerging nations. Participate with foreign planning organizations in policy development and risk assessment.
- Continue to expand the PDC presence in the Asia-Pacific Region capitalizing on existing efforts being undertaken by the East-West Center, US State Department and other international entities concerned with the rising cost, both in human lives and property, of natural and manmade disasters.
- Continue to support the US Military Commands, State and Federal Agencies, and regional organizations with unique products critical to decision makers in managing risk posed by, and emergencies caused by, nature and/or mankind.

**FY 2005 Plans:** N/A

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	21.874	24.638	35.614
Current BES	21.853	25.529	-
Total Adjustments	-.021	.891	-35.614
Congressional program reductions			
Congressional rescissions, Inflation Adjustments	-.021	-.218	
Congressional increases	6.000	8.800	



Reprogrammings SBIR/STTR Transfer	5.098
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**Change Summary Explanation:**

FY 2003: Non-pay purchase inflation adjustment -.021 million

FY 2004: Congressional add 1.369 million; FFRDC Reduction -.131 million; Management Improvements -.069 million; Management Efficiencies -.278 million.

FY 2005: Funding transferred to PEs 0605170D8Z, 0303169D8Z, and 0605200D8Z to implement restructuring of Defense Intelligence – 35.614 million .

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy.** N/A

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BUDGET JUSTIFICATION  
FOR PROGRAM ELEMENTS OF THE  
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM  
FISCAL YEAR (FY) 2005 BUDGET ESTIMATES SUBMISSION

PE 0605114D8Z, Black Light, program is submitted separately as a Special Access Program.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)						DATE February 2004	
APPROPRIATION/BUDGET ACTIVITY 6 Research, Development, Test & Evaluation, Defense-wide				R-1 ITEM NOMENCLATURE Technical Studies, Support & Analysis PE 0605104D8Z			
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total Program Element (PE) Cost	29.465	29.762	30.618	31.117	31.772	32.300	32.995
95 P421 Technical Studies, Support & Analysis	29.465	29.762	30.618	31.117	31.772	32.300	32.995

A. Mission Description and Budget Item Justification

This program element is classified in Budget Activity 6 (Management Support) because it is a primary source of funding for the Office of the Secretary of Defense and the Joint Staff for studies, analyses, management, and technical support efforts, to improve and support policy development, decision-making, management and administration of DoD programs and activities. Specific projects address a variety of complex issues and dynamic problems facing the Under Secretary of Defense for Acquisition, Technology & Logistics [USD (AT&L)], the Under Secretary of Defense for Policy [USD (P)], Under Secretary of Defense for Personnel and Readiness [USD (P&R)], Assistant Secretary of Defense for Networks & Information Integration [ASD(NII)], Director for Program Analysis and Evaluation (D,PA&E), the Joint Staff and Unified Command Commanders. Studies and analyses will examine the implications and consequences of current and alternative policies, plans, operations, strategies and budgets, and are essential for understanding and gaining insight into the complex multifaceted international, political, technological, economic, military, and acquisition environments in which defense decisions and opportunities take place. With our need to better understand and cope with the threats and uncertainties facing the Nation in the current security, threat, and economic environments, the need for objective analyses and forward-looking planning for the mid and long-range (at acceptable risk) becomes greater.

Details follow for each Under Secretary and Director or Chairman supported.

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General Support for USD (ACQUISITION, TECHNOLOGY & LOGISTICS) :

FY 2003 Accomplishments

- For SECDEF directly, further developed a capabilities-based Rapid Dominance strategy (Shock & Awe)
- Continued integration and display of Hard & Deeply Buried Target Defeat requirements and program options
- Continued long-range precision strike assessment from an integrated global perspective to provide a comprehensive, integrated and responsive long-range strike capability and quickly overcome projected anti-access and area denial scenarios.
- Single Integrated Space, Air , and Ground Pictures- Continued to build upon current developmental and legacy efforts to provide Full Spectrum Dominance in which we provide situational awareness for missile warnings, intelligence, surveillance, and reconnaissance., bringing together Services to leverage existing capabilities and data sharing technologies to enhance precision targeting and tracking and identification of friendly forces on the battlefield.
- Determined the common data base requirements for DoD Unmanned Aerial Vehicle (UAV) mission planning and proposed a single common mission planning architecture based on a module-based system and standard formats.
- Continued to evaluate technical, architectural, and programmatic issues in ballistic and cruise missile defense: space based sensors, radar systems, electro-optical systems, missile propulsion, missile guidance-and-control, software, lasers, algorithms, and systems engineering. In support of boost and mid-course intercept as well as terminal phase ballistic missile intercept, examine programmatic and technical issues associated with airborne and space based lasers systems and architectures.
- Supported activities for analyzing the interoperability dimensions of military requirements presented in new Operational Requirements Documents and assessing whether

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the requirements as stated are adequate for producing a system that will achieve the needed interoperability.

- Analyzed TACAIR weapon systems performance, cost, and schedule issues in support of acquisition milestone decisions and DoD planning, programming, and budgeting activities.
- Studied the effectiveness a SMART (Sports Medicine and Recondition Therapy) Center in a forward deployed operation or in a CONUS tactical unit in order to improve mission readiness of military operations through decreased medical attrition rates.
- Reviewed selected system-of-system concepts including Global Information Grid (GIG) to assess application of the Joint Technical Architecture and the extent of resulting interoperability.
- Implemented steps to review and document processes and technologies DoD-wide that serve as barriers or enablers to information, logistics, and business system interoperability.
- Estimated DoD laboratories' ability to biomonitor blood, and developed internal DoD capability to analyze blood for VOC (Volatile Organic Compounds)
- Assessed state of markets/firms -- Tactical Aircraft (retaining future design/manufacturing capability), Helicopters, Space, Missiles and Precision Guided Munitions (PGM), UAV, Shipbuilding, and Less Traditional Supplier Industry Studies
- Assessed Acquisition Program Plans, especially Nunn McCurdy breaches on various programs, and the Joint Strike Fighter
- Ensured continuing competition in Defense Industrial Base--performed Merger & Acquisition reviews (including Northrop Grumman/Newport News, TRW, Boeing/Hughes, L3-Communications/Raytheon, AIS and Perkins)
- Analyzed foreign Defense Industry Structure, esp. foreign supplier capabilities for JSF and other programs though building a database on thirty international companies
- Supported Defense Science Board task forces--Acquisition of National Security Space Programs, Enduring Freedom Lessons Learned, Unexploded Ordnance, Defense Against

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Terrorist Use of Nuclear Weapons Against US, Exploiting Technology for Transformation, Down Vaccine Selection Process (Smallpox), Interference Capabilities, Sea Basing, Joint Experimentation, DoD Roles and Missions in Homeland Security, Enabling Joint Forces Capabilities, Managing Foreign Intelligence by Focusing on Ends Vice Means, Future Conventional & Nuclear Strategic Strike Capabilities, Special Operations employment and intelligence in the War on Terrorism, and B-52 Re-Engining

- Per Congressional direction, evaluated weapon systems requirements and acquisition issues, and submitted master planning documents for key defense mission areas: Conventional Munitions (data collection annually, report submitted every other year), Anti-armor Munitions, and Electronic Warfare.
- CAMIS--Finalized and implemented a web-based, on-line system to capture A-76 data savings, validate the data, and finalize DOD Cost Comparison Handbook
- Developed tools to measure the ability of DoD Fire and Emergency Services to respond to weapons of mass destruction events and recommend means to improve their effectiveness.
- Analyzed 70 newly completed military construction buildings to determine systemic design and construction deficiencies that should have been corrected in design estimate costs to abate the hazards during occupancy. Will write a report cooperatively with industry to fix the problems.
- Developed an inventory of operational ranges and munitions response properties; assessed the cost for remedial action to remove unexploded ordnance contamination from operational ranges; and provide an assessment of available technologies and outline a technology roadmap to lower overall program cost.
- Conducted ESOH (Environmental Safety, Operations, and Health) risk analysis on beryllium in rocket propellant to estimate the magnitude of worker exposure.
- Identified the impacts of alternative utilities on Facilities sustainment costs
- The Small Business Innovation Research (SBIR) Program Reauthorization Act of 2000 (PL 106-554) requires the Department of Defense to cooperatively support the National Academy of Sciences (NAS) comprehensive study of how the SBIR Program has stimulated

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technological innovation and used small businesses to meet federal research and development needs.

**FY 2004 Program:**

- Project long term Operations & Support costs for the whole DoD
- Perform trade-off analyses of GMTI (Ground Moving Target Indicator) and Cruise Missile Defense Sensor Systems
- Assess the effectiveness and cost of Unmanned Air Vehicles
- Research on Sizing the Medical Readiness Capability and Managing Beneficiary Demand
- Cost Analysis of the Integrated Global 'Footprint'
- Analyze ways to transfer critical technologies from the military to civilian First Responders to emergencies
- Continue analysis of Joint Airborne Electronic System of Systems
- Analyze the UAV spectrum
- Refine the Nuclear Posture Review incorporating new TRIAD strike force requirements and acquisition approach/programming consistent with the Defense Planning Guidance and the President's direction for Global Strike.
- Continue the Combat Identification Architecture Study to improve the accuracy of the characterization of detected objects in the joint battlespace, minimize fratricide, and improve operational effectiveness
- Assess the potential combat effectiveness of alternative tactical aircraft forces
- Study development, implementation, and investment strategy of advanced electronic countermeasure capabilities
- Develop methods to improve Unmanned Aerial Vehicle survivability
- Identify and analyze the roles of Unmanned Aerial and Ground Vehicles and identified methods to integrate both types of systems.

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- Analyze and identify appropriate air-worthiness and air safety standards for Unmanned Aerial Vehicles (UAVs)
- Study the effects of small and handheld UAVs on manned aircraft, and identify ways to better integrate the battlespace.
- Perform in-depth industrial analyses of the sub-tier supplier base for the tactical missile and precision guided munitions (PGM) industry including market analysis, evaluation of industrial health and capacity, and recommended DoD actions
- Examine the long-term DoD acquisition model for advanced semiconductor devices used in military and intelligence applications (recommended by FY03 Appropriations Conference Report)
- Continue to evaluate technical, architectural, and programmatic issues in ballistic and cruise missile defense: space based sensors, radar systems, electro-optical systems, missile propulsion, missile guidance-and-control, software, lasers, algorithms, and systems engineering.
- Conduct detailed engineering-level vulnerability analysis of Space-based and terrestrial WMD control systems; Long-range, space-based and air-breathing, ISR/Targeting and control systems; land-based OTH surveillance and targeting mechanisms; and dynamically targetable, long-range, cruise and ballistic missile weapons.
- Analyze TACAIR weapon systems performance, cost, and schedule issues in support of acquisition milestone decisions and DoD planning, programming, and budgeting activities.
- Respond to Congressional direction to evaluate weapon systems requirements and acquisition issues, and to submit master planning documents for key defense mission areas: Conventional Munitions Master Plan (data collection annually, report submitted every other year), Anti-armor Munitions Master Plan, DoD Electronic Warfare Plan



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- Continue analytic effort to assess total joint warfighting requirements, define systems-of-systems architectures, set and implement policy for systems engineering, interoperability, and integration.
- Provide executive oversight of the multi-service Family of Interoperable Operational Pictures (FIOP) effort to further develop concepts for integrating Single Integrated Air, Ground, Maritime, Space, and Special Operations Pictures, Common Operational Picture and Common Tactical Picture to develop 80% solutions for the FIOP overarching initiative.
- Provide executive oversight of the Blue Force Tracking (BFT) initiative, ensuring multi-service participation and inclusion of technologies from the BFT Advanced Concepts and Technology Demonstration (ACTD).
- Continue support for US-UK Interoperability Commission with emphasis on weapons systems visibility, collaboration and "arrive on site first day integration" war fighting capabilities with emphasis on development of agreed network interfaces, data sharing arrangements, and tactical user operations conventions for military planning through strike functions
- Analyze economic and legal issues hindering privatization of DoD utility systems.
- Ongoing Technical and economic analysis to support Merger & Acquisition reviews
- Assess track record of divestitures used to remedy anti-competitive structures resulting from mergers between defense suppliers
- Continue to monitor footprint of foreign defense firms in the U.S.

**FY 2005 Plans:**

- Support high priority classified initiatives for the new DUSD (Intelligence)
- Support several Task Forces for the Defense Science Board
- Ongoing Technical and economic analysis to support Merger & Acquisition reviews
- Create database for transparency of all OSD special analyses

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- Review allied/coalition partner system developments and acquisition programs to assess interoperability potential and impacts.
- Continue support for National and Allied Coalition efforts for interoperable tactical communications (JTRS/Bowman, ICOG Interoperable Tactical Communications Task Force, to include support for development of US direct interoperability with the UK Bowman radio)
- Conduct several 'cross-cutting analyses' in areas of common concern to several OSD entities, to increase synergy and information sharing within the SECDEF staff

**Technical Support for the Director, Program Analysis & Evaluation**

**FY 2003 Accomplishments:**

- Analyzed operational effectiveness of the Future Combat System (FCS) to inform Program Reviews for FY 04-09, and provide alternative, executable courses of action for the Army.
- Continued development of a critical management indicators, tools, and techniques for incorporation into the DPP materials used to provide DoD senior leadership with an overview of the long term trends, "health", and affordability of the defense program..
- Reviewed ongoing issues arising from integration of key technologies in RAH-66 Comanche helicopter and the Beyond Line-of-Sight (BLOS) missile.
- Examined survivability, lethality, and range of individual platforms identified as potential LRI aircraft in context of future threat scenarios to show how platform alternatives influence the effectiveness of the entire force.
- Reviewed army force and manpower issues that arise as part of Program Reviews.
- Reviewed radar technologies to meet future shipboard air defense needs.
- Developed tool for comparing performances of alternative systems, weapon configuration, and force levels.
- Developed mathematical/engineering tools needed to in TACAIR analyses and studies.

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- Assessed operational effectiveness of air-launched weapons performance from a Joint or DoD perspective to aid in future weapon systems decisions.
- Examined the effectiveness of MLRS forces and fire support alternatives.
- Assessed the effectiveness of alternative force mixes for long-range interdiction and air superiority missions.
- Developed a "should cost" model to establish an estimate of requirements for the defense health program and to illuminate decisions on a program that commands an increasing proportion and amount of the DoD topline.
- Estimated the cost of military manpower to make effective force shaping decisions.
- Improved cost estimating relationships for Ballistic Missile Defense systems in preparation for major milestone reviews.
- Provided research on new tools for estimating costs of new development programs in key product sectors.
- Analyzed current program and budget data structures and processes to identify opportunities to integrate and streamline programming and budging data requirements and collection mechanisms.
- Improved the quality, timeliness, and cost effectiveness of DoD software cost estimating with development of a parsimonious set of historical resources and cost-driver data, and data collection consistent with principles of acquisition streamlining.
- Developed approach and comprehensive process to estimate the life-cycle cost of the next generation unmanned air vehicles (UAVs) and uninhabited combat air vehicles
- Developed metrics to evaluate the effectiveness and efficiency of Defense Working Capital Funds (DWCF) activities.
- Provided different options for rapid precision global strike.
- Analyzed aerial refueling tanker requirements in support of air mobility operations.

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- Developed part of an analytic foundation for examining opportunities and challenges arising from operations with non-US military organization in future smaller scale contingencies (SSCs).
- Analyzed alternatives for structuring future airlift capabilities.
- Verified & Validated simulation model used to analyze strategic lift issues
- Continued development of tool for comparing performances of alternative systems, weapon configuration, and force levels.
- Provided ground forces movement model as basis for ISR in TACAIR air-to-ground campaign modeling.
- Assessed the performance of air-launched weapons from a Joint perspective
- Estimated the cost of military manpower to make effective force shaping decisions.
- Developed metrics that can be used to gauge the sufficiency of military service and major defense agency funding for O&M.
- Analyzed KC-767 pricing, in consideration of DoD lease and buy alternatives for recapitalizing the aerial refueling tanker fleet.

**FY 2004 Program:**

- Assess the operational effectiveness of the KC-767A aircraft in the aerial refueling role in comparison with the KC-135R.
- Identify the near-term and potential long-term missions that should be conducted by Unmanned Combat Air Vehicles.
- Identify intelligence collection needs and define a corresponding integrated air and space architecture for 2008-2018 time period.
- Analyze the impact of the projected level of global engagement on US force structure on PERSTEMPO and OPTEMPO.
- Analyze cost and force capability implications of current and future defense programs.
- Examine enhancements to force capability and survivability of space systems.

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- Analyze C4ISR persistence surveillance and rapid strike capabilities.
- Assess military forces capabilities to better exploit information technology.
- Provide mathematical and scientific support for selected TACAIR analyses and studies.
- Continue the development of enhanced cost estimating tools to support military aircraft development and production.
- Improve methodologies for estimating weapon system development costs by the use of simulation techniques.
- Analyze US forces capabilities to display and sustain forces in an access-denial environment.
- Develop a comprehensive process to estimate the life-cycle cost of the next generation unmanned aerial vehicle systems.
- Develop metrics for sufficiency of military service / major defense agency O&M funding
- Provide research on new tools for estimating costs of new development programs in key product sectors.
- Provide technical analysis of selected aviation and ground systems and platforms.
- Estimate the market value and DoD cost to vacate the 1710-1755MHz spectrum.
- Analyze tradeoffs among Ground Moving Target Indicator (GMTI) and cruise missile defense sensor systems.
- Examine the force structure of the Navy Expeditionary Strike Group (ESG).
- Evaluate the effectiveness, costs, operational risks, technological risks, and programmatic risks of alternative joint UCAV and Airborne Electronic Attack (AEA) platform options.
- Examine O&M execution data in support of the Planning, Programming, Budgeting, and Execution System (PPBES).
- Assess the effectiveness and cost of tactical Unmanned Air Vehicles (UAVs).

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- Examine the potential impact of force transformation on logistics footprints (number of personnel, numbers and types of units), supply requirements, and deployment timelines and requirements.
- Develop methods for assessing the likely cost and schedule implications of capability needs as developed by the Joint Capabilities Integration and Development System (JCIDS) and as evaluated by the Enhanced Planning Process (EPP).
- Provide senior leaders with key analyses to aid in resource allocation decisions and will directly enhance defense planners' ability to make the most effective use of scarce collective defense resources.
- Assess the impact of various combinations of pre-positioned equipment and forward-based forces and their impact on both mobility requirements and modernization decisions for the C-5, C-17, KC-10, KC-135, C-130 and future airlift/tanker aircraft.
- Examine medical missions, capabilities, and forces in support of defending the homeland; deterring aggression and coercion forward in critical regions; swiftly defeating aggression in overlapping major conflicts while preserving the option to call for a decisive victory in one of the conflicts; and conducting a limited number of smaller-scale contingencies.
- Support the Secretary of Defense's Integrated Global Presence and Basing Strategy initiative by providing rough order of magnitude facilities cost estimates for Forward Operating Bases (FOBs) and Forward Operating Locations (FOLs).
- Examine critical air warfare problems: air-to-air campaigns; integration of intelligence, surveillance, and reconnaissance (ISR) into air campaigns; end game maneuver; the physics of target acquisition and track in air campaigns; modeling a responsive and adaptive adversary; and more.
- Improve the ability to evaluate program assumptions on costs and benefits of software development programs and strategies.

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- Improve databases and methods for estimating the costs to conduct defense systems remanufacturing, upgrades, modifications, service life extension programs and depot repair activities.
- Improve taxonomies for analyses of forces and missions and improve methods for estimating resource requirements for transformed military forces.
- Perform analyses to improve the Department's understanding of the complex relationship among resources allocated to Central Training, major characteristics of force structure, and the Department's investments in training and learning technologies.
- Develop a set of approaches and comprehensive processes to estimate the life cycle cost of next generation mission systems and avionics.
- Develop a comprehensive, global assessment of programmed operations and maintenance (O&M) funding.
- Analyze the tradeoffs between different operating concepts (CONOPs), platforms and systems in a challenging USW campaign.
- Develop alternative force/capability options for the QDR containing ambitious initiatives to mitigate future risks by transforming the force.

**FY 2005 Plan:**

- Provide senior leaders with key analyses to aid in resource allocation decisions and enhance defense planners ability to make the most effective use of scarce defense resources in support of transformation and capabilities-based planning.
- Establish a Cost Estimating Institute that will facilitate cooperative activities with industry and academia.
- Continue development of a critical management indicators, tools, and techniques for incorporation into the DPP materials used to provide DoD senior leadership with an overview of the long term trends, "health", and affordability of the defense program..
- Review army force and manpower issues that arise as part of the Program Review process.

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- Improve tools for comparing performance of alternative systems, weapon configurations, and force levels.
- Improved PA&E's ability to evaluate program assumptions in areas related to software.
- Provide analytical support to senior DoD leadership for development of the Quadrennial Defense Review (QDR).
- Analyze future airlift structures to help with the decision on whether to shut down the C-17 production line.
- Develop new tools to support Capabilities-Based Planning
- Build analytical baselines in support of the Analytical Agenda.
- Perform analyses to support issue teams in the Enhanced Planning Process.

**Technical Support for the Under Secretary of Defense (POLICY)**

**FY 2003 Accomplishments:**

- Smallpox Research Experts Group. The priorities established will be used to shape U.S. research plans
- Allied Defense Burdensharing and Capability Analysis report, a Congressionally-mandated report (w/PA&E)
- Completed developing scenarios for forecasting future insurgency threats
- Independent assessment of the needed structure and resources for USSOCOM to more effectively pursue the war on terrorism
- Evaluated Theater Security Cooperation Strategies
- Study to examine and estimate the prospective development of five Middle East economies under reformed economic and political institutions, including the issue of how U.S. policy might help foster improved institutions
- Analyzed the central issues attendant upon Korean unification, including both its economic and security-related consequences



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- Studied Turkish Economic Institutions, International Aid, and the Turkish Role in NATO
- Studied the international oil market and the potential economic consequences of an oil embargo
- Launched a major effort to develop scenarios and planning tools for use in connection with the Defense Planning Guidance and capabilities-based planning and programming
- Developed a set of alternate strategic concepts to help develop a warfighting strategy that includes direction for our forces to be able to swiftly defeat the efforts of an adversary
- Identified and documented the key characteristic of current Defense and State Department defense security cooperation programs and how well those programs relate to the objectives and direction provided in the Security Cooperation Guidance (co-funded and co-sponsored with other OSD components)

**FY 2004 Program:**

- Research the Russian economy, including the status and prospects for Russian economic and institutional reform and the implications for Russian relations with North Korea, Iran, and Cuba
- Study manning the Special Operations Forces, focusing on some critical current and near-term manning issues.
- Develop force capability option packages to help assess ways to mitigate future risk by transforming the force in distinctive ways that can be used in the next QDR (co-funded/co-sponsored with other components)
- Continue analyzing the North Korean nuclear threat
- Initiate a study on Designing a Homeland Strategy for the 21<sup>st</sup> Century
- Conduct a study on the terrorist threat in Africa
- Develop a strategy for integrated oversight and management of various DoD international education programs

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- Develop new Triad Master Plan, consistent with the Defense Planning Guidance and the Nuclear Posture Review guidance
- Continue the Allied Defense Burdensharing and Capability Analysis report, a Congressionally-mandated report
- Study how transformation efforts can be harnessed to maintain U.S. strategic superiority in an unpredictable world

**FY 2005 Plan:**

- Conduct various studies and research dealing with homeland defense
- Conduct studies and analyses dealing with deterring and responding to terrorism
- Conduct studies that support the goals and requirements of the Quadrennial Defense Review
- Continue research and studies on transforming the force
- Continue work on developing ways to counter the threat posed by weapons of mass destruction
- Conduct regionally-focused studies and other analyses on areas of interest to the new administration

**Technical Support for the Under Secretary of Defense (Personnel & Readiness)**

**FY 2003 Accomplishments:**

- Continued the development of a model of long-term operations and support costs, and identified major cost-drivers.
- Continued to evaluate the effect on military training of encroachments on training ranges in CONUS, and extend the analysis to OCONUS training ranges.
- Monitored and analyzed trends in performance metrics collected as part of the Human Resources Strategic Plan.

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- Estimated the costs of varying size and frequency of Reserve Component mobilizations, and analyzed alternate ways of managing variable periods of activation for reservists.
- Developed and evaluated more flexible tools for the management of the civilian workforce.
- Monitored and analyzed recruiting/retention programs of both military and civilian personnel, and their effectiveness in meeting the Department's need for quality people.
- Evaluated the cost-effectiveness and quality of care provided in the Military Health System (MHS) under the new Managed Care Support Contracts, the National Mail Order Pharmacy Contract, and other MHS initiatives.
- Monitored equal opportunity and sexual harassment policies and examined their effectiveness.
- Continued the assessment of child-care needs of military families.
- Assessed the need for proactive support of employment opportunities for spouses of military members.
- Developed policies to support easier movement among active and reserve components.
- Responded to congressional mandates and directives.

**FY 2004 Program:**

- Conclude the development of a model to forecast long-term operations and support costs based on major cost-drivers.
- Continue analysis of compensation issues.
- Analyze the implementation to date of TRICARE for Life benefit.
- Continue research support for the Department's recruiting and advertising programs.
- Evaluate the implementation of performance metrics in the P&R mission areas.
- Evaluate retention goals in view of changing personnel needs in the military.

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- Continue to explore the effects of more flexible career lengths and paths for military personnel.
- Conclude the assessment of child-care needs and preferences of military families, and the exploration of alternate ways the Department can provide child care.
- Analyze the impact of multiple and long-term deployments of reservists on reserve retention.
- Develop new approaches to using non-uniformed personnel in order to free military personnel for core military functions.
- Analyze approaches to eliminating domestic violence in the U.S. military.
- Develop total cost factors to support decisions concerning the conversion of military to civilian positions.
- Conclude the qualitative review of the Military Health System.
- Conclude the assessment of the military medical benefit.
- Develop approaches to managing and coordinating health care for dually-eligible beneficiaries of the Military Health Program.
- Respond to congressional mandates and directives.

**FY 2005 Plans:**

- Complete analysis of the alternate career path (Up or Stay Military officer) pilot project.
- Begin evaluating and providing "lessons learned" from the new National Security Personnel System (NSPS).
- Continue research to understand the most cost-effective ways to recruit and retain quality civilians.
- Analyze the full costs of family support, and Morale, Welfare, and Recreation activities, for deployed military personnel.
- Develop a strategic approach to joint personnel management.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2004
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
Research, Development, Test & Evaluation, Defense-wide	Technical Studies, Support & Analysis PE 0605104D8Z	

- Re-examine the compensation package for active and reserve military, in view of the recruiting/retention needs of a refocused military.
- Develop a strategic overview of the skills and competencies needed in both civilian and military workforces in view of recent aggressive efforts to convert military to civilian positions wherever possible.
- Develop a robust analysis of the medical readiness needs of a global strategy of 1-4-2-1.
- Evaluate ways to support the employers of mobilized reservists.
- Analyze the extent to which diversity improves team performance in the military.
- Conclude the evaluation of original ways to compensate personnel for distance-learning and other just-in-time training programs.
- Respond to congressional mandates and directives.

**Technical Support for the Assistant Secretary of Defense (Networks & Information Integration) [ASD (NII)]**

**FY 2003 Accomplishments:**

- Conducted an independent assessment panel of the proposed USD(I).
- Initiated an investment strategy and integrated architecture for Combat Identification Systems (CID) to guide requirements generation in achieving integration of capabilities.
- Conducted a study to identify deficiencies in or changes in direction of ongoing Navigation Warfare activities across the DoD.
- Developed a migration strategy for DoD radar systems that will be adversely impacted by commercial communication systems.
- Supported informatin assurance collaboration activities.

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)		DATE February 2004
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
Research, Development, Test & Evaluation, Defense-wide	Technical Studies, Support & Analysis PE 0605104D8Z	

**FY 2004 Program:**

- Conduct a study to determine the feasibility and technology needs for JTRS operating at higher bandwidths.
- Develop a migration strategy for DoD RADAR systems that are expected to be adversely impacted by future commercial communication systems.
- Analyze the impact of technology on managing need-to-know in the 21st century and the consequences for the warfighter.
- Conduct a study to improve network-centricity in coalition operations.

**FY 2005 Plans:**

- Develop a communication programs roadmap for transition to a Net centric environment.
- Build a semantic architecture that enables the sharing of information among military domains to improve collaboration and interoperability.
- Examine the net centric command and control capability within the Unified Command Structure to identify improvements for the shared situational awareness models.

**Technical Support for the Joint Staff**

**FY 2003 Accomplishments:**

- Tanker Leasing--Reviewed the operational implications of leasing 767 aircraft.
- Analysis of Narrowband Terminal Efficiency--UHF SATCOM system is the principal path for vital command and control to U.S. forces. Analysis identified inefficiencies in the system, and future efficiencies through new technology.
- Demand Assigned Multiple Access (DAMA)-- The military's current UHF satellite constellation is experiencing excessive user demand, and is incapable of meeting the numerous requirements imposed by worldwide tactical communications missions. DAMA permits several users to share a single channel, and DoD has selected it to mitigate

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE <b>February 2004</b>
APPROPRIATION/BUDGET ACTIVITY <b>Research, Development, Test &amp; Evaluation, Defense-wide</b>	R-1 ITEM NOMENCLATURE <b>Technical Studies, Support &amp; Analysis PE 0605104D8Z</b>	

this saturation. Study analyzing terminal fielding, training, and infrastructure set migration objectives.

- Special Operations Forces-- determined how SOF should evolve to meet future needs.
- Non Fixed-Wing-- A study of non fixed-wing aviation plans through 2020, examining new demands created by the changes in defense strategy, gaps in capability, ability to maintain a satisfactory average fleet age, and opportunities for additional commonality, interoperability, and technology insertion.
- Undersea Superiority--study to determine what investment strategy, including new technologies, is needed over the next decade to maintain U.S. undersea preeminence. This analysis provided decision opportunities to maintain this capability through 2015.

**FY 2004 Program:**

- Develop a plan for transitioning non-essential USSOCOM missions to other forces and agencies.
- "Quick-turnaround" assessments directed by Chairman of the Joint Chiefs of Staff
- GRIFFIN is a network initiative to exchange classified information among the SECRET High national networks of AUS, CA, NZ, UK, and US initially, and later Fr and GE. This study will look at chat- and web-enabling GRIFFIN.
- Global Force Management (GFM) Data--Increase the visibility and accessibility GFM data (e.g., unit, location and event assigned) to DoD planners enabling shorter decision cycles. This near term effort is needed to ensure data interoperability across DOD and shape implementation of DOD Net-Centric Data Strategy.

**FY 2005 Plans:**

- Mobility Capabilities Study--analysis on which to base C-17 long-lead-time production item decisions
- Operational Availability (OA) Study of joint military capabilities and force employment timelines required to accomplish emerging missions in the Contingency Planning

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		DATE <b>February 2004</b>
APPROPRIATION/BUDGET ACTIVITY	R-1 ITEM NOMENCLATURE	
<b>Research, Development, Test &amp; Evaluation, Defense-wide</b>	<b>Technical Studies, Support &amp; Analysis PE 0605104D8Z</b>	

Guidance. Follow-on work to examine five interrelated sub-studies under the OA umbrella, integrating analysis efforts and findings to inform the FY 05-10 DPG.

<b>B. <u>Program Change Summary</u></b>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>
Previous President's Budget	29.000	30.204	30.686	31.200
Current President's Budget	29.465	29.762	30.618	31.117
Total Adjustments	+ .465	- .442	- .068	- .083
Congressional program reductions		- .579		
Congressional rescissions				
Congressional increases				
Reprogrammings	+1.163	+ .500		
SBIR/STTR Transfer	- .698	- .550		
<b>C. <u>Other Program Funding Summary</u></b>	<b>N/A</b>			



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BUDGET JUSTIFICATION  
FOR PROGRAM ELEMENTS OF THE  
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM  
FISCAL YEAR (FY) 2005 BUDGET ESTIMATES SUBMISSION

PE 0604943D8Z, Thermal Vicar, program is submitted separately as a Special Access Program.

Exhibit R-2, RDT&E Budget Item Justification					Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE		
Research, Development, Test & Evaluation, Defense Wide					Joint System Architecture Development PE 0604875D8Z		
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0.000	0.000	4.989	0.000	0.000	0.000	0.000
<b>Project/Thrust</b> A Name/No. & subtotal cost *							
<p><u>A. Mission Description and Budget Item Justification</u></p> <p>Program Definition: AT&amp;L/DS manages this program which supports roadmap development, required supporting analysis, and systems engineering in support of CJCSI 3170/DOD 5000 Capability based planning, to address systems aspects of functional needs, area and solution analysis of systems to support joint capabilities. This includes the systems aspects and implications of integrated architectures and investment analysis in light of other factors affecting requirements and acquisition. The work will be accomplished through collaborative efforts to develop architectures and conduct assessments of joint capability area and joint operating concept issues, develop and support needed sets of system and system related data to support architectures, analysis and roadmaps, conduct support analysis of systems development and engineering issues, create roadmaps, and analyze investment options to support roadmap development.</p> <p>Justification: Transformation calls for top down, national security strategy driven concepts based requirements and integrated joint systems. DoD Instruction (DoDI) 5000.2 and CJCSI 3170.01C both call for upfront analysis and planning to support systems requirements and acquisition. In particular, integrated roadmaps based on joint integrated architectures and investment analyses are to be developed. Integrated architectures to support requirements definition and systems acquisitions will be developed collaboratively. "The Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD(AT&amp;L)), the Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD(C3I)), the Joint Staff, the Military Departments, the Defense Agencies, Combatant Commanders, and other appropriate</p>							

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2004		
<p>DoD Components shall work collaboratively to develop joint integrated architectures for capability areas as agreed to by the Joint Staff." [DODI 5000.2, 3.2.1.1] The AT&amp;L has responsibility for the systems aspects of these architectures: "The USD(AT&amp;L) (or PSA for business areas) shall lead development of the systems view, in collaboration with the Services, Agencies, and Combatant Commanders, to characterize available technology and systems functionality. The systems view shall identify the kinds of systems and integration needed to achieve the desired operational capability." [DODI 5000.2, 3.2.1.2]. Analysis of these architectures in light of changing needs and technology provides critical input into the future Defense planning and programming as well as design and engineering of integrated systems of systems which support joint warfighter capability needs. In particular: "Using the integrated architectures, the USD(AT&amp;L) shall lead the development of integrated plans or roadmaps. The Department of Defense shall use these roadmaps to conduct capability assessments, guide systems development, and define the associated investment plans as the basis for aligning resources and as an input to the Defense Planning Guidance, Program Objective Memorandum development, and Program and Budget Reviews." [DODI 5000.2, 3.2.2]. This Program Element specifically supports roadmap development and the needed supporting analysis. This includes the development and analysis of the systems aspects and implications of integrated architectures and investment analysis in light of other factors affecting requirements and acquisition. The work will be accomplished through collaborative efforts to develop architectures and conduct assessments of joint capability area and joint operating concept issues, develop and support needed sets of system and system related data to support architectures, analysis and roadmaps, conduct support analysis of systems development and engineering issues, create roadmaps, and analyze investment options to support roadmap development.</p>			
<p>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)</p>			
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	0.000	0.000	0.000
Current FY 2005 President's Budget	0.000	0.000	4.989
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			

Exhibit R-2, RDT&E Budget Item Justification			Date:	February 2004
SBIR/STTR Transfer				
Other	0.000	0.000		+4.989
A. <u>Other Program Funding Summary:</u> N/A				
B. <u>Acquisition Strategy:</u> N/A*				
* Not required for Budget Activities 1, 2, 3, and 6				

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E/Budget Activity 3				R-1 Item Nomenclature: *PE-0604774D8Z Defense Readiness Reporting System				
Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0.000	0.00	15.336	19.691	13.171	9.942	2.879	2.943
<p><b>A. Mission Description and Budget Item Justification:</b>  <b>Beginning in FY 2004, PE-0604774D8Z was transferred from DoD Human Resource (DHRA) PE-0605803S.</b></p> <p>In June 2002, DoD Directive 7730.65 established the Defense Readiness Reporting System (DRRS). This directive mandates the implementation of a capabilities-based, adaptive, near real-time readiness reporting system for the Department of Defense. When complete, the Defense Readiness Reporting System will transform the way readiness is measured and reported for U.S. military forces. DRRS provides a mission-focused framework for evaluating, in near real time, the capabilities of our military forces to carry out assigned tasks. DRRS fuses mission readiness assessments with rapid planning tools, providing the ability to create and modify war planning in a matter of hours/days. This capability is critical to enable the Department of Defense to respond to rapidly changing threats and world events.</p> <p>DRRS is composed of two parts: The Enhanced Status of Resources and Training System (ESORTS), which describes the current force status; and the Plans Assessment Tool Suite (PATS) which provides a suite of war planning and assessment tools to highlight the operational implications of readiness and force structure deficiencies. DRRS transforms unit readiness measurement by providing a status of a unit's mission essential tasks to defined output standards. For the first time, DRRS will enable readiness to be measured on expected military outputs, and not simply a measure of "inputs" or available resources. DRRS does allow for the "traditional" resource measures in the areas of personnel, equipment, training, and sustainment by using web services technologies. This technology allows for automatic, real-time queries into authoritative functional data sources. Likewise, the DRRS tool suite will assist commanders, the Joint Staff, and DoD users with tools to facilitate rapid assessments. These tools are not only capable of assessing potential deficiencies for a given scenario (using formal or ad hoc "plans"), but also provide a mechanism to alter war plans and identify mitigation options. By merging readiness analyses and rapid planning tools, DRRS allows the Department to identify accurately readiness concerns and quickly develop plans to mitigate those risks.</p> <p>This transformation presents a number of technical and management challenges. DRRS utilizes the latest information technologies to achieve a global readiness network. This network supports distributed, collaborative, and dynamic readiness reporting and continuous tool-based assessment. The primary technical goal is the creation of a high-reliability, secure integrated readiness data environment that leverages current data systems. DRRS uses net-centric technology including intelligent software agents, dynamic databases, semantic middleware, and publish/subscribe concepts; and will provide a logically uniform view into the multiple databases and information sources. This allows the DoD to dramatically expand the range of readiness information and queries in DRRS, and provides the military user with a set of high-speed scenario-oriented tools to support ad hoc queries and drilldown. Hence, DRRS can condense the readiness assessment timescales from weeks and months into hours and days by facilitating planning and assessment.</p>								

**B. Program Change Summary:** None

	<u>FY 03</u>	<u>FY 04</u>	<u>FY 05</u>	<u>FY06</u>
Previous President's Budget	.000	18.575	19.739	13.209
Current FY 2005 President's Budget	*	15.336	19.961	13.171
Total Adjustments		15.336	19.961	13.171
Congressional program reductions	none	3.00	NA	NA
Congressional rescissions				
Congressional increases		none		
Reprogrammings		none		
SBIR/STTR Transfer				
Other		15.336	19.961	13.171

\* Beginning in FY 2004, PE-0604774D8Z was transferred from DoD Human Resource (DHRA) PE-0605803S

**C. Other Program Funding Summary:** None.

**Acquisition Strategy.** DRRS is being developed with a spiral acquisition strategy over four years. In FY2003, a competitive contract was awarded for development of the basic DRRS concept, network infrastructure and services, and software prototypes for spiral I, as well as the project work and software requirements for Spiral II. The FY 2004 effort includes the initial operational release of DRRS tools to the Combatant Command user in U.S. PACOM. Subsequent development spirals will expand both the functionality of the software suite and the number of supported DRRS users and organizations. This represents a logical and deliberate path toward the full fielding and Defense wide implementation of the DRRS by FY 2007. The DRRS acquisition strategy also includes shared development efforts with other DoD partners that leverage off of existing information systems and development efforts to address common requirements. These include efforts with the Navy on DRRS-N, the Army on the Strategic Readiness System, the Joint Chiefs of Staff on both the Global Force Management and Adaptive Planning Initiative, and the Joint Forces Command on enhanced deployment planning and assessment. This strategy allows for a quick turn, responsive DRRS development and early user utility.

Exhibit R-2a, RDT&E Project Justification				Date: February 2004				
Appropriation/Budget Activity RDT&E. Defense-wide BA 3				PE PE-0604774D8Z Defense Readiness Reporting System				
Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
	*	*	15.336	19.691	13.171	9.942	2.879	2.943
(U) *In FY 2004, PE-0604774D8Z was transferred from DoD Human Resource (DHRA) PE-0605803S.								
<p>In June 2002, the DoD Directive 7730.65 established the Defense Readiness Reporting System. This mandates the implementation of a capabilities-based, adaptive, near real-time readiness reporting system for Department of Defense. When complete, the Defense Readiness Reporting System will transform the way readiness is measure and reported for our military forces. DRRS provides a mission-focused framework for evaluating, in near real time, the capabilities of our military forces to carry out assigned tasks. DRRS fuses mission readiness assessments with rapid planning tools, providing the ability to create and modify war planning in a matter of weeks. This capability is critical to enable to the Department of Defense to respond to rapidly changing threats and world events. Lessons learned from Operations Enduring Freedom and Iraqi Freedom again reinforced the need for rapid planning and risk assessment to support changing conditions in the theater of operations. The availability of key ports, launch points, and air bases for U.S. troops, as well as the potential contribution of coalition partners and allies, were key variables in understanding the readiness and risk to U.S. military forces. DRRS enables a near real time readiness assessment and provides a suite of tools for exploring risk mitigation options.</p> <p>DRRS transforms unit readiness measurement by providing a status of a unit's mission essential tasks to defined output standards. For the first time, DRRS will enable readiness to be measured on expected military outputs, and not simply a measure of "inputs" or available resources. DRRS does allow for the "traditional" resource measures in the areas of personnel, equipment, training, ordnance, and sustainment by using web services technologies. This technology allows for automatic, real-time queries into authoritative data sources. The DRRS tool suite will assist commanders, the Joint Staff, and DoD users in not only scenario risk analysis, but also in analyzing the risk to the overall National Military Strategy. These tools are designed to facilitate rapid assessments, and are not only capable of assessing potential deficiencies for a given scenario (using formal or ad hoc "plans"), but also provide a mechanism to alter war plans and identify mitigation options. By merging readiness analyses and rapid planning tools, DRRS provides the Department to identify accurately readiness concerns and quickly develop plans to mitigate those risks.</p> <p>This transformation presents a number of technical and management challenges. DRRS utilizes the latest information technologies to achieve a global readiness network. This network supports distributed, collaborative, and dynamic readiness reporting and continuous tool-based assessment. The primary technical goal is the creation of a high-reliability, secure integrated readiness data environment that leverages current data systems. DRRS uses net-centric technology including intelligent software agents, dynamic databases, semantic middleware, and publish/subscribe concepts; and will provide a logically uniform view into the multiple databases and information sources. This allows the DoD to dramatically expand the range of readiness information and queries in DRRS, and provides the military user with a set of high-speed scenario-oriented tools to support ad hoc queries and drilldown. Hence, DRRS can</p>								

condense the readiness assessment timescales from weeks and months into hours and days by facilitating planning and assessment.

**B. Accomplishments/Planned Program**

Defense Readiness Reporting System		FY 2002	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost		*	*	15.339	19.691
RDT&E Articles Quantity *(as applicable)					

**(U) FY 2003 Accomplishments:**\* PE-0604774D8Z was transferred from DoD Human Resource (DHRA) PE-0605803S starting in FY 2004.

**(U) FY 2004 Plans:** Finished Spiral I effort to include: development of DRRS concept of operations; completion of data model and the Readiness Data Mark-up Language (RDML); initial unit mapping of capabilities to Mission Essential Tasks and output standards; development of the ESORTS (1.0) operational prototype; incorporation of CFAST into the DRRS plan analysis tool suite; establishment of the DRRS web portal and net-centric web services; and web-enabling resource datasets from selected personnel, readiness, and equipment systems. Other efforts included joint integration with data and models from other DoD entities, such as the Navy, Army, Joint Chiefs of Staff, Joint Forces Command (JFCOM), and Pacific Command (PACOM). In sum, the FY2004 effort provides an initial operational capability for DRRS tools at Pacific Command.

**(U) 2005 Plans:** In FY 2005, DRRS will undertake the Spiral II development effort. This effort adds considerable increases to the functionality of the software, and expands the use of DRRS tools to more DoD organizations. Increased functionality for spiral II includes data and metrics for DoD installations, spare parts inventories, transportation assets; and war fighting models/outcomes. The effort will expand the number of web-service enabled data systems for equipment, personnel, training, ordnance, and units, and will continue the mission essential tasks development effort. For the PACOM DRRS application, all PACOM units will be targeted for reporting by mission essential tasks and output standards. The DRRS network infrastructure capabilities and software support will be expanded to include two more Combatant Commands and combat support agencies, and user-training products will be developed and applied to enable effective application of DRRS by DoD components.



Exhibit R-2, RDT&E Budget Item Justification				Date: February 2004				
Appropriation/Budget Activity RDT&E: Defense-Wide/BA 6 FY 2005 President's Budget				R-1 Item Nomenclature: Transformation Initiatives Program (TIP) <b>PE: 0603835D8Z</b>				
COST (\$ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0	0	0	9.977	9.971	9.983	9.996	10.012
<b>(U) A. Mission Description and Budget Item Justification:</b>								
<p>This new program is intended for exclusive use by Combatant Commanders to pursue unforeseen, but potentially high-payoff joint transformation initiatives/ opportunities during the year of execution. Transformation initiatives will be submitted by the Combatant Commanders and reviewed and either approved or disapproved by the Director for Force Transformation. Transformation initiatives or opportunities are intended to yield transformational effects such as major leaps in military capabilities. Transformation initiatives/ opportunities are expected to be time-critical and present themselves as opportunities to co-evolve operating concepts and technologies in contingencies, joint operations, exercises or experiments. Such effects are expected to occur during transformational discovery, innovation, and exploration through the execution of operational concepts and technologies, prototyping, experimentation, and war gaming. Funds will only be made available to Combatant Commanders and will only be approved by the Director for Force Transformation.</p>								
<b>(U) PROGRAM PLANS</b>								
<p>(U) Funding for this program will provide a modest means to gain the direct and active participation of the Combatant Commanders in the transformation process. It will provide a mechanism to fund transformation projects initiated by the Combatant Commanders during the year of execution permitting real-time preparation and testing of novel technologies or concepts that, if proven, will add to a force's capability in a significant way. In general, this program is expected to enhance:</p>								
<ul style="list-style-type: none"> <li>• Combatant commanders ability to quickly pursue unforeseen, but potentially high-payoff, joint transformation initiatives during the year of execution.</li> <li>• Inclusion of the combatant commands in the transformation process by funding initiatives that are time-critical and present themselves as opportunities to co-evolve operating concepts and technologies in contingencies, joint operations, exercises or experiments.</li> <li>• Increased infusion of transformational ideas into the transformation process.</li> <li>• Increased experimentation of transformational ideas using operator/warfighter expertise and organizations.</li> </ul>								

**(U) B. Program Change Summary:**

	<u><b>FY2003</b></u>	<u><b>FY2004</b></u>	<u><b>FY2005</b></u>
<b>Previous President's Budget</b>	0.0	0.0	0.0
Current President's Budget	0.0	0.0	9.977
Total Adjustments	0.0	0.0	9.977
a. Congressional program reductions	0.0	0.0	0.0
b. Congressional rescissions	0.0	0.0	0.0
c. Congressional increases	0.0	0.0	0.0
d. Reprogrammings	0.0	0.0	9.977
e. SBIR/STTR Transfer	0.0	0.0	0.0

**(U) Change Summary Explanation:**

**(U) Funding:** FY 2005 resources are to be used to initiate the Transformation Initiatives Program as directed by the SECDEF in the Transformation Planning Guidance in support of DoD Transformation Goals.

**(U) Schedule:** N/A

**(U) Technical:**

**(U) C. Other Program Funding Summary: N/A**

**(U) D. Acquisition Strategy. N/A**

**(U) E. Schedule Profile. N/A**

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Exhibit R-2, RDT&E Budget Item Justification								Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6					R-1 ITEM NOMENCLATURE Training Transformation – PE: 0603757D8Z				
COST (\$ In Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	2.909	0	0	0	0	0	0

**(U) A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** This program element supports the training transformation initiative as managed by the Deputy Under Secretary of Defense, Readiness. In FY03, the Training Transformation Implementation Plan was promulgated as a guiding document for the Department to transform joint training. This plan defines the full range of joint and mission rehearsal capabilities and the associated roles, responsibilities and timelines to accomplish training transformation objectives. The plan called for the Department to study how best to provide a dedicated joint training environment for functional warfighting and complex joint tasks; these funds support that work.

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY 2003 Accomplishments:**

- Not applicable

**(U) FY 2004 Plans:**

The following FY04 efforts support the study of how best to provide a dedicated joint training environment for functional warfighting and complex joint tasks:

- Identify Joint Urban Operations training requirements and deficiencies and develop potential solutions along with an investment strategy.
- Develop an interagency joint training roadmap that addresses Regional Combatant Commander operational requirements to accomplish effects-based objectives in concert with other government agencies, coalition partners and non-governmental organizations.
- Develop a Stability and Support Operations (SASO) joint training plan that addresses Regional Combatant Commander operational requirements to conduct these operations.
- Develop a joint training roadmap that identifies Regional Combatant Commanders operational requirements to address asymmetric warfare, focusing on the conduct of counter-asymmetric warfare training.

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<b>(U) B. <u>Program Change Summary</u></b>	<u>2003</u>	<u>2004</u>	<u>2005</u>
Previous President's Budget	0	2.951	0
Current President's Budget	0	2.909	0
Total Adjustments	0	-.042	0
a. Congressional Increase	0	0	0
b. Congressionally Directed Undistributed Reductions	0	0	0
c. Other (DOD Program Changes)	0	-.042	0

(U) C. Other Program Funding Summary: Not Applicable

(U) D. Execution: Labs/Centers: Efforts to be performed by Federally Funded Research and Development Centers.

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R-1 Shopping List Item No. 102

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Exhibit R-2a, RDT&E Project Justification							February 2004	
Appropriation/Budget Activity RDT&E/Budget Activity 6				Project Name and Number Training Transformation, PE: 0603757D8Z				
Cost (\$ in millions)	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Transformational Training	0	0	2.909	0	0	0	0	0
RDT&E Articles Quantity (as applicable)								
<p><b>A. Mission Description and Budget Item Justification:</b>                      The program element supports the Department's training transformation initiative. The element provides support for: planning comprehensive and systematic joint training; developing robust networked, live, virtual, and constructive training and mission rehearsal; revising acquisition and other supporting processes to identify interfaces between training systems and acquisition, logistics, personnel, military education, and command and control processes. The Deputy Under Secretary of Defense, Readiness, oversees this program.</p> <p><b>B. Accomplishments/Planned Program</b>                      New start in FY04. In FY03, the Training Transformation Implementation Plan was promulgated as a guiding document for the Department to transform joint training. This plan defines the full range of joint and mission rehearsal capabilities and the associated roles, responsibilities and timelines to accomplish training transformation objectives. The plan also called for the Department to study how best to provide a dedicated joint training environment for functional warfighting and complex joint tasks. The following efforts support this tasking:</p> <ul style="list-style-type: none"> <li>• Identify Joint Urban Operations training requirements and deficiencies and develop potential solutions along with an investment strategy.</li> <li>• Develop an interagency joint training roadmap that addresses Regional Combatant Commander operational requirements to accomplish effects-based objectives in concert with other government agencies, coalition partners and non-governmental organizations.</li> <li>• Develop a Stability and Support Operations (SASO) joint training plan that addresses Regional Combatant Commander operational requirements to conduct these operations.</li> <li>• Develop a joint training roadmap that identifies Regional Combatant Commanders operational requirements to address asymmetric warfare, focusing on the conduct of counter-asymmetric warfare training.</li> </ul>								
	FY 02	FY 03	FY 04	FY 05				
Accomplishment/ Effort/Subtotal Cost	0	0	2.909	0				
Funds research on expanding joint warfighter capabilities across the full spectrum of joint, interagency, intergovernmental, and multinational operations.								
<p><b>C. Other Program Funding Summary:</b>                      No procurement funds or military construction funds are related to this program element.</p> <p><b>D. Acquisition Strategy.</b> None required.</p> <p><b>E. Major Performers:</b> In FY04, contractors and a federally funded research and development center will perform the work.</p>								

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 6				R-1 Item Nomenclature: SPECIAL TECHNOLOGY SUPPORT PE 0603704D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost			19.274	19.468	19.703	21.128	21.424
<b>A. Mission Description and Budget Item Justification:</b>							
Special Technology Support to Intelligence and Light Forces is a classified program. See the Congressional Justification Book for program details.							
<b><u>FY 2005 Plans:</u></b>							
<ul style="list-style-type: none"> <li>Mission Support \$19.274 million</li> </ul>							
<b>B. Program Change Summary:</b> (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)							
			<u>FY 2005</u>				
Previous President's Budget			19.303				
Current BES			19.274				
Total Adjustments			-.029				
			Congressional program reductions				
			Congressional rescissions, inflation				
			Congressional increases				
			Reprogrammings				
			SBIR/STTR Transfer				
<b>Change Summary Explanation:</b>							
FY 2005: Reprogramming adjustments -.029							
<b>C. Other Program Funding Summary:</b> Not Applicable.							
Acquisition Strategy. Not Applicable.							

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Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E. DW BA # 6				R-1 Item Nomenclature: Intelligence Support to Information Operations PE 0305193D8Z				
Cost (\$ in millions)		FY2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost		0	0	12.878	13.350	13.336	13.519	13.809
E-Space				.748	.749	.749	.750	.751
Human Factors Analysis Center				10.431	10.768	10.745	10.911	11.157
IO Indications and Warning				1.699	1.833	1.842	1.858	1.901

**A. Mission Description and Budget Item Justification:**

Intelligence Support to Information Operations contains classified programs. Details are provided in the classified Congressional Justification Book.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	0	0	0
Current BES/President's Budget			12.878
Total Adjustments			
Congressional reductions, Inflation Adjustment			
Congressional rescissions			
Congressional increases			
Undistributed reductions			

**Change Summary Explanation:**

FY 2003: Not applicable  
 FY 2004: Not applicable  
 FY 2005: New program element

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C. **Other Program Funding Summary:** Not applicable

D. **Acquisition Strategy.** Not applicable

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Exhibit R-2, RDT&E Budget Item Justification						Date February 2004	
Appropriation/Budget Activity RDT&E Defense-Wide, BA 6				R-1 Item Nomenclature: IT Rapid Acquisition PE 0303169D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost			19.958	19.955	19.940	20.043	20.100
<p><b>A. Mission Description and Budget Item Justification:</b>                      The Rapid Acquisition Incentives – Net Centricity (RAI-NC) program provides funding for Net Centric pilot initiatives that directly support and facilitate DoD Enterprise efforts to implement network centric IT. This project is consistent with the Department’s strategic goals to: reduce costs; improve efficiency; increase effectiveness by improving the efficiency and effectiveness of process redesign; business systems modernization; strategic sourcing; infrastructure reductions; and optimal-sized inventories. RAI-NC accelerates DoD efforts to implement a network centricity operational environment while providing a secure, flexible, reliable, affordable, integrated network to achieve high effectiveness in joint and combined operations; and to further ensure that information technology is used to maximize advantage at least cost. The scope of the Rapid Acquisition Incentives – Net Centricity project encompasses defense policies, processes, people, and systems that guide, perform or support all aspects of business processes within the Department. Successful implementation will result in more reliable, accurate and timely net centric management information upon which managers can make more effective business decisions in a timely manner for the Department. The DoD CIO maintains an overarching implementation plan that includes requirements, criteria, review and reporting as well as performance measures for providing the incentives to DoD Components. This program employs RDT&amp;E funds to plan, develop and oversee proof of concept pilot projects. Successful pilots will not be allowed to enter full deployment and operation without an Opportunity Analysis (business case) demonstrating the achieved goals and outcomes, in addition to Domain support and resourcing. This program is funded under BA-6, Management Support because it includes studies and analyses in support of R&amp;D efforts.</p> <p><b><u>Program Accomplishments and Plans:</u></b></p> <p>FY 2003 Accomplishments: N/A</p> <p>FY 2004 Plans: N/A</p> <p>FY 2005 Plans:</p> <ul style="list-style-type: none"> <li>• Evaluate 200 pilot proposals for FY 2006.</li> <li>• Select 20 pilots for funding in FY 2006.</li> <li>• Oversee pilots selected for FY 2005 execution using same process as above. Continue to provide oversight of FY2004</li> </ul>							

pilots reaching completion in FY 2005.

- Support DoD Domain Managers in operational deployment of those pilots successfully completing and approved Opportunity Analysis.
- Incorporate Net Centric Enterprise Services (NCES) into RAI-NC pilots and propose NCES operational requirements.
- Expand pilot support to Business Management Modernization Program (BMMP) and Horizontal Fusion (HF) initiatives.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget			-
Current BES			19.958
Total Adjustments			19.958
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			19.958
DERF Adds			

Change Summary Explanation:

FY 2005: Transferred to ASD (NII) to implement restructuring of Defense Intelligence –19.958 million.

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy: N/A**

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Exhibit R-2/R-2a, RDT & E Budget Item Justification								February 2004	
Appropriation/Budget Activity Engineering and Manufacturing Development Defense Wide, Budget Activity 5					Item Nomenclature Business Management Modernization Program PE 0605016D8Z				
Cost (\$ in Millions)	Prior Years	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	99.521	67.191	45.098	94.767	93.832	95.648	97.453	99.416	

**A. Mission Description and Budget Item Justification****BRIEF DESCRIPTION OF ELEMENT**

The Business Management Modernization Program (BMMP) is responsible for the development and sustainment the Department of Defense (DoD) wide business enterprise architecture and the business process re-engineering across all DoD business areas. The architecture will serve as a “blueprint” to guide and constrain investments in financial management operations and systems. The new architecture is a high priority for the Secretary of Defense and is required for the Department to have timely, accurate and reliable financial data for use in making effective management decisions and achieving favorable audit opinions on financial statements.

BMMP is a broad and comprehensive reform initiative – its scope encompasses the defense policies, processes, people, and systems that guide, perform, and support all aspects of business management within the Department. Specifically, the goal of BMMP is to improve DoD business operations in which relevant, reliable, and timely business information, affirmed by clean audit opinions, is available on a routine basis to support informed decision-making at all levels throughout the Department.

**Program Accomplishments and Plans/New Starts:**

In FY 2004, the first of three increments will be initiated. Increment 1 will deliver an unqualified audit opinion in 2007 through a combination of system changes and manual work arounds in the early implementation stages. Business Modernization and Systems Integration (BMSI) will extend the Business Enterprise Architecture (BEA) in conjunction with the Domain efforts to develop detail data and process re-engineering. Increment 1 will consist of three major objectives.

1. Unqualified Audit Opinion (Objective 1.1)
  - Provide capability to enable an unqualified audit opinion
  - Evolve DoD-wide reference models towards operational support to the warfighter
2. Asset Accountability (Objective 1.2)
  - Provide capability to enable asset accountability
  - Evolve DoD-Wide reference models towards operational support to the warfighter

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<b>B. Program Change Summary</b>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>
Previous President's Budget	67.838	84.688	9.861	0
Current BES/President's Budget	67.191	45.098	94.767	93.832
Total Adjustments	-0.647	-39.590	84.899	93.832
Adjustment to Appropriated Value/Transferred Amount	0	0	0	0
a. Congressional realignment	0	0	0	0
b. Congressionally Directed Undistributed Reductions	0	0	0	0
c. Small Business Innovative Reserve	0	0	0	0

Current Budget Submit/Budget Estimate

Funding: Continuation of the high priority program established in FY 2002. The FY 2003 change were attributed to general inflation or similar changes. FY 2004 change supports the overall transformation to Business Management Modernization Program (BMMP) effort whereby the creation of the 7 domain areas were broken out. The \$39.6M change provides funding to support the domains as they perform portfolio management of systems, creation and termination of systems and detail extension of the BEA. For FY 2005 and 2006, the change was the re-alignment of BMMP procurement funds to RDT&E funds to support the BMSI BMMP effort to perform business process modeling and extension/integration efforts of the architecture. The FY 2004 - FY 2006 changes did not alter the overall funding levels for BMMP but re-aligned the funding for the specific needs of the program.

Schedule: Maintenance of the Department-wide Business Enterprise Architecture (BEA), perform Business Process Modeling (BPM) and integration Domain Business Process Engineering into the BEA.

Technical: Not Applicable

**C. Other Program Funding Summary:** N/A

**D. D. Acquisition Strategy:** The strategy will be to contract with the private sector for required effort, to include public accounting firms.

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Exhibit R-3, RDT & E, DW Project Cost Analysis										Date: February 2004		
Appropriation: RDT&E, Budget Activity: 5						Program Element: 0605016D8Z				Business Management Modernization Program		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total FY 2003 & PYs Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Perform Business Process Modeling and Integration of Domain Business Process Re-engineering efforts	Competitive Blanket Purchase Agreement	BMSI	61.0	37.5	Apr 04	85.7	Oct 04	85.0	Oct 05	256.4	527.6	
Independent Verification and Validation and OCI functions	Competitive Time & Material	BMSI	4.6	1.2	Mar 04	5.2	Oct 04	5.1	Oct 05	6.3	22.3	
Perform Engineering support for the Architecture	Competitive Time & Material	BMSI	18.1	2.0	Jul 04	3.8	Jul 05	3.7	Jul 06	29.7	59.8	
Support for the Domain and integration of BEA	Competitive Time & Material	BMSI	5.5	0							5.5	
Develop the BEA Ver.1.0	Competitive Time & Material	BMSI	74.7	0							74.7	

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Exhibit R-4, Schedule Profile																								Date: ( Month and Year ) February 2004																
Appropriation/Budget Activity RDT&E, 5												Program Element Number and Name 0605016D8Z Business Management Modernization Program												Project Number and Name																
Fiscal Year	2003				2004				2005				2006				2007				2008				2009															
	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	1	2	3	4
Develop Business Enterprise Architecture 1.0			△																																					
Increment 1 -			△																	△																				
Increment 2 -								△																																
Increment 3 -																△																								

R-4 Schedule Profile -

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<b>Exhibit R-4a, Schedule Detail</b>					Date: (month/year) <b>February2004</b>				
Appropriation/Budget Activity RDT&E, 5		Program Element Number and Name 0605016D8Z Business Management Modernization Program			Project Number and Name				
Schedule Profile		FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	
Enterprise Architecture		1-3Q							
Increment 1		Start 4 <sup>th</sup> Q				End 4 <sup>th</sup> Q			
Increment 2				Start 1-1-2Q				End - TBD	
Increment 3					Start - 1-2Q			End - TBD	

**R-4a Schedule Profile -**

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Exhibit R-2/R-2a, RDT&E Budget Item Justification					February 2004				
Appropriation/Budget Activity Engineering and Manufacturing Development Defense Wide, Budget Activity 5					Item Nomenclature Business System Transformation PE 0901200D8Z				
Cost (\$ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost				4.480	7.472	7.431	7.720	7.855	8.067

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT**

The Business Management Modernization Program (BMMP) Domains were established as part of the program's governance approach. The mission of the Domains is to lead business process transformation through business process reengineering (BPR) and system integration. The results of the reengineering efforts will be documented in the Business Enterprise Architecture (BEA) and will serve as a framework to guide investments in business management operations and systems.

**Program Accomplishments and Plans/New Starts:**

FY 2004 Plans:

1. (1.611) In FY 04, the Strategic Planning and Budgeting Domain will reengineer the Department's funds distribution process and budget execution process. The BPR will result in standard business processes that incorporate leading practices from both government and industry. The results of the BPR will be documented in the BEA that will be used to define the requirements for a Commercial of the Shelf (COTS) system solution(s).
2. (2.869) In FY 04, the Installations and Environment Domain will reengineer the Department's real property inventory process with a focus on data standardization. The BPR will result in standard business processes that incorporate leading practices from both government and industry. The results of the BPR will be documented in the BEA.

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**Program Accomplishments and Plans/New Starts (Cont.):**

FY 2005 Plans:

1. (1.572) In FY 05, the Strategic Planning and Budgeting Domain will reengineer the Department's program and budget formulation process. The BPR will result in standard business processes that incorporate leading practices from both government and industry. The results of the BPR will be documented in the BEA that will be used to define the requirements for a COTS system solution(s).
2. (3.900) In FY 05, the Installations and Environment Domain will implement the results of the real property reengineering initiative and begin the reengineering of the environmental management process and installation management process. The BPR will result in standard business processes that incorporate leading practices from both government and industry. The results of the BPR will be documented in the Business Enterprise Architecture (BEA).
3. (2.000) In FY 05, the Accounting and Finance Domain will reengineer the cost accounting process with a focus on data standardization. The BPR will result in standard business processes that incorporate leading practices from both government and industry. The results of the BPR will be documented in the Business Enterprise Architecture (BEA).

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<b>B. Program Change Summary</b>	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget	0	0	0	0
Current BES/President's Budget	0	0	4.480	7.472
Total Adjustments	0	0	0	0
Adjustment to Appropriated Value/Transferred Amount	0	0	0	0
Congressional realignment	0	0	0	0
Congressionally Directed Undistributed Reductions	0	0	0	0
Small Business Innovative Reserve	0	0	0	0

Current Budget Submit/Budget Estimate

    Funding: New Start

    Schedule: Business process reengineering was started following completion of the first version of the BEA. The reengineering will be on-going in an incremental approach consistent with the increments of BMMP. All results will be documented in updates to the BEA.

    Technical: Not Applicable

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** The strategy will be to contract with the private sector for required effort.

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Exhibit R-3, RDT & E, DW Project Cost Analysis										Date: February 2004		
Appropriation: RDT&E, Budget Activity: 5					Program Element: 0901200D8Z					Business System Transformation		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Business Process Reengineering Support	Competitive	OSD	0	0		4.480	Feb 04	7.472	Oct 05		11.952	

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**Exhibit R-4, Schedule Profile**

Date: Month and Year  
)

February 2004

Appropriation/Budget Activity  
RDT&E, 5

Program Element Number and Name  
0901200D8Z Business System  
Transformation

Project Number and Name

Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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
Increment 1 BPR														△				△																		
Increment 2 BPR																		△				△														

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

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Exhibit R-4a, Schedule Detail				Date: (month/year)					
Appropriation/Budget Activity RDT&E, 5		Program Element Number and Name 0901200D87			February 2004 Project Number and Name				
Schedule Profile	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	
Increment 1 BPR			2Q	1Q					
Increment 2 BPR				1Q	1Q				

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

<b>EXHIBIT R-2a, RDT&amp;E Project Justification</b>		DATE: <b>February 2004</b>
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E,DW/BA-5</b>	PROJECT NUMBER AND NAME <b>MIDS-LVT P773</b>	
<p><b>D. Acquisition Strategy:</b>                  USD(AT&amp;L) approved the FY00 procurement of MIDS terminals based on the favorable LRIP DAB review on 27 April 2000. The approval included procurement of 70 MIDS terminals and associated spares and an additional 11 terminals for emergent lab and test requirements. This decision was consistent with the Acquisition Strategy Report (ASR) approved by USD(AT&amp;L) in November 1999. The FY00 MIDS LRIP terminals were equitably split between the two US-led contracts. FY01 and out-year quantities are being competitively procured. USD(AT&amp;L) has directed that after completion of the US-led and European-led MIDS terminal production qualification efforts, the production requirements of all MIDS participants will be combined and competed among the US and European qualified MIDS manufacturers. For LRIP Lot 2, on 10 August 2001 the OIPT met and approved a two-phased LRIP buy and recommended to USD(AT&amp;L) to proceed with the acquisition without a formal DAB. The first phase was approved for 59 terminals and spares in September 2001. The second phase provided for 60 terminals and emerging requirements, and occurred in November 2001 after USD(AT&amp;L) reviewed DOT&amp;E's assessment. For LRIP Lot 3, USD(AT&amp;L) authorized the procurement of 208 MIDS terminals, plus spares and emergent requirements on 11 June 2002, and delegated the MS III Full Rate Production decision scheduled for July 2003 to ASN(RD&amp;A). The LRIP Lot 3 ADM was signed 26 June 2002. The Program Decision Meeting held 25 Sep 2003 with ASN(RD&amp;A) resulted in a Full Rate Production decision for the MIDS-LVT(2) Army unique variant and FRP for the USAF MIDS-LVT. The USN only received LRIP Lot 4 authority with direction to resolve open F/A-18 MIDS deficiencies prior to the next planned contract award. The ADM was signed 8 Dec 2003.</p> <p><b>E. Major Performers:</b>                  BAE Systems, Wayne, New Jersey, Systems Engineering &amp; Integration contract awarded June 2000.</p>		

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 5				R-1 ITEM NOMENCLATURE PE 0604709D8Z JOINT ROBOTICS EMD			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	27.326	21.381	13.845	14.081	14.264	14.761	15.085
CRS	6.939	7.600	2.330	2.000	2.146	2.197	2.117
RCSS	7.687	2.500	2.870	2.094	2.420	2.460	2.471
GLADIATOR	0.000	9.700	5.165	6.437	6.078	6.424	6.717
MDARS-E	12.700	1.581	3.480	3.550	3.620	3.680	3.780

**A. Mission Description and Budget Item Justification:**

This program is a budget activity level 5 based on the successful transition of robotic technologies from Concept and Technology Development activities to System Development and Demonstration (SDD) as part of an Evolutionary Strategy. This PE was established in response to Office of the Secretary of Defense (OSD) and Service agreement at the April 1997 Joint Robotics Program General Officer Steering Committee (GOSC). The agreement was to have OSD retain oversight of DoD robotics programs through SDD formerly Engineering, Manufacturing and Development (EMD). Individual Services are responsible for requirements generation and procurement funding. Within the JRP, emphasis is on the development of robotic technologies that are usable in multi-service missions; provide capability in hazardous environments; provide improved battlefield efficiency using supervised autonomous operational capability; reduce or enhance force manpower and sustainability; and are affordable. Success has been achieved in five programs to justify SDD at this time. This PE establishes the consolidated DoD robotics program for Unmanned Ground Vehicles (UGV) and advances UGV concepts into SDD for (1) the Common Robotic System (CRS) - a generic, modular set of robotic systems that can be used to retrofit several different types of currently fielded vehicles to allow remote obstacle breaching operations (minefields, earthworks, bunkers, etc.), and have supported operations in Bosnia and Kosovo; (2) the Robotic Combat Support System (RCSS) - capable of neutralizing anti-personnel mines, breaching wire obstacles and delivery of smoke or obscurants with P3I upgrades such as manipulator arm, semi-autonomous/autonomous control, prototypes have supported operations in Bosnia, Kosovo, Iraq and Afghanistan; (3)

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GLADIATOR—in response to a Marine Corps requirement, GLADIATOR will provide units of the Marine Air Ground Task Force (MAGTF) with multi-mission (RSTA, obstacles, direct fire, chem./bio detect) capability.

**B. Program Change Summary:** The Program was transferred by direction of Congress from the Department of the Air Force to the Department of Defense for FY 2004 execution.

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	27.887	13.597	13.861
Current FY 2005 President's Budget	27.326	21.381	13.845
Total Adjustments	-.561	+7.784	-.016
Congressional program reductions			
Congressional rescissions	-.561		-.016
Congressional increases		+7.784	
Reprogrammings			
SBIR/STTR Transfer			

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable



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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 5				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0604709D8Z			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
CRS	6.939	7.600	2.330	2.000	2.146	2.197	2.117

**A. Mission Description and Budget Item Justification:**

The Common Robotic System (CRS) program is a generic and modular robotic system that can be retrofitted to many different military applications and vehicles. The U.S. Army approved the Operational Requirements Document (ORD) in September 1997. Currently, the SRS system is being built for the DEUCE engineer dozer for the BCT; the GSTAMIDS Block 0 countermine system; the Unmanned Ground Vehicle Robotic Obscuration Platform (UGV ROP) for the M56 Coyote Smoke Obscuration System; and USMC Assault Breacher Vehicle (ABV) to allow remote obstacle breaching operations (minefields, earthworks, bunkers and obstacles such as clearing of rubble in a MOUT environment or a man-made obstacle covered by enemy fire). The Joint Project Office continues to support six M1A1 Panther systems for contingency support Bosnia and Kosovo that have cleared over 500 mines and submunitions. Panther is a tank chassis with SRS system and mine rollers used to proof roads or fields for mines.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	6.939	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Continued engineering and program management support for CRS system development.
- Continued SDD acquisition activity for the design, manufacture, and deliver of engineering prototypes for CRS.
- Conducted CRS IPR.
- Initiated CRS competitive Source Selection.
- Tested CRS contingency kits for GSTAMIDS Block 0.
- Delivered kits for the Assault Breacher and UGV ROP testing.

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	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	7.600	0.000
RDT&E Articles Quantity * (as applicable)			

- Award CRS SDD contract.
- Begin DT for UGV ROP.
- Begin GSTAMIDS Block 0 production of 10 units.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	2.330
RDT&E Articles Quantity * (as applicable)			

- Complete SDD for UGV ROP.
- Obtain MS C for UGV ROP.
- Begin Full Rate Production of UGV ROP.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:	February-2004				
DEFENSE-WIDE			Program Element				CRS					
BUDGET ACTIVITY 5			PE 0604709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				3.141		3.702		0.746				
Ancilliary Hardware Development												
Systems Engineering				2.318		2.318		1.057				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				5.459		6.020		1.803				
Remarks:												
Development Support				0.240		0.240		0.145				
Software Development				0.600		0.600		0.098				
Training Development												
Integrated Logistics Support				0.180		0.180		0.072				
Configuration Management				0.180		0.180		0.072				
Technical Data												
GFE												
Subtotal Support				1.200		1.200		0.387				
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)							Date:	February-2004					
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z				CRS						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT						0.216							
IOT&E													
Subtotal T&E				0.000		0.216		0.000					
Remarks:													
Contractor Engineering Support													
Government Engineering Support				0.160		0.080		0.080					
Program Management Support				0.120		0.084		0.060					
Program Management Personnel													
Travel													
Labor (Research Personnel)													
Miscellaneous													
Subtotal Management				0.280		0.164		0.140					
Remarks:													
Total Cost				6.939		7.600		2.330					
Remarks:													

Exhibit R-4, Schedule Profile																								Date: February 2004												
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #5												Program Element Number and Name PE 0604709D8Z – Joint Robotics Program												Project Number and Name CRS												
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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	[Timeline bar with triangle at 2006 Q1 and star at 2006 Q3]																																			
Contingency Prototypes	[Timeline bar from 2001 Q1 to 2003 Q4]												MS C				FUE																			
T&E Milestones													▲																							
DT and IOT&E for each System																	[DT and IOT&E box]																			
Production Milestones LRIP GSTAMIDS M56 Coyote													LRIP ▲				LRIP ▲				[LRIP bar]															
Full Rate Production																					FRP start ▲				[FRP bar]											
Deliveries																																				

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 Common Robotic System (CRS)			
Schedule Profile	FY 2001	FY 2002	FY200 3	FY200 4	FY200 5	FY200 6	FY200 7	FY200 8
SDD	1-4Q	1-4Q	1-4Q	1-4Q				
Milestone C						1Q		
LRIP GSTAMIDS				3Q				
LRIP M56 Coyote								
Full Rate Production UGV ROP						2Q		

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 5				R-1 ITEM NOMENCLATURE PE 0604709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
RCSS	7.687	2.500	2.870	2.094	2.420	2.460	2.471

**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 Afghanistan, as a contingency asset. RCSS threshold requirements include anti-personnel mine clearing and neutralization, improved reliability and human-machine interface, wire obstacle breaching, remotely deployed smoke and obscurants, and the capability to carry soldier loads. 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 breaching systems. A Mission Need Statement (MNS) and an Operational Requirements Document (ORD) have been approved by Army Training and Doctrine Command (TRADOC).

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**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	7.687	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- 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.

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	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	2.500	0.000
RDT&E Articles Quantity * (as applicable)			

- Initiate RCSS COTS procurement contract.
- Conduct safety testing and obtain safety release.
- Field RCSS COTS systems to War on Terrorism operating forces including training and maintenance support.
- Begin preparation for Type Classification testing.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	2.870
RDT&E Articles Quantity * (as applicable)			

- Continue Type Classification testing.
- Continue fielding and support of RCSS COTS systems to War on Terrorism forces.
- Obtain Type Classification.
- Begin integration of selected Mission Effects Modules.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable



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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004				
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z				RCSS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF			2.712		0.779		1.149				
Ancillary Hardware Development												
Systems Engineering				2.663		0.602		0.602				
Licenses												
Tooling				0.767		0.052		0.052				
GFE												
Award Fees												
Subtotal Product Development				6.142		1.433		1.803				
Remarks:												
Development Support				0.075		0.052		0.052				
Software Development				0.112		0.086		0.086				
Training Development				0.125		0.105		0.105				
Integrated Logistics Support				0.125		0.085		0.085				
Configuration Management				0.125		0.075		0.075				
Technical Data												
GFE												
Subtotal Support				0.562		0.403		0.403				
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)							Date:	February-2004				
DEFENSE-WIDE			Program Element				RCSS					
BUDGET ACTIVITY 5			PE 0604709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT						0.206		0.206				
IOT&E						0.240		0.240				
Initial Verification Testing				0.746								
Subtotal T&E				0.746		0.446		0.446				
Remarks:												
Contractor Engineering Support				0.052		0.038		0.038				
Government Engineering Support				0.110		0.120		0.120				
Program Management Support				0.075		0.060		0.060				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.237		0.218		0.218				
Remarks:												
Total Cost				7.687		2.500		2.870				
Remarks:												

Exhibit R-4, Schedule Profile																												Date: February 2004								
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #5														Program Element Number and Name PE 0604709D8Z – Joint Robotics Program										Project Number and Name RCSS												
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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																																				
Log Demo	MS A								MS B								MS C																			
Safety Testing																																				
T&E Milestones																																				
Independent Verification Test																																				
Type Classification Tests																																				
IOT&E																																				
Production Milestones																																				
COTS Procurement																																				
Deliveries													1				22				2								4							

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004					
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 Robotic Combat Support System (RCSS)				
Schedule Profile	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
Milestone A	1Q								
Contract Preparation	1-4Q	1-4Q	1-4Q						
CTD Contract Award	4Q		1Q						
CTD	4Q	1-4Q	1Q						
Milestone B									
Contract Preparation		4Q							
SDD Contract Award									
SDD									
Safety Test				2-3Q					
Type Classification testing				4Q	1-4Q				
IOT&E									
COTS Procurement Contract				2Q					
Full Rate Production									
First Unit Equipped				3Q					

R-4a Schedule Profile

Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 5				R-1 ITEM NOMENCLATURE PE 0604709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
GLADIATOR	0.000	9.700	5.165	6.437	6.078	6.424	6.717

**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 requirement 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

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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 Joint Chemical Agent Detector (JCAD), Anti-Personnel Obstacle Breaching System (APOBS), and direct fire (lethal and non-lethal) weapons.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Program remained in CTD.

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	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	9.700	0.000
RDT&E Articles Quantity * (as applicable)			

- Complete detailed design of Gladiator.
- Complete Future Naval Capability demonstrations.
- Prepare Milestone B documentation.
- Obtain Milestone B approval, initiate System Design and Development (SDD).

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	5.165
RDT&E Articles Quantity * (as applicable)			

- Complete build of 6 EDMs for DT/OT.
- Complete DT/OT.
- Complete Log Demo.
- Prepare 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 5.000 million  
 FY 2003 2.500 million  
 FY 2004 1.500 million

**D. Acquisition Strategy:**

Not Applicable

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**E. Major Performers:**

Not Applicable



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Exhibit R-3 Cost Analysis (page 1)							Date: February-2004					
DEFENSE-WIDE			Program Element				Gladiator					
BUDGET ACTIVITY 5			PE 0604709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF					5.264		2.444				
Ancilliary Hardware Development												
Systems Engineering						2.223		0.102				
Licenses												
Tooling						0.052		0.052				
GFE												
Award Fees												
Subtotal Product Development				0.000		7.539		2.598				
Remarks:												
Development Support						0.095		0.052				
Software Development						0.086		0.086				
Training Development						0.046		0.046				
Integrated Logistics Support						0.085		0.085				
Configuration Management						0.075		0.075				
Technical Data												
GFE												
Subtotal Support				0.000		0.387		0.344				
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)							Date:		February-2004			
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z				Gladiator					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT						1.451		2.000				
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.000		1.451		2.000				
Remarks:												
Contractor Engineering Support						0.038		0.038				
Government Engineering Support						0.225		0.125				
Program Management Support						0.060		0.060				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.000		0.323		0.223				
Remarks:												
Total Cost			0.000	0.000		9.700		5.165				
Remarks:												

Exhibit R-4, Schedule Profile																								Date: February 2004																								
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																								
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009															
	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	[Timeline bar with milestones: MS B (2004 Q3), MS C (2006 Q1), FUE (2007 Q4)]																																															
Prototype Phase	[Timeline bar from 2001 Q1 to 2002 Q3]												MS B				MS C				FUE																											
Program Milestones																																																
Log Demo																																																
T&E Milestones	[Timeline bar with milestones: 2005 Q3, 2005 Q4, 2006 Q3]																																															
Independent Verification Test																																																
DT	[Timeline bar: 2005 Q3]																																															
OT	[Timeline bar: 2005 Q4]																																															
IOT&E	[Timeline bar: 2006 Q3]																																															
Production Milestones																																																
LRIP FY 06	[Timeline bar with start marker: 2006 Q1]																																															
FRP FY 07	[Timeline bar with start marker: 2007 Q4]																																															
Deliveries	[Timeline bar with boxes: 44 (2007 Q3), 44 (2008 Q1), 47 (2009 Q1)]																																															

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
Milestone A									
Contract Preparation		1-2Q							
CTD Contract Award		2Q							
CTD		2-4Q	1-4Q						
Milestone B				3Q					
Contract Preparation				2-4Q					
SDD Contract Award				4Q					
SDD				3-4Q	1-4Q				
Developmental Test					3-4Q				
Log Demo					4Q				
Operational Test					4Q	1Q			
Milestone C						2Q			
Low Rate Initial Production						2Q			
IOT&E							2Q		
Full Rate Production							4Q		
First Unit Equipped							4Q		

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 5				R-1 ITEM NOMENCLATURE PE 0604709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
MDARS-E	12.700	1.581	3.480	3.550	3.620	3.680	3.780

**A. Mission Description and Budget Item Justification:**

The Mobile Detection Assessment Response System - Exterior (MDARS-E) will provide commanders at Army, Air Force, Navy, and Defense Logistics Agency (DLA) facilities with the capability to conduct semi-autonomous, random patrols and surveillance activities, barrier assessment, and theft detection functions. MDARS-E can be used in a variety of installations: chemical storage facilities, general storage yards; depots; Arms, Ammunition, and explosives (AA&E) storage areas; air fields; rail-yards; and port facilities. The system will autonomously conduct surveillance activities, conduct lock interrogations, and assess the status of facility barriers such as AA&E storage bunkers. Capabilities include the detection of unauthorized personnel, verification of barriers and product status, and the remote investigation of an alarm source.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	12.700	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Conduct Critical Design Review
- Identify Early User Appraisal (EUA) Activities for Army and Air Force Sites.
- Deliver First Pre-Production Platforms.
- Conduct Production Qualifications Test (PQT) 1a.
- Explore Tactical/Contingency Applications.
- Continue System Integration of Sensor Technologies.

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- Continue C2 Software Engineering and Test.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	1.581	0.000
RDT&E Articles Quantity * (as applicable)			

- Conduct PQT 1b.
- Conduct Early User Appraisal Training (EUA) at Hawthorne Army Depot and Nellis Air Force Base, NV.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	3.480
RDT&E Articles Quantity * (as applicable)			

- Conduct PQT2.
- Conduct New Equipment Training.
- Initiate Initial Operational Test and Evaluation.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:		February 2004			
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z				MDARS-E					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				12.700		1.581		3.480				
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				12.700		1.581		3.480				
Remarks:												
Development Support												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support				0.000		0.000		0.000				
Remarks:												



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Exhibit R-3 Cost Analysis (page 2)								Date:	February 2004				
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z					MDARS-E					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT													
IOT&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													
				0.000		0.000		0.000					
Remarks:													
Total Cost				12.700		1.581		3.480					
Remarks:													

Exhibit R-4, Schedule Profile																								Date: February 2004												
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #5												Program Element Number and Name PE 0604709D8Z – Joint Robotics Program												Project Number and Name MDARS-E												
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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																																				
Award SD&D Contract																																				
System Delivery																																				
EUA Training																																				
EUA/PQT2																																				
IOT&E																																				

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004					
Appropriation/Budget Activity RDT&E, Defense Wide/ Budget Activity 5		Program Element Number and Name PE 0604709D8Z		Project Number and Name MDARS-E					
Schedule Profile	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
Milestone B IPR	3Q								
Award SD&D contract		2Q							
System Delivery				2Q					
EUA Training				2Q					
EUA/PQT2									
Initiate				2Q					
Complete					2Q				
IOT&E					3Q				
Milestone C IPR						3Q			

R-4a Schedule Profile

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<b>Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&amp;E Budget Item Justification</b>	Date: February 2004
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Appropriation/Budget Activity RDT&E., DW BA5	R-1 Item Nomenclature: Man Portable Air Defense Systems (MANPADS)0604618D8Z
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Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0.000	2.958	14.135	13.674	.970	.978	.979

**A. Mission Description and Budget Item Justification:**

(U) Man Portable Air Defense (MANPAD) systems are very widely proliferated, with greater than 500,000 produced and many poorly controlled. These weapons can be easily concealed and transported in a container as small as a suitcase, and can be lethal to a wide range of military and dual use aircraft. MANPAD systems and their launchers are available on the black market for as little as \$15,000. As demonstrated by recent events in Operation Iraqi Freedom, Department of Defense (DOD) and Civil aircraft are attractive terrorist targets.

(U) The process of defeating an IR missile includes two necessary tasks, detecting missile launch, and executing countermeasures to defeat the missile guidance system. Modern IRCM systems rely on sensors mounted on the protected aircraft and either infrared decoys (flares) or directed energy lamp or laser systems. Although various onboard systems have been developed and fielded to counter the IRCM threat, including MANPADS, they remain costly (between \$250,000 and \$5,000,000 per aircraft installation) and their integration is complex and time consuming.

(U) Alternatives are needed to reduce the cost and lead time required to protect aircraft from IR missiles in the near-ground urban and expeditionary environment. This program investigates the development of a ground based, networked electro-optical sensor grid that would provide missile launch detection and warning, including examination of commercially available components to lower costs and to reduce the lead-time for system fielding. By using vehicle mountings and wireless networking, it will be potentially possible make the system readily portable for rapid coverage area reconfiguration. Expeditionary airfields could thus be quickly protected.

(U) A second component of this program explores the development of more affordable countermeasures technologies suitable for use in urban and expeditionary airfield environments.

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(U) The objective of this effort is to develop and demonstrate a low-cost, rapidly fieldable IRCM options for the rapid protection of expeditionary airfields and urban areas where comprehensive onboard protection cannot be guaranteed.

**Program Change Summary:**

	FY 2003	FY 2004	FY 2005
Previous President's Budget	0.000	25.000	21.609
Current FY 2005 President's Budget	0.000	2.958	14.135
Total Adjustments		-22.042	-7.474
Congressional program reductions		-22.042	
Congressional rescissions			
Congressional decrease			
Reprogrammings			
SBIR/STTR Transfer			
Other			-7.474

<b>RDT&amp;E Budget Item Justification Sheet (R-2a Exhibit)</b>						<b>Date:</b> February 2004	
<b>Appropriation/Budget Activity</b> RDT&E, Defense Wide/BA-5			<b>R-1 Item Nomenclature</b> Man Portal Air Defense System (MANPADS) Countermeasures PE 0604618D8Z				
Cost (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
MANPADS	0.000	2.958	14.135	13.674	.970	.978	.979

**A. Mission Description and Budget Item Justification**

(U) Man Portable Air Defense (MANPAD) systems are very widely proliferated, with greater than 500,000 produced and many poorly controlled. These weapons can be easily concealed and transported in a container as small as a suitcase, and can be lethal to a wide range of military and dual use aircraft. MANPAD systems and their launchers are available on the black market for as little as \$.015 million. As demonstrated by recent events in Operation Iraqi Freedom, Department of Defense (DOD) and Civil aircraft are attractive terrorist targets.

(U) The process of defeating an IR missile includes two necessary tasks, detecting missile launch, and executing countermeasures to defeat the missile guidance system. Modern IRCM systems rely on sensors mounted on the protected aircraft and either infrared decoys (flares) or directed energy lamp or laser systems. Although various onboard systems have been developed and fielded to counter the IRCM threat, including MANPADS, they remain costly (between \$.250 million and \$5.000 million per aircraft installation) and their integration is complex and time consuming.

(U) Alternatives are needed to reduce the cost and lead time required to protect aircraft from IR missiles in the near-ground urban and expeditionary environment. This program investigates the development of a ground based, networked electro-optical sensor grid that would provide missile launch detection and warning. A second component of this program explores the development of more affordable countermeasures technologies suitable for use in urban and expeditionary airfield environments.

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(U) The objective of this effort is to develop and demonstrate a low-cost, rapidly fieldable IRCM option for the protection of expeditionary airfields and urban areas where comprehensive onboard protection cannot be guaranteed.

**B. Program Plans - FY 2005 Through FY 2006:**

	FY 2003	FY2004	FY 2005
<b>Man Portal Air Device</b>	0.000	2.958	14.135

(U) Based upon results from an FY 2003 study, this effort is planned to consist of two demonstration phases. Phase I will consist of a ground-based sensor grid component evaluation, system design, performance evaluation and demonstration. Phase II will consist of reduced cost, ground and/or on aircraft countermeasures.

(U) The initial testing will occur at the Naval Air Warfare Center, Weapons Division (NAWC-WD), China Lake, and will consist of a network of promising ground sensors. Objectives of the test are to show that the sensor and associated computational algorithms can reliably detect a missile launch and provide a declaration in sufficient time to initiate appropriate countermeasures (time is classified).

(U) The ground based sensor grid will consist of an array of sensors that constantly monitor for the presence of a MANPAD launch. Several factors favor this architecture, with much higher detection and lower false alarm rates than current on-aircraft launch detectors. The sensor grid will use commercially available components to reduce cost and the lead-time to field a system. Additionally, it will be possible make the system portable by mounting the sensors on vehicles and using wireless networking between the sensors. Expeditionary airfields and urban areas could be quickly augmented for MANPADS protection.

**C. Other Program Funding Summary:** N/A

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0605017D8Z REDUCTION OF TOTAL OWNERSHIP COST			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost-0605017D8Z	0.000	0.000	27.351	25.145	25.159	25.190	25.239

**A. Mission Description and Budget Item Justification:**

This program provides funding for start-up costs for projects that will increase the reliability, readiness and capability of new or existing defense systems; reduce logistics footprint; and generate future savings in total ownership cost. Start-up costs include, but are not limited to: non-recurring engineering, test and qualification, development of procedures and processes, documentation, cost driver identification, and other features that could produce significant future savings from a relatively small investment in Research, Development, Test & Evaluation (RDT&E). The objective of this program is to optimize returns on investments that reduce operating and support costs for systems.

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	0.000	0.000	0.000
Current FY 2005 President's Budget	0.000	0.000	27.351
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other			+27.351

**C. Other Program Funding Summary:**



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Not Applicable

**D. Acquisition Strategy:**

There will be an annual competition for funding. A request for projects will be made to the Military Departments annually in May. Formats and instructions will be provided. Projects will be scored objectively in the following areas: return on investment during the FYDP; return on investment over the life cycle; crossover year (the year when return is greater than investment); payback year (the year when total return is greater than total investment); and service ranking. Projects will be scored subjectively in the following areas: operational readiness improvements; the credibility of achieving the predicted benefits; technological risk; schedule risk; budget risk; and the extent of management support. An evaluation team will complete the selection process by the end of September.

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Exhibit R-2, RDT&E Budget Item Justification								Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 4					R-1 ITEM NOMENCLATURE Joint Service Education & Training Development - PE: 0604722D8Z				
COST (\$ In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	.961	.987	0	0	0	0	0	0	0

**(U) A. Mission Description and Budget Item Justification**

**(U) BRIEF DESCRIPTION OF ELEMENT:** The program element supports the application of advanced distributed learning (ADL) technologies for military education and training. It promotes the use of interoperable, online learning content for use by multiple services as well as the civilian community as appropriate. Policy oversight of this program is managed by the Office of the Under Secretary of Defense/Readiness (Readiness and Training Policy and Programs).

**PROGRAM ACCOMPLISHMENTS AND PLANS:**

**(U) FY2003 Accomplishments:**

- Completion of interoperable, online course for NATO as part of U.S. contribution to training enhancement.
- Developed medical related instructional modules to address the health care shortage and the need for clinical experience.
- Convened a national strategic summit on learning content repositories for adopting standards for access to digital content.

**(U) FY 2004 Accomplishments:**

- Extension of ADL to Internet-based multiplayer online gaming environment for instruction on net centric warfare.
- Embedding access to learning content repositories into online games for instructional purposes.

**(U) FY 2005 Plans:** Not applicable.

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Exhibit R-2, RDT&E Budget Item Justification		Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 4	R-1 ITEM NOMENCLATURE Joint Service Education & Training Development - PE: 0604722D8Z		
<b>(U) B. <u>Program Change Summary</u></b>	<u>2003</u>	<u>2004</u>	<u>2005</u>
Previous President's Budget	.986	0	0
Current President's Budget	.961	.987	0
Total Adjustments	-.025	+.987	0
a. Congressional Increase	0	1.000	0
b. Congressionally Directed Undistributed Reductions	0	0	0
c. Other (DOD Program Changes)	-.25	-.013	0
(U) C. <u>Other Program Funding Summary:</u> Not Applicable			
(U) D. <u>Execution:</u> FY03 Academic Advanced Distributed Learning Co-Laboratory, University of Wisconsin, Madison, WI FY04 Concurrent Technologies Corporation, Johnstown, PA			

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Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-wide BA 4				Project Name and Number – Joint Service Education & Training Development PE: 0604722D8Z				
Cost (\$ in millions)		FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	FY 09
Project 001		.986	.987	0	0	0	0	0
RDT&E Articles Quantity – N/A								
<p><b>A. Mission Description and Budget Item Justification:</b>                      This program supports development of tools and applications of Advanced Distributed Learning technologies. At the direction of Congress, funds were added in FY03 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 sixty 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 FY04 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.</p> <p><b>B. Accomplishments/Planned Program:</b>                      Developed medical related instructional modules to address the health care shortage and the need for clinical experience. Created an online interface for searching learning content repositories. Convened a national strategic summit on learning content repositories for adopting standards for access to digital content so that learners can have seamless access to digital libraries to the widest extent possible. Developed a prototype framework for inserting learning content into multiplayer online games.</p>								
				FY 03	FY 04	FY 05		
Accomplishment/ Effort/Subtotal Cost (\$ in Millions)				.986	.987	0		
RDT&E Articles Quantity – N/A								
<p><b>C. Other Program Funding Summary:</b> None.</p> <p><b>D. Acquisition Strategy:</b> None required.</p> <p><b>E. Major Performers:</b> In FY03, the University of Wisconsin, Madison, WI. In FY04, Concurrent Technologies Corp., Johnstown, PA.</p>								

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>					Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4			R-1 ITEM NOMENCLATURE J-UCAS Advanced Component and PE 0604400D8Z Prototype Development			
COST (\$ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
PE 0604400D8Z	-	422.873	667.307	380.105	1043.498	986.156

**A. Mission Description and Budget Item Justification:**

The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint DARPA, Air Force, and Navy effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture. The J-UCAS program combines 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. Although these efforts were targeted towards service-specific needs, 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, will reduce the risk of the system being developed for the joint early operational assessment. The J-UCAS concept incorporates the next generation Boeing X-45C family and Northrop Grumman X-47B family of air vehicles, together with a common architecture and subsystems (e.g. sensors, communications, and command & control software). These common system elements will maximize system flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint early operational assessment planned for the FY07-09 timeframe. The J-UCAS Office integrates DARPA, Air Force, and Navy personnel, operating in close coordination with Service users and other components. The program is focused on achieving a joint early operational assessment that supports both Services and enables an operational system development decision by the end of the decade. PE 0604400D8Z is for J-UCAS Advanced Component and Prototype Development, which funds development of the common systems and technologies and the demonstration systems for the joint early operational assessment.

**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	-	-	-
Current FY 2005 President's Budget	-		422.873
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			

**C. Other Program Funding Summary:**

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	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
PE 0603400D8Z, OSD	-	-	284.617
PE 0603114N, Navy	-	117.865	-
PE 0604731F, Air Force	-	174.449	-
PE 0207256F, Air Force	-	2.305	-
PE 0603285E, DARPA	-	38.385	-

**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 early operational assessment. The common architecture and subsystems will maximize system flexibility and operational versatility/interoperability.

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Exhibit R-2a, RDT&E Budget Item Justification							Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE J-UCAS Advanced Component and PE 0604400D8Z Prototype Development				
COST (\$ in millions)			FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
J-UCAS			0.000	422.873	667.307	380.105	1043.498	986.156

**A. Mission Description and Budget Item Justification:**

The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint DARPA, Air Force, and Navy effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture. The J-UCAS program combines 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. Although these efforts were targeted towards service-specific needs, 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, will reduce the risk of the system being developed for the joint early operational assessment. The J-UCAS concept incorporates the next generation Boeing X-45C family and Northrop Grumman X-47B family of air vehicles, together with a common architecture and subsystems (e.g. sensors, communications, and command & control software). These common system elements will maximize system flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint early operational assessment planned for the FY07-09 timeframe. The J-UCAS Office integrates DARPA, Air Force, and Navy personnel, operating in close coordination with Service users and other components. The program is focused on achieving a joint early operational assessment that supports both Services and enables an operational system development decision by the end of the decade. PE 0604400D8Z is for J-UCAS Advanced Component and Prototype Development, which funds development of the common systems and technologies and the demonstration systems for the joint early operational assessment.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	422.873

Planned Program:

- Continue development of J-UCAS systems, specifically the Boeing X-45C and Northrop Grumman X-47B air vehicles as well as the common operating system and sensors.
- Prepare for joint early Operational Assessment (OA).

**C. Other Program Funding Summary:**

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	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
PE 0603400D8Z, OSD	-	284.617	77.785	-	-	-
PE 0603114N, Navy	117.865	-	-	-	-	-
PE 0604731F, Air Force	174.449	-	-	-	-	-
PE 0207256F, Air Force	2.305	-	-	-	-	-
PE 0603285E, DARPA	38.385	-	-	-	-	-

**D. Acquisition Strategy:**

The J-UCAS Advanced Technology Development and Risk Reduction acquisition strategy is to prove the basic technological feasibility of the J-UCAS concept with the X-45A technology demonstrator and to prove the military utility through the next generation demonstrators – the X-45C and the X-47B demonstrators. This effort is tightly coupled with PE 0604400D8Z (J-UCAS Advanced Component and Prototype Development), which complements the work under this program element to deliver systems for the joint early operational assessment, using a common architecture and subsystems.

**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



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Exhibit R-3 Cost Analysis					Date: February 2004		
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	FY 2003 Cost	FY 2004 Cost	FY 2005 Cost	Cost to Complete	Total Cost
Product Development:							Continuing
X-45	OTA	Boeing Phantom Works, St. Louis MO			137.599	650.662	
X-47	OTA	Northrop Grumman, El Segundo, CA			116.835	885.852	
Common Systems	TBD				150.243	1033.238	Continuing
Subtotal Product Development					404.677	2569.752	
T&E:							
Operational Assessment (OA)					0.100	372.740	
Subtotal T&E					0.100	372.740	
Management Services:					18.096	134.574	
Subtotal Management Services					18.096	134.574	
Total Cost					422.873	3077.066	
Remarks							

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Exhibit R-4, Schedule Profile																												Date: February 2004								
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												
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
X-45A Demonstrations	[Shaded bar from Q1 2002 to Q4 2005]																																			
J-UCAS Demonstrator Development									[Shaded bar from Q1 2003 to Q4 2007]																											
Common Systems Development					[Shaded bar from Q1 2004 to Q4 2010]																															
Joint Early Operational Assessment																	[Shaded bar from Q1 2008 to Q4 2010]																			

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Exhibit R-4a, Schedule Detail			Date: February 2004						
Appropriation/Budget Activity	Program Element Number and Name	Project Number and Name							
DEFENSE WIDE RDT&E/B.A. 4	PE 0604400D8Z – J-UCAS Advanced Component and Prototype Development	J-UCAS							
		FY 2002	FY 2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Common Systems Development Begins				3Q					
X-45A Flight Demonstrations Conclude					2Q				
J-UCAS Flight Demonstrations Begin						3Q			
J-UCAS Flight Demonstrations Conclude							4Q		
Joint Early Operational Assessment Begins								1Q	

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/ Budget Activity 4				R-1 ITEM NOMENCLATURE Coalition Warfare 0603923D8Z			
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total 0603923D Cost	6.545	5.882	5.886	5.852	5.849	5.850	5.877
Coalition Readiness Mgt. System	0.560	0.000	0.000	0.000	0.000	0.000	0.000
JTRS/Bowman Interoperability	0.600	0.000	0.000	0.000	0.000	0.000	0.000
Search and Rescue Info System	0.200	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Wide Area Network-PACOM	1.900	0.000	0.000	0.000	0.000	0.000	0.000
Quiet Interlude	0.400	0.000	0.000	0.000	0.000	0.000	0.000
Coalition UAV Interoperability	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Coalition Warfare Support	0.360	0.375	0.390	0.000	0.000	0.000	0.000
Quick-Win II - Interoperable Tactical Communications	0.200	0.200	0.000	0.000	0.000	0.000	0.000
Satellite Coalition Broadcast Environment	0.400	0.569	0.000	0.000	0.000	0.000	0.000
Battlefield Combat Identification	0.900	0.600	0.000	0.000	0.000	0.000	0.000
Blue Force Situational Awareness	0.025	0.375	0.450	0.000	0.000	0.000	0.000
Joint Threat Warning System	0.000	1.000	0.700	0.000	0.000	0.000	0.000
Mark XIIIA Mode 5 IFF	0.000	0.855	0.675	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Subnet Relay	0.000	0.650	0.425	0.000	0.000	0.000	0.000
Coalition Shared Network Intelligence Environment/ACTD	0.000	0.120	0.200	0.000	0.000	0.000	0.000
ROK/U.S. Exercise Simulation Interoperability	0.000	0.075	0.200	0.000	0.000	0.000	0.000
Navigation Warfare Electronic Support w/Micro UAVs	0.000	0.500	0.600	0.000	0.000	0.000	0.000
US-UK Imagery	0.000	0.300	0.000	0.000	0.000	0.000	0.000
ICOG Task Force Project Support	0.000	0.203	0.120	0.000	0.000	0.000	0.000
Advanced Soldier Systems	0.000	0.000	0.550	0.000	0.000	0.000	0.000
Non-lethal Laser/Microwave	0.000	0.000	0.400	0.000	0.000	0.000	0.000
Force Protection	0.000	0.000	0.500	0.000	0.000	0.000	0.000
Coalition Exercises- Technical Enablers	0.000	0.000	0.326	0.000	0.000	0.000	0.000
Transformational C4ISR	0.000	0.000	0.350	0.000	0.000	0.000	0.000
<p><b>A. Mission Description:</b> The Coalition Warfare (CW) initiative brings added 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&amp;D process yield large dividends (e.g., Joint Strike</p>							

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Exhibit R-2, RDT&E Budget Item Justification

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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 programs to the highest level of CW support and interest. CW is supporting the Coalition Combat Identification Advanced Concept Technology Demonstration (ACTD), as well as the Coalition Blue Force Situational Awareness ACTD, by providing the necessary financial support to both internationalize these projects and enhance their potentials for success. Both U.S. and foreign technologies and research may be applied to improve the end product.

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, responsiveness to USD (AT&L) priorities for international armaments cooperation and goals of the Nov 02 NATO Prague Summit (capabilities-related commitments), potential for leveraging results across multiple Combatant Commands and potential risks related to security and controlled

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Exhibit R-2, RDT&E Budget Item Justification

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technology.

Prospective new-start projects are being evaluated in anticipation of action by a review board in May 2004.

<b>B. Program Change Summary:</b>	FY 2003	FY 2004	FY 2005
Previous President's Budget Submit	6.944	5.906	5.886
Current President's Budget Submit	6.545	5.822	5.886
<b>Total Adjustments</b>	-0.399	-0.084	0.000
Adjustments to Appropriated Value			
a. Congressionally Directed Undistributed Reduction	-0.326	-0.084	0.000
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.056	0.000	0.000
c. Other (SBIR)	-0.017	0.000	0.000

**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. Army Communication and Electronics Command, New Jersey
- U.S. Navy Space and Naval Warfare Systems Center, San Diego, CA
- U.S. Naval Air Systems Command, Patuxent River, MD
- U.S. Strategic Command, Offutt Air Force Base, NB
- U.S. Special Operations Command, Tampa, FL

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Exhibit R-2, RDT&E Budget Item Justification							February 2004	
Appropriation/Budget Activity RDT&E BA 4				R-1 Item Nomenclature: Humanitarian Demining 0603920D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	12.627	13.108	13.747	13.982	14.213	13.739	14.104	
Humanitarian Demining/P920	12.627	13.108	13.747	13.982	14.213	13.739	14.104	
<b>A. Mission Description and Budget Item Justification:</b>								
<p>The Humanitarian Demining R&amp;D program element focuses on the testing, demonstration and validation of equipment for immediate use in international humanitarian demining missions and environments. The goal is to assess equipment capabilities in actual demining conditions by providing it to the international demining community. The equipment developed under this program also has military applications. Several pieces of equipment are being evaluated under the Joint Area Clearance Advanced Concept Technology Demonstration (JAC ACTD). The Humanitarian Demining R&amp;D Program focuses on R&amp;D technology development to reduce the time and cost associated with demining while improving operator safety. This is accomplished through adaptation of commercial-off-the-shelf equipment, the integration of mature technologies, and leveraging past and current R&amp;D project activity in the Army's Night Vision and Electronic Sensor's Directorate (NVESD) tactical Countermine and Science and Technology mission areas. The program aims to improve existing technologies for: individual mine and minefield detection; wide area survey; mechanical/mine and vegetation clearance; mine neutralization; individual deminer/soldier protection; detection of explosives in buried mines (biosensors); 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 Humanitarian Demining Workshops that bring the international Non-Governmental Organizations (NGOs) and Mine Action Centers (MACs) together to assist in this process.</p>								
<b>B. Program Change Summary:</b>								
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>					
Previous President's Budget	12.893	13.299	13.771					
Current President's Budget	12.627	13.108	13.747					
Total Adjustments								
Congressional program reductions								
Congressional rescissions								
Congressional increases								
Reprogrammings								
SBIR/STTR Transfer								
Undistributed Reductions/Withholds	.266	.191	.024					
<b>C. Other Program Funding Summary: NA</b>								
<b>D. Acquisition Strategy:</b>								
<p>Following a rapid prototyping/development 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 humanitarian demining technologies in the face of ongoing casualties in mine-affected countries. The program develops prototype equipment by acquiring off-the-shelf equipment from industry using competition to the maximum extent possible, by leveraging ongoing countermine R&amp;D efforts in other U.S. and foreign R&amp;D activities, and by taking advantage of extensive in-house developmental capabilities at the Army's Night Vision &amp; Electronic Sensor's Directorate (NVESD).</p>								

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Exhibit R-2a, RDT&E Project Justification							February 2004											
Appropriation/Budget Activity RDT&E. BA 4				Project Name and Number Humanitarian Demining 0603920D8Z														
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	FY 2008	FY 2009											
Humanitarian Demining/P920	12.627	13.108	13.747	13.982	14.213	13.739	14.104											
<p><b>B. Mission Description and Budget Item Justification:</b>                      The Humanitarian Demining R&amp;D program element focuses on the testing, demonstration and validation of equipment for immediate use in international humanitarian demining missions and environments. The goal is to assess equipment capabilities in actual demining conditions by providing it to the international demining community. The equipment developed under this program also has military applications. Several pieces of equipment are being evaluated under the Joint Area Clearance Advanced Concept Technology Demonstration (JAC ACTD). The Humanitarian Demining R&amp;D Program focuses on R&amp;D technology development to reduce the time and cost associated with demining while improving operator safety. This is accomplished through adaptation of commercial-off-the-shelf equipment, the integration of mature technologies, and leveraging past and current R&amp;D project activity in the Army's Night Vision and Electronic Sensor's Directorate (NVESD) tactical Countermines and Science and Technology mission areas. The program aims to improve existing technologies for: individual mine and minefield detection; wide area survey; mechanical/mine and vegetation clearance; mine neutralization; individual deminer/soldier protection; detection of explosives in buried mines (biosensors); 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 Humanitarian Demining Workshops that bring the international Non-Governmental Organizations (NGOs) and Mine Action Centers (MACs) together to assist in this process.</p>																		
<p><b>B. Accomplishments/Planned Program</b></p> <table border="1"> <thead> <tr> <th></th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> <th></th> </tr> </thead> <tbody> <tr> <td>Accomplishment/ Effort/Subtotal Cost</td> <td>12.627</td> <td>13.108</td> <td>13.747</td> <td></td> </tr> </tbody> </table>										FY 2003	FY 2004	FY 2005		Accomplishment/ Effort/Subtotal Cost	12.627	13.108	13.747	
	FY 2003	FY 2004	FY 2005															
Accomplishment/ Effort/Subtotal Cost	12.627	13.108	13.747															
<p><b><u>FY2003 Accomplishments</u></b></p> <p>Continued to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging existing technology from the tactical countermines area. Continued to develop: Improved handheld detection using new developments in electro-magnetic induction, ground penetrating radar and acoustic technology; individual mine neutralization technologies using both high and low order detonation methods to include neutralization of mines under water; vegetation and mechanical clearance systems suitable for removing dense vegetation from mined areas and for excavating and clearing landmines for large area reduction and QA operations; and a solar powered battery charging system for field operations. Initiated/fielded operational evaluations of detection, mine/vegetation clearance and neutralization technologies in mine infested regions of the world. This includes the Mine Clearing Cultivator and Mine Clearing Sifter in Angola, the Uni-disk in Mozambique, the MAXX mini-mulcher in Namibia and Rwanda, a Tempest vegetation clearer in Thailand and Mozambique, the Survivable Demining Tractor and Tools in Thailand, the Sifting Excavator for a new operational field evaluation in Honduras, and Setco tires to Halo Trust (a humanitarian demining non-governmental organization) in Sri-Lanka, Djibouti and Georgia. Conducted site surveys/country assessments for Azerbaijan, Honduras, Angola and Mozambique to provide advice on specific prototype items developed under the program would be best suited based on the situation in the country and also assist in future development efforts. Conducted the annual HD Workshop in July 2003 to determine/validate areas of emphasis for technology development.</p>																		

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	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	12.627	13.108	13.747	
<b><u>FY 2004 Plans:</u></b>				
<p>Continue to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging technology from the tactical countermine area. Continue to develop improved handheld detection technologies, and mine/minefield marking. Continue to develop vegetation and mechanical clearance and neutralization systems suitable for removing dense vegetation from mined areas and excavating and clearing landmines for large area reduction and quality assurance operations. Initiate a comparative analysis of existing individual mine neutralization technologies. Continue to develop and demonstrate individual deminer tools and equipment. Conduct site survey(s), country assessment(s) and initiate/sustain operational field evaluations of prototypes developed under the program in the area of detection, mine/vegetation clearance, neutralization and personal deminer protection systems in mine-infested regions of the world. Continue on-going operational field evaluations of mine/vegetation clearance systems in heavily mined regions throughout the world. Continue development of equipments suitable for area reduction and quality assurance operations. Complete and distribute the 2003 Humanitarian Demining R&amp;D Program Developmental Technologies video to assist with the global demining effort. Conduct an annual HD Requirements Workshop.</p>				
<b><u>FY 2005 Plans:</u></b>				
<p>Continue to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging technology with the tactical countermine area. Continue to develop detection technologies to improve detection capability and reduce false alarms. Continue 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. Continue to develop and demonstrate individual deminer protective equipment. Continue development of equipment suitable for area reduction and quality assurance operations. Continue wide area detection cooperative endeavor with international partners. Continue the mine neutralization technologies comparative evaluation initiated in FY2004. Complete and distribute the 2004 Humanitarian Demining R&amp;D Program Developmental Technologies catalog to assist with the global demining effort. Conduct an annual HD Requirements Workshop.</p>				
<b>C. Other Program Funding Summary: NA</b>				
<p><b>Acquisition Strategy.</b> Following a rapid prototyping process, 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 humanitarian demining technologies in the face of ongoing casualties in mine-affected countries. The program develops prototype equipment by acquiring off-the-shelf equipment from industry using competition to the maximum extent possible, by leveraging ongoing countermine R&amp;D efforts in other U.S. and foreign R&amp;D activities, and by taking advantage of extensive in-house developmental capabilities at the Army's Night Vision Laboratory.</p>				

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Exhibit R-3 Cost Analysis										Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY				PROGRAM ELEMENT						PROJECT NAME AND NUMBER		
RDT&E / BA 4				0603920D8Z						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 <sup>1</sup>	Various <sup>2</sup>	80.920	7.568	NA <sup>3</sup>	7.937	NA <sup>3</sup>	8.073	NA <sup>3</sup>	24.281	128.779	NA <sup>4</sup>
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			80.920	7.568		7.937		8.073		24.281	128.779	
Remarks:												
<p>1: The Humanitarian Demining R&amp;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.</p> <p>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.</p> <p>3. The HD Program goal is to award all individual efforts to ensure DoD performance goals are met or exceeded.</p> <p>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.</p>												
Development Support												
Software Development	Various <sup>1</sup>	Various <sup>2</sup>	3.146	.406	NA <sup>3</sup>	.426	NA <sup>3</sup>	.433	NA <sup>3</sup>	1.303	5.714	NA <sup>4</sup>
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			3.146	.406		.426		.433		1.303	5.714	
Remarks:												
See remarks for notes 1, 2, 3 and 4 in the Product Development Section.												

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Exhibit R-3 Cost Analysis (page 2)										Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY				PROGRAM ELEMENT						PROJECT NAME AND NUMBER		
RDT&E / BA 4				0603920D8Z						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	2.744	.885	NA <sup>3</sup>	.928	NA <sup>3</sup>	.944	NA <sup>3</sup>	2.839	8.340	NA <sup>5</sup>
Tooling												
GFE												
Subtotal T&E			2.744	.885		.928		.944		2.839	8.340	
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 the 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 <sup>1</sup>	Various <sup>2</sup>	5.374	.750	NA <sup>3</sup>	.787	NA <sup>3</sup>	.800	NA <sup>3</sup>	2.406	10.117	NA <sup>4</sup>
Government Engineering Support	NA	RDECOM NVESD Fort Belvoir, VA	4.940	.957	NA <sup>3</sup>	1.004	NA <sup>3</sup>	1.021	NA <sup>3</sup>	3.070	10.992	NA
Program Management Support	Various <sup>1</sup>	Various <sup>2</sup>	7.500	.900	NA <sup>3</sup>	.944	NA <sup>3</sup>	.960	NA <sup>3</sup>	2.888	13.192	NA <sup>4</sup>
Program Management Personnel	NA	RDECOM NVESD Fort Belvoir, VA	.797	.143	NA <sup>3</sup>	.150	NA <sup>3</sup>	.153	NA <sup>3</sup>	.459	1.702	NA
Travel	NA	NA	1.672	.300	NA <sup>3</sup>	.315	NA <sup>3</sup>	.320	NA <sup>3</sup>	.963	3.570	NA
Labor (Research Personnel)	NA	RDECOM NVESD Fort Belvoir, VA	8.747	1.199	NA <sup>3</sup>	1.256	NA <sup>3</sup>	1.278	NA <sup>3</sup>	3.847	16.327	NA
Overhead												
Subtotal Management			29.030	4.249		4.456		4.532		13.633	55.900	
Remarks: See remarks for notes 1, 2, 3 and 4 in the Product Development Section.												
Total Cost			115.840	13.108		13.747		13.982		42.056	198.733	
Remarks												

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004																	
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide/Budget Activity 4				R-1 ITEM NOMENCLATURE Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z																			
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009																
Total PE 0603851D Cost	20.091	35.191	32.546	31.028	28.709	27.851	28.574																
<b>ESTCP Cost</b>	20.091	35.191	32.546	31.028	28.709	27.851	28.574																
<p><b>A. Mission Description and Budget Item Justification</b></p> <p>This program demonstrates and validates the most promising innovative environmental technologies that target DoD's most urgent environmental needs, and are projected to pay back the investment within five years through cost savings and improved efficiencies. It 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 real world commitments such as 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.</p> <p><b>B. Program Change Summary:</b></p> <table border="0"> <tr> <td></td> <td style="text-align: center;"><u>FY 2003</u></td> <td style="text-align: center;"><u>FY 2004</u></td> <td style="text-align: center;"><u>FY 2005</u></td> </tr> <tr> <td>Previous President's Budget</td> <td style="text-align: center;">20.363</td> <td style="text-align: center;">35.594</td> <td style="text-align: center;">32.606</td> </tr> <tr> <td>Current FY 2005 President's Budget</td> <td style="text-align: center;">20.091</td> <td style="text-align: center;">35.191</td> <td style="text-align: center;">32.546</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: center;">-.272</td> <td style="text-align: center;">-.403</td> <td></td> </tr> </table>									<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	Previous President's Budget	20.363	35.594	32.606	Current FY 2005 President's Budget	20.091	35.191	32.546	Total Adjustments	-.272	-.403	
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>																				
Previous President's Budget	20.363	35.594	32.606																				
Current FY 2005 President's Budget	20.091	35.191	32.546																				
Total Adjustments	-.272	-.403																					

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2004
<p>a. Congressional program reductions</p> <p>b. Congressional rescissions</p> <p>c. Congressional increases</p> <p>d. Reprogrammings</p> <p>e. SBIR/STTR Transfer                      -.272            -.403</p> <p><b>C. Other Program Funding Summary: N/A</b></p>	

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Exhibit R-2a, RDT&E Project Justification						Date: February 2004									
Appropriation/Budget Activity RDT&E. Defense-wide BA 4				Project Name and Number Environmental Security Technology Certification Program (ESTCP) 0603851D8Z											
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009								
Environmental Security Technology Certification Program (ESTCP) 0603851D8Z	20.091	35.191	32.546	31.028	28.709	27.851	28.574								
<p><b>Mission Description and Budget Item Justification:</b> This program demonstrates and validates the most promising innovative environmental technologies that target DoD's most urgent environmental needs and are projected to pay back the investment within five years through cost savings and improved efficiencies. It 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 real world commitments such as 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. Project funding supports the following categories for each year.</p> <p><b>B. Accomplishments/Planned Program</b></p> <table border="1"> <thead> <tr> <th></th> <th>FY 2003</th> <th>FY 2004</th> <th>FY 2005</th> </tr> </thead> <tbody> <tr> <td>Accomplishment/ Effort/Subtotal Cost</td> <td>20.091</td> <td>35.191</td> <td>32.546</td> </tr> </tbody> </table> <p><b>FY 2003 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>- Reviewed and selected 25 technologies for demonstration.</li> <li>- Reviewed and selected sites for demonstration of technologies.</li> <li>- Prepared site-specific implementation plans.</li> <li>- Prepared sites and secure regulatory permitting.</li> </ul>									FY 2003	FY 2004	FY 2005	Accomplishment/ Effort/Subtotal Cost	20.091	35.191	32.546
	FY 2003	FY 2004	FY 2005												
Accomplishment/ Effort/Subtotal Cost	20.091	35.191	32.546												

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- Continued to demonstrate and evaluate 57 selected technologies. Of these 57 technologies 18 were completed.

By Pillar:

- Remediation: Validate technologies and continue demonstrations in multiple high priority areas related to the Cleanup of contaminated DoD sites. For example, ESTCP researchers are continuing successful multi-site demonstration for cost-effective in-situ treatment for perchlorate. Technologies are projected to reduce future DoD cleanups by \$100s of millions. Complete evaluation of source treatment technology. Continued demonstrations of in-situ treatment for RDX and TNT. (\$6.392 million)
- Unexploded Ordnance: ESTCP researchers are continuing development and testing of new software systems to reduce false alarm rates. New signal processing algorithms will reduce cleanup costs by 50% at many sites. Complete validation of airborne UXO systems. Cost to survey large areas are projected to be 10 to 100 less than traditional means. Initiated demonstration of mechanical clearance technology. Complete validation of man-portable UXO sensor technologies, which will have a significant impact on the DoD UXO remediation efforts. (\$4.551 million)
- Pollution Prevention: ESTCP continues to validate and transition environmentally clean technologies that directly support the military mission. Examples include demonstration of an new combustor design for DoD aircraft with reduced emissions, demonstration of lead free primers for munitions, and complete demonstrations of environmentally friendly alternative for hard chrome plating for a wide variety of weapon system components and environmentally benign paint stripping technologies. (\$6.337 million)
- Compliance: Significant progress has been 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 waste; demonstration of grenade range maintenance technology, and air monitoring technologies. (2.811 million)

**FY 2004 Plans:** The FY 2004 funds are 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

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primarily required to continue ongoing investments.

- Continue and complete 64 demonstration projects
- Review and selected 37 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.

By Pillar:

- Remediation: (\$9.755 million)
- UXO: (\$11.086 million)
- Pollution Prevention: (\$9.11 million)
- Compliance: (\$4.56 million)

**FY 2005 Plans:** The FY 2005 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: (\$8.160 million)
- UXO: (\$10.136 million)
- Pollution Prevention: (\$9.107 million)
- Compliance: (\$5.143 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.

**E. Major Performers** DoD Laboratories, FFRDC's, Contractors and others perform this work. No individual organization receives 15% or more of total funding available in ESTCP

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Exhibit R-3 Cost Analysis						Date: February 2004	
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	FY 2003 Cost	FY 2004 Cost	FY 2005 Cost	Cost to Complete	Total Cost
Demonstration and Validation	C	DoD	18.451	32.511	30.596	Continuing	Continuing
Overhead			1.64	1.34	1.95		
Subtotal Management			1.64	1.34	1.95		
Total Cost			20.091	35.191	32.546	Continuing	Continuing
Remarks							

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 4				R-1 Item Nomenclature: ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	16.914	32.983	17.581	17.863	18.175	17.525	18.011

**A. Mission Description and Budget Item Justification:**

The program focuses on continued development of domestic and assessment of foreign technology that has 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.

**FY 2003 Accomplishments:**

- Mission Support \$16.914 million

**FY 2004 Accomplishments:**

- Mission Support \$32.983 million

**FY 2005 Plans:**

- Mission Support \$17.581 million

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	15.994	16.718	17.612
Current BES	16.914	32.983	17.581
Total Adjustments	.920	16.265	-.031
Congressional program reductions	-3.000		
Congressional rescissions, inflation	-.139		
Congressional increases	3.000	16.750	
Reprogrammings	-.441	-.485	-.031
DARPA Transfer	1.500		

**Change Summary Explanation:**

FY 2003: Congressional program reductions -3.000; Non-pay purchase inflation adjustments (section 8123) -.139; Congressional add +3.000; Reprogramming adjustments - .441; DARPA transfer +1.500  
 FY 2004: Congressional add +16.750; Reprogramming adjustments -.485  
 FY 2005: Reprogramming adjustments -.031

**C. Other Program Funding Summary:** Not Applicable

**D. Acquisition Strategy:** Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification					Date: February 2004			
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM				PE 0603709D8Z
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost-	19.235	15.784	11.771	11.907	12.145	11.828	12.142	
JOINT SERVICE EOD	3.100	2.500	0.810	0.820	0.840	0.814	0.814	
JAUS	1.000	1.400	0.856	1.086	1.096	1.199	1.357	
GLADIATOR	3.125	1.140	1.140	1.152	1.220	1.090	1.211	
RCSS	2.318	1.058	1.060	1.100	1.120	1.094	1.120	
NUSE 2	0.000	2.100	1.065	1.100	1.123	1.090	1.120	
INTELLIGENT MOBILITY	1.200	1.000	1.120	1.139	1.420	1.261	1.230	
RACS	5.200	4.500	5.520	5.310	5.326	5.280	5.290	
COTS	3.292	2.086	0.200	0.200	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. 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

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protection and countermine capabilities. Increasing Service UGV demand and positive feedback from users in the field have validated the JRP mission.

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**B. Program Change Summary:** The Program was transferred by direction of Congress from the Department of the Air Force to the Department of Defense for FY 2004 execution.

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	19.943	11.515	11.791
Current FY 2005 President's Budget	19.235	15.784	11.771
Total Adjustments	-.708	+4.269	-.020
Congressional program reductions			
Congressional rescissions	-.708		-.020
Congressional increases		+4.269	
Reprogrammings			
SBIR/STTR Transfer			

**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.



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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Joint Service EOD	3.100	2.500	0.810	0.820	0.840	0.814	0.814

**A. Mission Description and Budget Item Justification:**

This program office is responsible for the lifecycle management of EOD equipment for all four military Services. This particular project will conduct Concept and Technology Development efforts to determine maturity of existing technology and exploration of new concepts to meet EOD requirements. All four Services have the Remote Ordnance Neutralization System (RONS) fielded with their EOD users, and this program includes the RONS Continuous Improvement Program to identify, develop, and qualify improvements to the system. The Joint EOD community has a requirement for a small Man Transportable Robotic System that can conduct EOD tasks to include the use of a manipulator arm to render safe or neutralize unexploded ordnance in confined areas that current systems have difficulty accessing. Also, the Joint EOD community needs increased autonomy in its robotic platforms, and cooperative control of the different classes of robots, and these needs are addressed in this project. The acquisition strategy for Joint Service EOD Robotics includes the conduct of an Analysis of Alternatives by the Joint users, development of a requirements document by the Joint Users, competitive solicitation of a development contract, with built-in options for production, upgrades, support and spare parts. Each Service individually funds for their production, upgrade, support, and spares.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	3.100	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Took delivery of MTRS Performance Specification Verification Models.

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- Initiated government testing and evaluation of MTRS Performance Specification Verification Models.
- Took delivery of, and evaluated, Semi-Autonomous Remote Ordnance Neutralization System prototype.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	2.500	0.810
RDT&E Articles Quantity * (as applicable)			

- Order MTRS Production Representative Models and conduct final government testing..
- Achieve Production Decision for the MTRS AAP, and transition to Production Phase for the four Services.
- Initiate block upgrade development in accordance with the MTRS evolutionary acquisition approach.
- Demonstrate improved manipulation capability on prototype Semi-Autonomous RONS.
- Complete RONS Continuous Improvement Program project for PC-based electronics and develop additional Semi-Autonomous RONS capabilities.
- Execute user-prioritized RONS Continuous Improvement projects.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable

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<b>Exhibit R-3 Cost Analysis (page 1)</b>							Date:		February 2004				
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Primary Hardware Development				1.500		1.960		0.250					
Ancillary Hardware Development													
Systems Engineering				0.210		0.250		0.250					
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development				1.710		2.210		0.500					
Remarks:													
Development Support				0.100		0.100		0.100					
Software Development				0.500		0.100		0.100					
Training Development													
Integrated Logistics Support				0.300									
Configuration Management													
Technical Data													
GFE													
Subtotal Support				0.900		0.200		0.200					
Remarks:													

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Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT				0.100		0.090		0.110				
IOT&E												
Initial Verification Testing												
Subtotal T&E				0.100		0.090		0.110				
Remarks:												
Contractor Engineering Support												
Government Engineering Support				0.200								
Program Management Support				0.190								
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.390		0.000		0.000				
Remarks:												
Total Cost				3.100		2.500		0.810				
Remarks:												

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Exhibit R-4, Schedule Profile																									Date: February 2004											
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	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
MTRS PSVM T&E			3-4Q	1-2Q				
MTRS PRM T&E				3-4Q	1Q			
MTRS AAP PROD DEC					1Q			
RONS CIP			Cont.	Cont.	Cont.	Cont.		

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
J AUS	1.000	1.400	0.856	1.086	1.096	1.199	1.357

**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 interfaces between software 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 and pursue the adoption of JAUS as a commercial and military standard.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	1.000	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Released Version 1.0 and Version 1.1 of the JAUS Strategic Plan.
- Drafted Version 1.0 of the JAUS Compliance Specification.
- Drafted Version 3.0 of the JAUS Domain Model.
- Established a JAUS TCP/UDP port number.
- Released Version 1.5 of the JAUS SOP.
- Conducted four JAUS Working Group meetings.

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	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	1.400	0.856
RDT&E Articles Quantity * (as applicable)			

- Plans for FY2004-2005 are to demonstrate and validate dynamic registration and expansion port capabilities.
- The compliance suite will be completed.
- Establish JAUS as a commercial standard with the Society of Automotive Engineers.
- Release Version 3.0 of the Domain Model.
- Release Version 1.0 of the Compliance Specification.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable



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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004					
DEFENSE-WIDE			Program Element				JAUS						
BUDGET ACTIVITY 4			PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2003 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 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			0.650	0.750		0.500							
Training Development													
Integrated Logistics Support													
Configuration Management													
Technical Data													
GFE													
Subtotal Support			0.650	0.750		0.500							
Remarks:													

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Exhibit R-3 Cost Analysis (page 2)								Date:	February 2004				
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 2003 Cost	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost	Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT													
IOT&E													
Initial Verification Testing				0.300		0.100							
Subtotal T&E				0.300		0.100							
Remarks:													
Contractor Engineering Support													
Government Engineering Support													
Program Management Support			0.150	0.150		0.056							
Program Management Personnel			0.050	0.050		0.050							
Travel			0.050	0.050		0.050							
Labor (Research Personnel)													
Miscellaneous			0.100	0.100		0.100							
Subtotal Management			0.350	0.350		0.256							
Remarks:													
Total Cost			1.000	1.400		0.856							
Remarks:													

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Exhibit R-4, Schedule Profile																				Date: February 2004																	
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	2001				2002				2003				2004				2005				2006				2007				2008				2009				
	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																																					
Reference Architecture Specification																																					
Domain Model																																					
Compliance Spec Versions																																					
Developmental Evaluation																																					

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
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; 2Q; 3Q; 4Q	1Q; 2Q; 3Q; 4Q			
Compliance Spec Versions 1.0; 2.0				3Q	1Q			
Developmental Evaluation			Cont.	Cont.	Cont.			

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
GLADIATOR	3.125	1.140	1.140	1.152	1.220	1.090	1.211

**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 requirement 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 Joint Chemical Agent

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Detector (JCAD), Anti-Personnel Obstacle Breaching System (APOBS), and direct fire (lethal and non-lethal) weapons.

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**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	3.125	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Complete Technical Development Model (TDM) evaluation and down-select to two contractors.
- Integrate NBC module on Concept Validation Models (CVMs).
- Complete early user evaluation of CVMs.
- Coordinate Gladiator requirements and program plans with the Future Combat System Program.



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	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	1.140	0.000
RDT&E Articles Quantity * (as applicable)			

- Complete Detailed Design of Gladiator.
- Complete Future Naval Capability demonstrations.
- Prepare Milestone B documentation.
- Obtain Milestone B approval, initiate System Design and Development (SDD).

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	1.140
RDT&E Articles Quantity * (as applicable)			

- Complete Log Demo.
- Initiate and complete Development Test.
- Begin Operational Test

**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 5.000 million  
 FY 2003 2.500 million  
 FY 2004 1.500 million

**D. Acquisition Strategy:**

Two contractors were selected for down select competition for Gladiator SDD. These two contractors are Lockheed Martin, Bethesda, MD and Carnegie Mellon, Pittsburgh, PA.

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**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004				
DEFENSE-WIDE			Program Element				GLADIATOR					
BUDGET ACTIVITY 4			PE 0603709D8Z									
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PYs Cost	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 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:												

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Exhibit R-3 Cost Analysis (page 2)							Date: February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 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		0.070				
Government Engineering Support				0.120		0.120		0.120				
Program Management Support				0.080		0.080		0.080				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.267		0.270		0.270				
Remarks:												
Total Cost				3.125		1.140		1.140				
Remarks:												

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Exhibit R-4, Schedule Profile																								Date: February 2004												
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #5												Program Element Number and Name PE 0603709D8Z – Joint Robotics Program												Project Number and Name GLADIATOR												
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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																																				
Prototype Phase													MS B								MS C				FUE											
Program Milestones																																				
Log Demo																																				
T&E Milestones																																				
Independent Verification Test																																				
DT																																				
OT																																				
IOT&E																																				
Production Milestones																																				
LRIP FY 06																																				
FRP FY 07																																				
Deliveries																																				

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 Gladiator			
Schedule Profile	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Milestone A								
Contract Preparation		1-2Q						
CTD Contract Award		2Q						
CTD		2-4Q	1-4Q					
Milestone B				3Q				
Contract Preparation				2-4Q				
SDD Contract Award				4Q				
SDD				3-4Q	1-4Q			
Developmental Test					3-4Q			
Log Demo					4Q			
Operational Test					4Q	1Q		
Milestone C						2Q		
Low Rate Initial Production						2Q		
IOT&E							2Q	
Full Rate Production							4Q	
First Unit Equipped							4Q	

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
RCSS	2.318	1.058	1.060	1.100	1.120	1.094	1.120

**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. 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 breaching systems. The RCSS Mission Need Statement (MNS) and Operational Requirements Document (ORD) have been approved by Army Training and Doctrine Command (TRADOC).

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	2.318	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- 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.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	1.055	0.000
RDT&E Articles Quantity * (as applicable)			

- Select RCSS COTS vendor.
- Initiate RCSS COTS procurement contract.

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- Determine and identify Mission Essential Modules to improve COTS system multi-mission capability.
- Initiate Mission Essential Modules Integration program.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	1.065
RDT&E Articles Quantity * (as applicable)			

- Continue Mission Essential Module Integration program.

**C. Other Program Funding Summary:**

Army Procurement funding utilized to procure RCSS COTS systems in FY 04.

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Primary Hardware Development				1.230		0.284		0.284					
Ancilliary Hardware Development													
Systems Engineering				0.446		0.142		0.142					
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development				1.676		0.426		0.426					
Remarks:													
Development Support				0.040		0.002		0.002					
Software Development				0.075		0.062		0.062					
Training Development				0.050		0.030		0.030					
Integrated Logistics Support				0.025		0.025		0.025					
Configuration Management				0.055		0.025		0.025					
Technical Data													
GFE													
Subtotal Support				0.245		0.144		0.144					
Remarks:													

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Exhibit R-3 Cost Analysis (page 2)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT						0.288		0.288					
IOT&E													
Initial Verification Testing				0.130									
Subtotal T&E				0.130		0.288		0.288					
Remarks:													
Contractor Engineering Support				0.067		0.063		0.065					
Government Engineering Support				0.120		0.074		0.074					
Program Management Support				0.080		0.063		0.065					
Program Management Personnel													
Travel													
Labor (Research Personnel)													
Miscellaneous													
Subtotal Management				0.267		0.200		0.202					
Remarks:													
Total Cost				2.318		1.058		1.060					
Remarks:													

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Exhibit R-4, Schedule Profile																												Date: February 2004								
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								
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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																																				
Log Demo																																				
Maintenance/Log Demo																																				
T&E Milestones																																				
Independent Verification Test																																				
DT																																				
IOT&E																																				
Production Milestones																																				
FRP FY 06																																				
Deliveries																																				

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
Milestone A	1Q								
Contract Preparation	1-4Q	1-4Q	1-4Q						
CTD Contract Award	4Q		1Q						
CTD	4Q	1-4Q	1Q						
Milestone B			1Q						
Contract Preparation		4Q	1Q						
SDD Contract Award			1Q						
SDD			1-4Q						
Developmental Test				1-2Q					
Maintenance/Log Demo				2Q					
IOT&E				3-4Q					
Milestone C					1Q				
Full Rate Production					2Q				
First Unit Equipped					3Q				

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE			
DEFENSE WIDE RDT&E BA 4				JOINT ROBOTICS PROGRAM PE 0603709D8Z			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
NUSE 2	0.000	2.100	1.065	1.100	1.123	1.090	1.120

**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

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- Be dual capable, i.e., able to support experimentation and testing in both live and virtual venues

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	2.100	0.000
RDT&E Articles Quantity * (as applicable)			

- Initiate NUSE2 concept and develop strategy, campaign plan, and organize team.
- Conduct Site Surveys.
- Organize and stand up Integrated Product Teams (IPTs).
- Organize and stand up the Management IPT.
- Identify and refine standards and metrics for experiments.
- Identify and acquire infrastructure requirements.
- Conduct initial live and virtual experiments (countermine).
- Identify and begin planning for follow-on experimentation.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	1.065
RDT&E Articles Quantity * (as applicable)			

- Continue to identify and acquire infrastructure requirements.
- Continue IPT oversight.
- Continue to identify and refine standards and metrics for experiments.
- Conduct live and virtual experimentation.
- 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:**

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Not Applicable

**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Primary Hardware Development													
Ancillary Hardware Development													
Systems Engineering													
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development						0.000		0.000					
Remarks:													
Development Support						0.500							
Software Development													
Training Development													
Integrated Logistics Support													
Configuration Management													
Technical Data													
GFE													
Subtotal Support						0.500		0.250					
Remarks:													

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Exhibit R-3 Cost Analysis (page 2)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT													
IOT&E													
Initial Verification Testing													
Subtotal T&E													
Remarks:													
Contractor Engineering Support													
Government Engineering Support						1.000		0.750					
Program Management Support						0.600		0.065					
Program Management Personnel													
Travel													
Labor (Research Personnel)													
Miscellaneous													
Subtotal Management						1.600							
Remarks:													
Total Cost						2.100		1.065					
Remarks:													

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Exhibit R-4, Schedule Profile																								Date: February 2004												
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	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Infrastructure				3-4Q	1-4Q			
Standards Identification				3-4Q	1-4Q			
UMS Experiments				3Q	2Q, 4Q			

R-4a Schedule Profile

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Exhibit R-2a, RDT&E Budget Item Justification					Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Intelligent Mobility Program	1.200	1.000	1.120	1.139	1.420	1.261	1.230

**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 (ODIS) developed through a partnership between the TARDEC robotics mobility lab (TRML) and Utah State University's Center for Self-Organizing and Intelligent Systems (CSOIS), 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. Prototype ODIS UGV's are currently in the process of deployment 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.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	1.200	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

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- Completed successful mission testing at Port of Los Angeles / Port of Long Beach with US Coast Guard and other agencies.
- Supported the Dept. of Justice in a Homeland Defense Force Protection mission during the Lee Malvo Sniper trial
- Extended Other Transaction for follow on ODIS work with Utah State University
- Completed revision and product improvement of ODIS for functional prototype testing.
- Completed build of 10 ODIS systems for extended testing (OCU's are pending 2Q FY 2004)
- Awarded Work Directive for cold regions mechanical testing and RF analysis of small robotic platforms.

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	1.000	0.000
RDT&E Articles Quantity * (as applicable)			

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	1.120
RDT&E Articles Quantity * (as applicable)			

FY04 and FY05 expected Accomplishments

- Planned completion of additional 10 ODIS systems for deployment to Iraq, and extended testing (2Q FY 2004)
- Investigate utility and need for ODIS platform variants.
- 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:**

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\$.800 million awarded to Utah State University using JRP funding previously allocated to US Navy SPAWAR for prototype build of ODIS.

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Kachemak Research Development Center      \$1,995K  
Contractor  
Homer, Alaska

Utah State University                              \$300K  
University  
Logan, Utah

Utah State University                              \$800K (reprogrammed funds from US Navy SPAWAR)  
University  
Logan, Utah

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Exhibit R-3 Cost Analysis (page 1)							Date: February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.220		0.223		0.147				
Ancilliary Hardware Development				0.047		0.063		0.049				
Systems Engineering				0.070		0.063		0.033				
Licenses												
Tooling								0.033				
GFE												
Award Fees												
Subtotal Product Development				0.337		0.349		0.262				
Remarks:												
Development Support				0.140		0.063		0.065				
Software Development				0.187		0.089		0.022				
Training Development				0.047		0.062		0.033				
Integrated Logistics Support				0.033		0.032		0.033				
Configuration Management				0.033		0.032		0.065				
Technical Data						0.032		0.131				
GFE												
Subtotal Support				0.440		0.310		0.349				
Remarks:												

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
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

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
RACS	5.200	4.500	5.520	5.310	5.326	5.280	5.290

**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 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	5.200	4.500	5.520
RDT&E Articles Quantity * (as applicable)			

- 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.

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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).

- Power Rake - This effort is sponsored in cooperation with HQ ACC/CEX for the Air Force Airborne Engineer initiative. The Power Rake is a military munitions clearance tool developed for use on the ARTS robot. The Power Rake will remove or detonate sub-munitions and anti-personnel mines for the purpose of small area-clearance, lane proofing, and active range clearance. The research goals for this effort are:
  1. Investigate the available COTS equipment that is capable of performing this task.
  2. Develop and integrate a lightweight armor package for the Power Rake attachment.
  3. Characterize the system performance including: explosives resistance, operational capabilities, and system reliability. This effort will provide two proof-of-concept systems for testing and evaluation.
- 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 a AR-10, 7.62mm rifle has been developed and limited testing performed. Transition planned late FY03. Tele-operated Remote Aiming Platform: TRAP is a future P<sup>3</sup>I effort that is contained in the CE Readiness Modernization Roadmap and is scheduled to undergo system

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design and development (SDD) in FY 2004 with production to follow in FY2005. Accomplishments include demonstration of a radio controlled TRAP system.

- 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 738<sup>th</sup> 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 is requesting conversion of three more systems including potential spiral development for increased capabilities.
- 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 1<sup>st</sup> 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 75% 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. Commencing in FY 2004, plans are to begin integration of J-LONS onto a mobile unmanned platform.
- 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

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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 concepts demonstrations will be conducted in June FY04. Accomplishments development and demonstration of the Scout robotic platform at the Force Protection Battlelab exposition for AF/XOF. Contracts were let for procurement of the MDARS-E and Packbot systems.
- Defense Threat Reduction Agency (DTRA) - DTRA's Integrated Technology Demonstration puts to use Department of Defense (DoD) technology and Federal Emergency Management Agency (FEMA) training exercises to provide possible real-world terrorist scenarios. Accomplishment was the CHER-CAP Exercise, which was performed in February 2003 in Northwest Florida. With the close location of many area DoD laboratories and their missions within the DoD, existing priorities and funding were leveraged with the FEMA exercise scenario. The DTRA Combating Terrorism Program will benefit greatly from this opportunity as it will be able to test DoD technologies that are relevant to a variety of threats to DoD forces and assets in the US and abroad. Participating agencies and organizations included: (1) Defense Threat Reduction Agency Technology Directorate (DTRA/TD); (2) Air Force Research Laboratory Airbase Technologies Division (AFRL/MLQ); (3) Naval Coastal Systems Station (CSS); (4) Air Force Civil Engineer Support Agency (AFCESA); (5) Florida State University Panama City (FSU-PC); (6) Local Emergency

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Planning Committee, Florida District 1 (LEPC); and (7) Federal Emergency Management Agency (FEMA). Northwest Florida's Comprehensive HAZMAT Emergency Response Capability Assessment Program (CHER-CAP Exercise), demonstrated and integrated the following technologies: (1) Port Occurrence Response Training System (PORTS) for exercise planning and documentation tools; (2) Networked Sensor/C2 System for a deployable sensor network; (3) Common Command and Control for Unmanned Systems for unmanned vehicle/platform utilization; and (4) Underwater Forensic Protocol for Forensic and investigation procedure development.

- STORK - The STORK Initiative was a program developed to (1) outfit an Unmanned Aerial Vehicle (UAV) with a communications suite needed to remotely control an Unmanned Ground Vehicle (UGV) and its sensors beyond current system ranges of UGV Ground Control Station; (2) to prove a UAV can deliver a UGV into an area needed during urban operations; and (3) to show UAV/UGV integration can provide persistent target information for Intelligence Preparation of the Battlespace. The STORK Initiative included the following robotic platforms: an ARTS UGV, a Matilda UGV and EEL UGV's, and a Sentry HP UAV. Accomplishments include successful demonstration of the STORK Initiative in March 2003. All objectives were met including extension of UGV control from 2 km out to 26 km, successful insertion of UGV by parachute from the UAV, and simultaneous control of multiple UGV in the area of operations.
- 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 procurement of the rotary-wing UAV and necessary training and transfer of aerial video through JAUS networked system.
- Active Range Clearance - The US Army Engineering and Support Center (USAESCH) in Huntsville, Alabama requested the AFRL/MLQF Robotics Group to perform a technology demonstration project for an ongoing clearance operation at the Honey Lake site on Sierra Army Depot, CA. Approximately 2500 acres of Honey Lake were contaminated with military munitions scrap and unexploded ordnance from open pit demolition operations. Accomplishments: AFRL/MLQF Robotics Group used existing robotic equipment and tools to assist in the surface clearance operation at Honey Lake from July through September 2003. AFRL/MLQF used the ARTS robotic system with a Barber Surf Rake to remove the majority of scrap items from the lakebed surface. AFRL/MLQF robotics evaluated several innovative concepts during this demonstration including: Night Operations, Simultaneous

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Robotic Operations, and Extended Operations. Robotic night operations were conducted during 6 of the 8 weeks to allow UXO contractor personnel to operate on the site during daylight hours. Multiple systems were simultaneously operated during 2 weeks of the demonstration. In addition, the robotic systems demonstrated the ability to operate in an austere environment for an extended period of time. Over 250 robotic operating hours were accumulated during the technology demonstration. AFRL/MLQF also evaluated a Harley Rock Picker system and towed magnet systems for effectiveness in munitions scrap removal. AFRL's robotic systems removed an estimated 95,600lbs of scrap materials from 19-grids (285 acres) during eight weeks of operations. The site was being cleared using only manual methods by teams of UXO technicians that would walk each grid and pick up all scrap materials larger than a "bottlecap". The robotic system decreased the average time for manual clearance of each grid from 3 weeks to 1 week.

- 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.

**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

Air Force Research Laboratory, \$5.200 million Tyndall AFB, Florida

**E. Major Performers:**

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Applied Research Associates  
Wintec Incorporated  
University of Florida  
Titan Corporation

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Primary Hardware Development				0.870		0.530		0.610					
Ancilliary Hardware Development				0.370		0.320		0.640					
Systems Engineering				0.370		0.320		0.640					
Licenses													
Tooling													
GFE													
Award Fees				0.130		0.130		0.130					
Subtotal Product Development				1.740		1.300		2.030					
Remarks:													
Development Support				0.440		0.230		0.270					
Software Development				0.440		0.230		0.270					
Training Development				0.060		0.100		0.100					
Integrated Logistics Support													
Configuration Management													
Technical Data				0.130		0.220		0.230					
GFE													
Subtotal Support				1.070		0.780		0.860					
Remarks:													

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Exhibit R-3 Cost Analysis (page 2)							Date:	February 2004					
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
DT				0.480		0.370		0.320					
IOT&E													
Initial Verification Testing													
Subtotal T&E				0.480		0.370		0.320					
Remarks:													
Contractor Engineering Support				0.670		0.110		0.170					
Government Engineering Support				0.250		0.300		0.440					
Program Management Support				0.310		0.520		0.540					
Program Management Personnel				0.230		0.380		0.400					
Travel				0.230		0.380		0.400					
Labor (Research Personnel)				0.110		0.180		0.190					
Miscellaneous				0.110		0.180		0.180					
Subtotal Management				1.910		2.060		2.310					
Remarks:													
Total Cost				5.200		4.500		5.520					
Remarks:													

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Exhibit R-4, Schedule Profile																								Date: February 2004												
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	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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 A				▲ MS B				▲ MS A	▲ MS C							▲ MS C									
Prototype Phase																																				
User Evaluation																																				
EMD																																				
Production																																				

Deleted: B  
 Deleted: B  
 Deleted: B

R-4 Schedule Profile

Main Programs in Advancements for ARTS  
 Remote Water Cutting System  
 Alternate Control System  
 Deployed Nozzle  
 Articulated Remote Manipulation System

## UNCLASSIFIED

Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
Concept Design	1Q								
Hardware Procurement	2Q								
Quality Design and Build	3Q								
Developmental (PD&RR) Technical Testing	3Q								
Transition to System Program Office		4Q							
Developmental (User) Evaluation		4Q							
EMD				4Q					
Production						1Q			

Main Programs in Advancements for ARTS

Remote Water Cutting System

Alternate Control System

Deployed Nozzle

Articulated Remote Manipulation System

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Exhibit R-4, Schedule Profile																												Date: February 2004												
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	2001				2002				2003				2004				2005				2006				2007				2008				2009							
	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																																								
Prototype Phase																																								
User Evaluation																																								
EMD																																								
Production																																								

Deleted: B

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

## UNCLASSIFIED

Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
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

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Exhibit R-4, Schedule Profile		Date: February 2004																																						
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	2001				2002				2003				2004				2005				2006				2007				2008				2009							
	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																																								
Prototype Phase																																								
EMD																																								
Production																																								

Deleted: B

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

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Exhibit R-4a, Schedule Detail				Date: February 2004						
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008		
Concept Design	1Q									
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

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Exhibit R-4, Schedule Profile																							Date: February 2004																					
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	2001				2002				2003				2004				2005				2006				2007				2008				2009											
	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																																												
Proto. Phase Evolutionary Development																																												
EMD																																												
Production/ Authorization																																												

R-4 Schedule Profile

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Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	
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

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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															
		2001		2002				2003				2004				2005				2006				2007				2008				2009					
Fiscal Year		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																																					
Prototype Phase																																					
EMD																																					
Production																																					

▲  
MS A

▲  
MS B

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R-4 Schedule Profile

Main Programs include  
 REDCAR  
 DTRA  
 STORK

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Exhibit R-4a, Schedule Detail				Date: February 2004						
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008		
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

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Exhibit R-2a, RDT&E Budget Item Justification					Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 4				R-1 ITEM NOMENCLATURE PE 0603709D8Z JOINT ROBOTICS PROGRAM			
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
COTS	3.292	2.086	0.200	0.200	0.000	0.000	0.000

## A. Mission Description and Budget Item Justification:

The Commercial-off-the-Shelf (COTS) program is new for the JRP. Its purpose is to create 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.

## B. Accomplishments/Planned Program

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	3.292	0.000	0.000
RDT&E Articles Quantity * (as applicable)			

- Accomplishments for FY 2003 include:
  - Robotic Systems Pool Chartered; Tri-Service Management Board established to provide guidance and vet requests for support.
  - Robotic Systems Pool Standard Operating Procedures approved by JRP Managers.
  - Loans made to the following organizations:
    - Joint Project Office Unmanned Ground Vehicle Systems
    - Navy EOD Mobile Unit Three
    - US Army 82<sup>nd</sup> Airborne
    - US Army Infantry Schools Command

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- US Army Corps of Engineers
- Center for Robot Assisted Search and Rescue (CRASAR)
- San Diego Metro Arson Strike Team
- Las Vegas Metropolitan Police Department
- Supported research completed at SPAWAR Systems Center San Diego on ground robot RF communications and data to determine optimum frequency and bandwidth for operations.
- Collected, organized, and posted user feedback to on-line website.
- Provided training for US Army, US Navy, San Diego County Sheriff, San Diego Metro Arson Strike Team, and Las Vegas Metropolitan Police Department SWAT.
- Responded to 55 requests for robot loans and operational support.
- Procurement of 15 new robotic systems and support equipment including fiber-optic spoolers, operator control units, and spares. (iRobot)
- Development/procurement and rapid equipment fielding of four chemical/radiation/gas sensor suites for small robotic systems. (iRobot)
- Enhancements to the (BBN) Ad Hoc Networking Radios used in small robotic systems including:
  - A new driver for the Cisco 802.11b card (with diversity antennas).
  - A study of power requirements for the ad hoc networking radios.
  - A power distribution/charging circuit for the radio.
  - A link-quality/connectivity graphic visualization program for the ad hoc network.
  - A centralized relay brick deployment program.
- Development/procurement of a miniature perimeter surveillance radar that is less than half the size of the current model (PSRS) and detects human-sized intruders with 360 degrees of horizontal coverage and up to a range of 100m. The delivered system operates standalone or as payload component on man-portable UGS/backpackable robots with applications for force protection and remote sensing. Since its primary sensor is based on dual-use obstacle avoidance technology for the automotive industry (e.g. tractor trailers), the estimated per unit cost in production will be a fraction of the current model. (STS)
- Development/procurement of a miniature stereo, vision-based obstacle detection and collision avoidance sensor used for small mobile robot navigation. This sensor will be used on a variety of small robots to aide in autonomous mobility to enhance the effectiveness of small mobile robots. (JPL)
- Development/procurement of a novel unmanned ground vehicle with configurable/adaptable mobility modes. (ACEi)

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- o Development of advanced small mobile robot autonomous navigation capabilities. Allows for autonomous mobility using high-resolution sensors such as LASERs. The software has been transferred to COTS small robots. (INEEL)
- o Development of an interface to the GOTS Common Geospatial Navigation Toolkit (COGENT) that allows NIMA Digital Nautical Charts to be displayed by other software application programs. This interface will be used in robotic operator control units. (SPAWAR Systems Center Charleston)

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.200	0.200
RDT&E Articles Quantity * (as applicable)			

- Plans for FY 2004-2005 include:
  - o 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.
  - o Collection of performance data to provide feedback to developers for the improvement of COTS systems and technologies.
  - o Provide advice, maintenance, and training to the requesting agencies.
  - o Continue maintenance, upgrades, and support as required.

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

**E. Major Performers:**

Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:		February 2004			
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	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	2005 Cost	2005 Award Date	Cost To Complete	Total Cost	Target Value of Contract
COTS System Procurement				3.292		1.186						
Ancilliary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				3.292		1.186		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:												

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Exhibit R-3 Cost Analysis (page 2)								Date:	February 2004				
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	Cost 2003	Award Date 2003	Cost 2004	Award Date 2004	Cost 2005	Award Date 2005	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:													
Total Cost				3.292		2.086		0.200					
Remarks:													

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Exhibit R-4, Schedule Profile																									Date: February 2004															
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	2001				2002				2003				2004				2005				2006				2007				2008				2009							
	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

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Exhibit R-4a, Schedule Detail				Date: February 2004				
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 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Procure COTS Systems			1-4Q					
Maintenance, Training, Support			Cont.	Cont.	Cont.	Cont.		

R-4a Schedule Profile

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Exhibit R-2, RDT&E Budget Item Justification				Date: February 2004			
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E B.A. 4			R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z				
COST (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	46.872	<b>**1.183</b>	0.000	0.000	0.000	0.000	0.000
ASPSS	0.500						
CROWS	0.400						
Delay/Denial D/D	0.900						
Product Development/Qualification	0.925						
Advanced Technology Program	0.948						
Product Testing & Support	0.930						
SAFE Gate (previously Smart Gate)	0.775						
MDARS-I	0.800						
MDARS-E	0.550						
COTS	4.202						
Technology Base	14.293						
TASS	4.097						
WSS	3.353						
EDE	7.514						
Locks, Safes, Vaults	1.415						
HVISS	2.500						
PEWD II	0.000						
ETF	2.000						
SEMD	0.770	1.183	0.000	0.000	0.000	0.000	0.000

**A. Mission Description and Budget Item Justification:**

**\*\* Effective October 1, 2003, OSD PBD 203C transferred funding for this program to the Air Force and DTRA for management and execution. However, Congress added funds to the FY 04 Defense Appropriations Bill even after appeal by OSD.**

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 all DoD components, to include Force Protection. This program supports the protection of tactical and nuclear weapons systems, DoD personnel and DoD facilities. Funding for critical RDT&E security improvements within Service channels fluctuated widely over the years and

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prompted the FY 1989 Congressionally directed consolidation of the Services and former Defense Special Weapons Agency (DSWA) / Defense Threat Reduction Agency (DTRA) PSE RDT&E funds into this single OSD controlled program element. The funds are used to provide PSE RDT&E for individual Service and Joint PSE requirements. The PSE program is organized so that an ongoing DoD-coordinated Joint Action Group, consisting of Army, Navy, Air Force, and Defense Threat Reduction Agency (DTRA) representatives monitors, directs and prioritizes potential and existing PSE programs. With few exceptions, each Service sponsors RDT&E efforts for technologies and programs that have multi-service application. The funds are also used to evaluate applied research of Physical Security Equipment. This program element supports the Army's advanced engineering development of Interior and Exterior Detection, Security Lighting, Security Barriers and Security Display Units. In a like manner, the program element also supports the Air Force's PSE RDT&E effort in the areas of Exterior Detection/Surveillance, Entry Control, Delay/Denial, Tactical Systems and Airborne Intrusion. Finally, the program supports Navy RDT&E efforts in the areas of Waterside Security, Explosive Detection, and improved technology for Locks, Safes and Vaults. Beginning with FY 1997, this PE includes funding for Force Protection Commercial-Off-The-Shelf (FP COTS) evaluation and testing, which has received focus since the 1996 Khobar Towers terrorist bombing incident. The FP COTS testing applies to all available technologies, which are considered effective for DoD use.

(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:**

	<u>FY</u> <u>2003</u>	<u>FY</u> <u>2004</u>	<u>FY</u> <u>2005</u>
Previous President's Budget	47.519	0.000	0.000
Current FY 2005 President's Budget	46.872	1.183	0.000
Total Adjustments			
Congressional program reductions	-0.647		
Congressional rescissions			
Congressional increases		1.183	

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Reprogrammings  
SBIR/STTR Transfer

**C. Other Program Funding Summary:**

Not Applicable

**D. Acquisition Strategy:**

Not Applicable

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Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004	
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 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
SEMD	0.770	1.183	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 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	0.770		
RDT&E Articles Quantity * (as applicable)			

- Survey of 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.
- Test and evaluate of selected commercial mobile devices to determine suitability.
- Survey of wireless data service coverage at two U.S. Navy installations in the Pacific Northwest Region.
- Requirements analysis for mobile NCIS agents.
- Requirements analysis for base security guards.
- Requirements analysis for access to NCIS, FBI and Washington State databases (in progress, Task continues in FY 2004).



	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost		1.183	0.000
RDT&E Articles Quantity * (as applicable)			

- 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 the NCIS, WACIC and CLEOC law enforcement databases.

**C. Other Program Funding Summary**

Not Applicable

**D. Acquisition Strategy:**

Transition to Program of record in FY 2006.

**E. Major Performers:**

Mobilisa Inc., Port Townsend, WA  
 Space and Naval Warfare Systems Center, San Diego, CA

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2004				
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	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												
Ancillary Hardware Development												
Systems Engineering				0.100								
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				0.100								
Remarks:												
Development Support			0.500									
Software Development				0.680								
Training Development												
Integrated Logistics Support												
Configuration Management				0.050								
Technical Data				0.050								
GFE												
Subtotal Support			0.500	0.780								
Remarks:												

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Total Cost		0.770	1.180																	
Remarks:																				

Exhibit R-4, Schedule Profile																									Date: February 2004											
Appropriation/Budget Activity DEFENSE WIDE RDT&E/B.A. #4												Program Element Number and Name PE 20062003228D8Z Physical Security Equipment												Project Number and Name SEMD												
Fiscal Year	2001				2002				2003				2004				2005				2006				2007				2008				2009			
	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																																				

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Exhibit R-4a, Schedule Detail				Date: February 2004					
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 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Protoypes, 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					3Q				

R-4a Schedule Profile

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E Defense Wide, BA 4				R-1 Item Nomenclature: Joint Electromagnetic Technology (JET) Program PE 0303191D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	10.063	14.944	6.679	6.785	6.911	6.741	6.919
<b>A. Mission Description and Budget Item Justification:</b>							
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.							
<b>Program Accomplishments and Plans:</b>							
FY 2003 Accomplishments (\$10.063 million)							
<ul style="list-style-type: none"> <li>Program planning and support.</li> </ul>							
FY 2004 Plans: (\$14.944 million)							
<ul style="list-style-type: none"> <li>Program planning and support.</li> </ul>							
FY 2005 Plans: (\$6.679 million)							
<ul style="list-style-type: none"> <li>Program planning and support.</li> </ul>							
<b>B. Program Change Summary:</b> (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)							
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>				
Previous President's Budget	10.070	6.362	6.690				
Current BES	10.063	14.944	6.679				
Total Adjustments	.007	8.582	-.011				
Congressional program reductions							
Congressional rescissions, Inflation Adjustments	-.007	-.218	-.011				
Congressional increases		8.800					

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Reprogrammings  
SBIR/STTR Transfer

**Change Summary Explanation:**

FY 2003: Non-pay purchase inflation adjustments -.007 million.

FY 2004: Congressional Add 8.8 million; FFRDC Reduction -.057 million; Management Improvements-.032 million; Management Efficiencies-.129 million.

FY 2005: Non-pay purchase inflation adjustment -.011 million.

**C. Other Program Funding Summary:** N/A

**Acquisition Strategy.** N/A



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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE		
APPROPRIATION/BUDGET ACTIVITY							R-1 ITEM NOMENCLATURE		
RDT&E, Defense Wide/BA 3							Counterproliferation Support		
							PE 0605160D8Z		
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	1.683	1.851	1.958	2.018	2.052	2.357	2.408	Continuing	Continuing
Nuclear Matters/P476	1.683	1.851	1.958	2.018	2.052	2.357	2.408	Continuing	Continuing

**(U)      A. Mission Description and Budget Item Justification**

(U) The U.S. nuclear deterrent posture is the most visible and critical element of U.S. military capabilities used to deter aggression and coercion. Therefore, nuclear weapons require special consideration because of this political and military importance and because of the destructive power of a nuclear weapon and the potential consequences of an accident or unauthorized act. The Nuclear Matters Program provides the capability to conduct technical assessments and to develop policy recommendations on complex and vital national issues. The Nuclear Matters program provides analysis and assessments of issues associated with the stockpile size and composition, safety, reliability, security, use control, survivability, transportation, command and control, maintenance, storage, emergency response, and enduring stockpile sustainability.

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<i>COST (In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	1.683	1.851	1.958	2.018	2.052	2.357	2.408	Continuing	Continuing
Nuclear Matters/P476	1.683	1.851	1.958	2.018	2.052	2.357	2.408	Continuing	Continuing

(U) **Project Number and Title: P476 Nuclear Matters**

(U) **PROGRAM ACCOMPLISHMENTS AND PLANS**

(U) **FY 2003 Accomplishments:**

(U) Analyses and Assessments: These provided the basis for preparation of the Nuclear Weapons Council (NWC) Chairman's Annual Report to Congress, the DoD-DOE Annual Surety Report to the President, and the Annual Certification Report to the President. These products provided technical policy recommendations to the President, Secretary of Defense, Secretary of Energy, and the Chairman of the NWC on key nuclear weapon issues. The actions of the Congressionally directed Panel to Assess the Safety, Reliability, and Security of the United States Nuclear Stockpile were completed leading to key policy and technical recommendations. The Office of Nuclear Matters, under its responsibilities as OSD sponsor, sustained the continuing contributions of the Joint Advisory Committee on Nuclear Weapons Surety (JAC) and participated in the Strategic Capabilities Assessment that will develop the roadmap for implementation of the recommendation the 2001 Nuclear Posture Review. (\$ 0.510 million)

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(U) Nuclear Weapons Council: Efficiently managed the operations of the Joint DoD-DOE Nuclear Weapons Council (NWC), as directed by law, and the activities of the supporting NWC Staff, the NWC Standing and Safety Committee (NWCSSC), the Compartmented Advisory Committee (CAC), and the Action Officer Group. Conducted research and framed technical issues for the NWC members and staff concerning the evolution of the nuclear weapons complex and infrastructure in view of Presidential decision to resize the strategic stockpile. Facilitated activities to proceed with Phase 6.2 and 6.2A on a Robust Nuclear Earth Penetrator study (RNEP). Monitored activities of weapon system Project Officer Groups (POG). Conducted reviews of nuclear testing readiness and tritium production readiness. Convened a 1-day conference among 150 nuclear weapons experts and senior defense and energy leaders to discuss stockpile transformation issues. Conducted a week-long trip to several nuclear weapons complex sites for over sixty individuals within the nuclear weapons community including senior DoD/DOE officials. The recommendations of the Federal Advisory Committee on the End-to-End Review on Nuclear Command and Control, and the Panel to Assess the Safety, Reliability, and Security of the United States Nuclear Stockpile (aka the Foster Panel) were assessed and implementation actions were brought into consideration. (\$ 0.300 million)

(U) DoD-NNSA Nuclear Weapons Requirements: Provided contractor Requirements Team to continue the conduct of the joint DoD-NNSA Requirements activities to integrate and prioritize the nuclear weapons-related requirements for both DoD and the National Nuclear Security Administration (NNSA) to support key decisions in the development of and the implementation of the recently conducted Nuclear Posture Review. (\$0.295 million).

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(U) Maintaining the Deterrent Infrastructure: Analyses were conducted on sustaining nuclear weapons safety, use control, survivability, emergency response, certification, transportation, and reliability. These efforts supported DoD oversight of DOE stockpile stewardship activities, such as nuclear weapon sustainment and revalidation, technology issues and infrastructure requirements, nuclear weapon life extension, and stockpile stewardship and maintenance. Conducted nuclear weapon accident response staff exercises. Published update to DoD Directive 3150.1, Joint Nuclear Weapons Life Cycle Activities. Initiated update to DoD Directive 3150.3, Nuclear Forces Security and Survivability. Updated handbooks on Nuclear Weapons Surety, Stockpile Management Information, and the Nuclear Matters Executive Overview to sustain core expertise. Initiated a knowledge management system to help preserve nuclear weapons information for the next generation, for knowledge of designing, testing, and other similar weapons activities. (\$ 0.409 Million)

(U) Policy and Guidance for International Obligations: Oversight and guidance was provided to activities and organizations, such as the NATO High Level Group (HLG), the Joint (SHAPE/EUCOM) Theater Surety Management Group (JTSMG), and technical exchanges with foreign nations under government-to-government agreements, such as WSSX (Russia) and STOCKTAKE (UK). WSSX. Activities included technical exchange meetings in the United States and Russia, a program management meeting in Moscow, conducted a technical exchange at Picatinny Arsenal, NJ, coordination of U.S. proposals for projects, the continuing of a master projects list, and completion of a U.S Procedures Document. Also planned and participated in WSSX technical interchange meetings on nuclear weapons safety and security issues, including a workshop on lightning detection and protection led by the Nuclear Matters office. Visited NATO nuclear capable units and reported on status to raise awareness of surety issues to the NATO HLG. Conducted planning for exercises for developing mutual understanding of issues for the safety and security of nuclear weapons for U.S./France technology exchanges. (\$ 0.169 million)

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### (U) FY 2004 Plans:

(U): Analyses and Assessments: Will provide basis for preparation of the annual Nuclear Weapons Stockpile Memorandum to the President, the Requirements and Planning Document, the Nuclear Weapons Council (NWC) Chairman's Annual Report to Congress, the Joint Surety Report to the President, and the Annual Certification Report to the President. These products provide the basis for technical policy recommendations to the President, Secretary of Defense, Secretary of Energy, and Chairman of the NWC on key nuclear weapon issues. Analyses will be produced in preparation for the annual Nuclear Weapons Deployment Request to the President. Continue as the OSD sponsor for the Joint Advisory Committee on Nuclear Weapons Surety (JAC) that will assess nuclear weapon delivery system platforms and associated weapons. Continue to participate and help lead the Strategic Capabilities Assessment that will develop the roadmap for implementation of the recommendation the 2001 Nuclear Posture Review. (\$ 0.590 million)

(U) Nuclear Weapons Council: Manage the operations of the Joint DoD-DOE Nuclear Weapons Council (NWC), as directed by law, and the activities of the supporting NWC Staff, the NWC Standing and Safety Committee (NWCSSC), the Compartmented Advisory Committee (CAC), and the Action Officer Group. Conduct research and frame technical issues for the NWC members and staff concerning the evolution of the nuclear weapons complex and infrastructure. These analyses will facilitate decisions on the refurbishment of specific weapon systems and the development of agenda items for the NWC. The development of the NNSA capability to produce and certify nuclear pits will be analyzed. Efforts will continue on the RNEP program to meet congressional requirements and to continue development activities. DoD and NNSA safety and security standards will be assessed. Plan and execute a week-long trip to several nuclear weapons complex sites for about sixty individuals within the nuclear weapons community including senior DoD/DOE officials. Ongoing actions to implement the recommendations of the Federal Advisory Committee on the End-to-End Review on Nuclear Command and Control, and the Panel to Assess the Safety, Reliability, and Security of the United States Nuclear Stockpile will be continued and additional implementation actions will be initiated. Monitor activities of weapon system Project Officer Groups (POG). (\$ 0.320 million)

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(U) DoD-NNSA Nuclear Weapons Requirements: Provide contractor Requirements Team to assess the joint DoD-NNSA Requirements to integrate and prioritize the nuclear weapons-related requirements for both DoD and the National Nuclear Security Administration (NNSA) to support key stockpile decisions. Activities include the conduct of tradeoff assessments and the update of the First Production Unit (FPU) Milestones Chart of critical stockpile activities for measuring DoD/NNSA performance. Requirements-related issues regarding implementation of the 2001 Nuclear Posture Review and the Moscow Treaty on the reduction of warheads will also be evaluated and addressed. (\$0.320 million)

(U) Maintaining the Deterrent Infrastructure: Manage implementation of Presidential initiatives on stockpile composition and quantities. Conduct assessments for the ATSD (NCB). Perform analyses on issues for sustaining nuclear weapons safety, use control, survivability, certification, transportation, and reliability. These efforts support DoD oversight of DOE stockpile stewardship activities, such as nuclear weapon sustainment and revalidation, infrastructure requirements, nuclear weapon life extension, and stockpile stewardship and maintenance. Conduct nuclear weapon accident staff exercises and identify relationship between homeland defense and nuclear accident response. Initiate update of DoD-DOE nuclear weapon related MOAs/MOUs with emphasis on the 1953 Agreement for the Development, Production, and Standardization of Atomic Weapons. Continue update to DoD Directive 3150.3, Nuclear Forces Security and Survivability. Continue to develop and implement a knowledge management system to help preserve nuclear weapons information for the next generation of nuclear weapons staff. (\$ 0.441 Million)

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(U) Policy and Guidance for International Obligations: Oversight and guidance will be provided to activities and organizations, such as the NATO High Level Group, the Joint Theater Surety Management Group, U.S.-UK STOCKTAKE, and activities under the U.S.-Russia WSSX Agreement. Visit NATO nuclear capable units and report on status to raise awareness of surety issues to NATO HLG. Participate in the initiation of NATO-Russia exchanges on nuclear weapons safety and security, the identification of information to be exchanged and the conduct of an HLG symposium. Continue planning for exercises for developing mutual understanding of issues for the safety and security of nuclear weapons within the U.S./France technology exchanges. Participate in WSSX Joint Steering Committee and Joint Coordinating Group program management meetings in the U.S. and Russia. Review U.S. and Russian proposed projects and consider counter-terrorism related projects, maintain list of ongoing WSSX activities, and approve WSSX project proposals. Initiate update of DoD Directive 5030.14 to affirm responsibilities of Joint Atomic Information Exchange Group (JAIEG). (\$ 0.180 Million)

### (U) FY 2005 Plans:

(U) Analyses and Assessments: Will provide basis for preparation of the annual Nuclear Weapons Stockpile Memorandum to the President, the Requirements and Planning Document, the Nuclear Weapons Council (NWC) Chairman's Annual Report to Congress, the Joint Surety Report to the President, and the Annual Certification Report to the President. These products will provide the basis for technical policy recommendations to the President, Secretary of Defense, Secretary of Energy, and Chairman of the NWC on key nuclear weapon issues. These reports must reflect implementation actions for the 2001 Nuclear Posture Review. Analyses will be produced for the annual Nuclear Weapons Deployment Request to the President. Continue as the OSD sponsor for the Joint Advisory Committee on Nuclear Weapons Surety (JAC). Nuclear Matters will continue to participate and help lead the Strategic Capabilities Assessment that will develop the roadmap for implementation of the recommendation the 2001 Nuclear Posture Review. (\$ 0.624 Million)

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(U) Nuclear Weapons Council: Manage the operations of the Joint DoD-DOE Nuclear Weapons Council (NWC), as directed by law, and the activities of the supporting NWC Staff, the NWC Standing and Safety Committee (NWCSSC), the Compartmented Advisory Committee (CAC), and the Action Officer Group. Conduct research and frame technical issues for the NWC members and staff concerning the evolution of the nuclear weapons complex and infrastructure. These analyses will facilitate decisions on the refurbishment of specific weapon systems and the development of agenda items for the NWC. Life extension programs for the enduring stockpile will be closely managed into the successive phases to sustain the viability of the stockpile. Ongoing efforts on the RNEP Program will proceed into later phases of the 6X process while meeting congressional requirements. Activities to initiate or update Memoranda of Agreement between the DOE and DoD will continue. Plan and execute a week-long trip to several nuclear weapons complex sites for about sixty individuals within the nuclear weapons community including senior DoD/DOE officials. Implementation actions for the recommendations of the Federal Advisory Committee on the End-to-End Review on Nuclear Command and Control and the Panel to Assess the Safety, Reliability, and Security of the United States Nuclear Stockpile will continue. Activities of weapon system Project Officer Groups (POG) will be monitored. (\$ 0.340 Million)

(U) DoD-NNSA Nuclear Weapons Requirements: Provide contractor Requirements Team to assess the joint DoD-NNSA Requirements Process to integrate and prioritize the nuclear weapons-related requirements for both DoD and the National Nuclear Security Administration (NNSA) to support key stockpile decisions. Process includes the development and maintenance of a requirements database, quantities and schedules, the conduct of tradeoff assessments. The requirements process will be analyzed for its capability to address cost factors. The requirements process and requirements prioritization guidelines will be modified as necessary and approved by the NWC. Major changes in a NNSA schedule for a warhead life extension will be assessed for its impact on the overall requirements reflected. Actions relating to ongoing Nuclear Posture Review and Moscow Treaty implementation activities will also be evaluated and addressed. (\$0.340 million)

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(U) Maintaining the Deterrent Infrastructure: Manage implementation of presidential initiatives on stockpile composition and quantities. Conduct assessments for the ATSD (NCB). Perform analyses on issues for sustaining nuclear weapons safety, use control, survivability, certification, transportation, and reliability. These efforts support DoD oversight of DOE stockpile stewardship activities, such as nuclear weapon sustainment and revalidation, infrastructure requirements, nuclear weapon life extension, and stockpile stewardship and maintenance. Conduct nuclear weapon accident staff exercises and define relationships between homeland defense and nuclear accident response. Update handbooks on Nuclear Weapons Council and on Systems Nuclear Survivability to sustain core expertise. Continue update of DoD-DOE nuclear weapon related MOAs/MOUs. Assess the need to update DoD Directive 3150.2 and DoD-M 3150.2, Nuclear Weapon Systems Safety and initiate DoD Directive 4540.5 and DoD-M 4540.5, Nuclear Weapons Transportation. Coordinate and publish update to DoD Directive 3150.3, Nuclear Forces Security and Survivability. Manage continuing implementation of presidential initiatives on stockpile composition and quantities as outlined in the 2001 Nuclear Posture Review. Perform analyses on issues for sustaining nuclear weapons safety, use control, survivability, certification, transportation, and reliability. These efforts support DoD oversight of NNSA stockpile stewardship activities, such as nuclear weapon sustainment and revalidation, infrastructure requirements, nuclear weapon life extension, and stockpile stewardship and maintenance. Complete implementation of a knowledge management system to help preserve nuclear weapons information for the next generation of nuclear weapons staff. (\$ 0.464 Million)

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(U) Policy and Guidance for International Obligations: Oversight and guidance will be provided to activities and organizations, such as the NATO High Level Group, the NATO Proliferation Group, the Joint Theater Surety Management Group, U.S.-UK STOCKTAKE, and activities under the U.S.-Russia WSSX Agreement. Visit NATO nuclear capable units and report on status to raise awareness of surety issues to NATO HLG. Participate in the ongoing NATO-Russia exchanges on nuclear weapons safety and security. Conduct U.S./France accident response exercise for developing mutual understanding of issues for the safety and security of nuclear weapons. Participate in WSSX Joint Coordinating Group and Joint Steering Committee program management meetings in the U.S. and Russia, and plan and participate in WSSX technical interchange meetings on nuclear weapons safety and security issues. Review U.S. and Russian proposed projects relating to nuclear weapons safety and security, and nuclear counter-terrorism, maintain list of WSSX activities, and approve WSSX project proposals. Update of overall WSSX agreement to potentially include counter-terrorism and chem-bio issues. Coordinate and publish update of DoD Directive 5030.14 to affirm responsibilities of Joint Atomic Information Exchange Group (JAIEG). (\$ 0.190 Million)

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<b>(U) B. Program Change Summary</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	<b><u>Total Cost</u></b>
Previous President's Budget	1.729	1.882	1.960	Continuing
Current FY 2005 President's Budget	1.683	1.851	1.958	
Total Adjustments	.046	.031	.002	
Appropriated Value	1.806	1.882	0.000	
a. Congressionally Directed Undistributed Reduction	-0.046	-0.031	0.002	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other				

**Change Summary Explanation:**

**(U) Funding**

**(U) C. Other Program Funding Summary**

(U) NA

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**(U)      D. Execution**

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

Labs/centers

Universities

FFRDC's

Contractors            Science Applications International Corporation, VA - \$1.000

Other                    Defense Threat Reduction Agency, \$0.300; Department of Energy - \$0.325

**(U)** List only those entities receiving 10% or more of total funding available in the PE.

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Exhibit R-2, RDT&E Budget Item Justification				Date: February 2004				
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				R-1 Item Nomenclature: Defense TechLink Program PE0603942D8Z				
Cost (\$ in millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0	0	3.547	1.934	2.248	2.246	2.240	2.248
<p><b>(U) A. Mission Description and Budget Item Justification:</b> Defense TechLink is a critical element in the Department's technology transfer, transition, and acquisition activities. Its three-fold mission is (1) integration of advanced commercial-sector technologies into DoD systems, particularly from nontraditional defense contractors; (2) spin-off of DoD-developed technologies to the commercial sector to make these technologies more affordable for military acquisition; and (3) establishment of collaborative R&amp;D projects with the private sector for cost-sharing of new dual-use technology development. Congress provided plus-ups for four years and the FY 2003 Senate Appropriations Committee report states, "The Committee continues its support for the Defense TechLink program and strongly encourages the Department of Defense to include funding for this program in its fiscal year 2004 budget submission. Defense TechLink has been highly successful at helping the Department transfer its technologies to U.S. companies, making these technologies available for both military and commercial applications. The Department is urged to make the Defense TechLink program a permanent part of its technology transfer, transition, and acquisition activities." TechLink is highly cost-effective and has provided a return on the investment to DoD of 3:1 on funds expended to date. This efficiently run organization currently accounts for 15 per cent of all DoD patent license agreements (PLAs) and has brokered nearly 80 cooperative research and development agreements (CRADAs) and other R&amp;D partnerships involving innovative companies new to DOD. The Congressional Record for November 18, 2003, page S15056, has a statement from Senator Burns (R-MT) commending TechLink for its outstanding achievements.</p> <p><b>(U) B. Program Change Summary:</b> (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)</p>								

	FY 2003	FY 2004	FY 2005	FY 2006
Previous President's Budget	N/A	2.000	1.936	2.248
Current FY 2005 President's Budget	N/A	3.547	1.936	2.248
Total Adjustments		+1.547	-0.002	
Congressional program reductions				
Congressional rescissions		-0.053		
Congressional increases		+1.600		
Reprogrammings				
SBIR/STTR Transfer				
Other			-0.002	

**(U) C. Other Program Funding Summary: None**

RDT&E Budget Item Justification Sheet (R-2a Exhibit)							Date: February 2004		
Appropriation/Budget Activity RDT&E, Defense Wide/BA-3				R-1 Item Nomenclature Defense TechLink Program: PE 0603942D8Z					
Cost (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
<b>TechLink</b>	0	3.547	1.934	2.248	2.246	2.240	2.248	Continue	Continue

#### A. Mission Description and Budget Item Justification

**BRIEF DESCRIPTION OF ELEMENT:** Defense TechLink is a critical element in the Department's technology transfer, transition, and acquisition activities. Its three-fold mission is (1) integration of advanced commercial-sector technologies into DoD systems, particularly from nontraditional defense contractors; (2) spin-off of DoD-developed technologies to the commercial sector to make these technologies more affordable for military acquisition; and (3) establishment of collaborative R&D projects with the private sector for cost-sharing of new dual-use technology development. Congress provided plus-ups in each of four years preceding FY 2004 for TechLink. The FY 2003 Senate Appropriations Committee report states, "The Committee continues its support for the Defense TechLink program and strongly encourages the Department of Defense to include funding for this program in its fiscal year 2004 budget submission. Defense TechLink has been highly successful at helping the Department transfer its technologies to U.S. companies, making these technologies available for both military and commercial applications. The Department is urged to make the Defense TechLink program a permanent part of its technology transfer, transition, and acquisition activities." TechLink is highly cost-effective and has provided a return on the investment to DoD of 3:1 on funds expended to date. This efficiently run organization currently accounts for 15 per cent of all DoD patent license agreements (PLAs) and has brokered nearly 80 cooperative research and development agreements (CRADAs) and other R&D partnerships involving innovative companies new to DOD.

**B. Program Plans - FY 2004 Through FY 2005:**

	FY 2003	FY2004	FY 2005
<b>Marketing of DoD Technologies</b>	N/A	2.627	1.344

**FY 2004 Plans:** Undertake active marketing of DoD-developed technologies to United States companies to establish Patent License Agreements to commercialize these technologies for both civilian and military applications. The multiple objectives of this technology marketing activity are: (1) to accelerate the transition of DoD-developed technologies to the warfighter; (2) to lower the cost of DoD technology acquisition by developing a larger commercial market for dual-use technologies; (3) to provide a return of revenue to DoD labs from commercial spin-off of DoD-developed technologies; and (4) to fulfill DoD's Congressionally mandated technology transfer directives (\$1.08 million).

The congressional add of \$1.6M is for a Technology Venture Center in Montana and in Alaska to provide an entrepreneurial training/virtual business incubator. These funds will be used to provide specific start-up support to those companies initially licensing or taking to market technology developed in DoD and now available for commercialization. Efforts will be made to ensure the commercial products using the DoD developed technologies are made available to DoD buyers/programs. (\$1.547M)

**FY 2005 Plans:** Continue active marketing of DoD-developed technologies to US companies to establish Patent License Agreements to commercialize these technologies for both civilian and military applications. The multiple objectives of this technology marketing activity are to (1) accelerate the transition of DoD-developed technologies to the warfighter; (2) lower the cost of DoD technology acquisition by developing a larger commercial market for dual-use technologies; (3) provide a return of revenue to DoD labs from commercial spin-off of defense technologies; and (4) fulfill DoD's Congressionally mandated technology transfer directives (\$1.344 million).

	FY 2003	FY 2004	FY 2005
Dual Use Technology Deployment		0.56	0.56

**FY 2004 Plans:** Actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. This activity will particularly focus on nontraditional defense contractors and is intended (1) to help lower the expense of new



defense-related technology development through cost-sharing with industry, and (2) to help DoD benefit from private-sector technology investments and innovations (\$0.56 million).

**FY 2005 Plans:** Continue to actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DoD labs and industry for development of technology with both commercial and military applications. This activity will particularly focus on nontraditional defense contractors and is intended (1) to help lower the expense of new defense-related technology development through cost-sharing with industry, and (2) to help DoD benefit from private-sector technology investments and innovations (\$0.56 million).

	FY 2003	FY 2004	FY 2005
<b>Spin-On of Advanced Commercial-Sector Technologies</b>	N/A	0.36	0.30

**FY 2004 Plans:** Actively promote the DoD Small Business Innovation Research (SBIR) (focus on Phase III contracts) and Independent Research and Development (IR&D) programs to companies in the Northwestern United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems. (\$0.36). (Total \$2 million).

**FY 2005 Plans:** Continue active promotion of the DoD Small Business Innovation Research (SBIR) (focus on Phase II contracts) and Independent Research and Development (IR&D) programs to companies in the Northwestern United States in order to help DoD identify, fund, acquire, and integrate private-sector innovations and advanced commercial technologies into DoD systems (\$0.36 million). (Total \$2 million).

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** N/A.

Fiscal Year (FY) 2005 Budget Estimates RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							Date February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3					Project Name and Number: <b>Joint Wargaming Simulation Management Office PE 0603832D8Z</b>			
COST <i>(In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total Program Element (PE) Cost	45,835	41.735	46.017	46.489	47.083	48.853	49.928	
JSM/P476	45,835	41.735	46.017	46.489	47.083	48.853	49.928	

**(U) A. Mission Description and Budget Item Justification:**

Modeling & Simulation (M&S) has been a critical component in the development, deployment and sustainment of military capability for many years. By the last decade of the twentieth century, it became evident to Congress and the Department that a focused effort was needed to harness the promise M&S for national defense. To provide strategic direction, the Executive Council for Modeling and Simulation (EXCIMS) developed a vision statement for DoD M&S which they reconfirmed in 1999. "Defense modeling and simulation will provide readily available, operationally valid environments for use by the DoD Components: (1) To train jointly, develop doctrine and tactics, formulate operational plans, and assess warfighting situations; and (2) To support technology assessment, system upgrade, prototype and full-scale development, and force structuring. Furthermore, common use of these environments will promote a closer interaction between the operations and acquisition communities in carrying out their respective responsibilities." (DoD5000.59-P)

In responding to the Congressional initiative to "... establish an Office of the Secretary of Defense level joint program office for simulation to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments and to establish guidelines and objectives for [the] coordination [of] simulation, wargaming and training..." (SAC, SR101-521), the DMSO was created under

DDR&E with an S&T budget designed to " ... promote the enhancements of DoD M&S technologies in support of operational needs and the acquisition process; develop common tools, methodologies, and databases; and establish standards and protocols promoting the internetting, data exchange, open system architecture, and software reusability of M&S applications." (DoD Directive 5000.59).

DMSO continues to direct a technical program that supports the effective use of simulation across the Department of Defense, provides the foundation for interoperability, enhances cost-effective use of simulation and serves as the laboratory for the development of standards or policy. The need for effective M&S capability continues to grow. Transformation Planning Guidance provides a clear statement that transformation must span the way we fight, the way we do business and the way we work with others. The way we fight must be in Joint and Coalition contexts with the equipment, training and planning to enable that type of operation. The business end of Defense, the acquisition of equipment and capabilities, needs to be adaptive to new missions and the introduction of new technology at a far more rapid pace. Finally, Defense must engage other sectors of the US government and our international partners in more effective ways. All of these tasks rely on the ability to use M&S capability that is agile, responsive and interoperable.

M&S requires the appropriate mix of long and short-term investment. The architectural basis that enabled Millennium Challenge 02 and supports on-going experimentation was the result of long-term (7 years) investment at a significant level. The speed and agility of tomorrow's military operations as illustrated in Operation Iraqi Freedom signals the need to link operational systems to simulations that can provide added insight into complex, dynamic situations. USD (AT&L) must rely on effective M&S tools and techniques to assess the military utility of emerging technology and speed its introduction into military products.

Further non-technical requirements in DoDD 5000.59 are to develop a DoD M&S Master Plan; policies and procedures for the validation, verification and accreditation (VV&A) of DoD M&S; designate DoD M&S Executive Agents; establish a Defense Modeling and Simulation Office (DMSO) and establish a M&S Information Repository. DMSO is responsible for developing the DoD modeling and simulation infrastructure (standards, tools,

methodologies, etc.) that meet the Department's requirements for Joint Warfighting usage across the domains of analysis, acquisition, training, experimentation, and operations. To accomplish this DMSO stimulates activities for Service cooperation, coordination, and consolidation of effort; establishes interoperability policy, standards and protocols; develops VV&A policy that leverages the expansion of science and technology; and promotes the appropriate use of M&S within the Department. This Program element specifically facilitates cost-effective M&S utilization across the Department through: a common technical framework for M&S which enables interoperability with other systems; timely delivery of the natural environment and common authoritative representations; oversight of authoritative representations of systems and human performance; M&S policy and guidance to meet M&S end-user needs; and a means to share the benefits of M&S.

**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 2003	FY 2004	FY 2005
Previous President's Budget	46.337	44.887	46.075
Current FY 2005 President's Budget	45.835	41.735	46.017
Total Adjustments	.502	3.152	.058
Congressional program reductions			
Congressional rescissions		3.152	
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Undistributed Reductions			
Other	.502		.058

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: <b>Joint Wargaming Simulation Management Office PE 0603832D8Z</b>				
	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Cost (\$ in millions)	45,835	41.735	46.017	46.489	47.083	48.853	49.928	
RDT&E Articles Quantity *								
JSM/P476 (Projects A thru F)	45,835	41.735	46.017	46.489	47.083	48.853	49.928	
<b>(U) A. Mission Description and Budget Item Justification:</b>								
<p>M&amp;S has been a critical component in the development, deployment and sustainment of military capability for many years.</p> <p>In responding to the Congressional initiative to "... establish an Office of the Secretary of Defense level joint program office for simulation to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments and to establish guidelines and objectives for [the] coordination [of] simulation, wargaming and training..."</p> <p>DMSO continues to direct a technical program that supports the effective use of simulation across the Department of Defense, provides the foundation for interoperability, enhances cost-effective use of simulation and serves as the laboratory for the development of standards and policy.</p> <p>M&amp;S requires the appropriate mix of long- and short-term investment. The architectural basis that enabled Millennium Challenge and supports on-going experimentation was the result of long-term (7 years) investment at a significant level.</p>								

Further non-technical requirements in DoDD 5000.59 are to develop a DoD M&S Master Plan; policies and procedures for the validation, verification and accreditation (VV&A) of DoD M&S; designate DoD M&S Executive Agents; establish a Defense Modeling and Simulation Office (DMSO) and establish a M&S Information Repository.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004				
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Joint Programs <b>Project A</b>				
	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>					
Project Name /No./Subtotal Cost	4.310	2.845	3.364					
<p><b>(U) A. Mission Description and Budget Item Justification:</b> The Joint community and Services require infrastructure tools to allow their separate models, simulations and command and control systems to effectively operate in a common environment. The Joint Programs Project ensures DMSO standards, policies and products support the full spectrum of users while promoting interoperability through all technical areas. It also enriches the support tools of the DoD analysis, acquisition, training, experimentation, and operations communities. This project transitions M&amp;S capabilities into major Joint Programs of Record, and drives the continued update of the High Level Architecture (HLA) to account for emerging technology and evolving user requirements.</p> <p><b>(U) B. FY 2003 Accomplishments:</b> Joint Program investments created standards-based prototypes for use in several different communities.</p> <p>(U) The CINC/Service program fielded the JTLS-JCATS interface. The product was used successfully by the Joint Forces Command and the Korean Battle Simulation Center to link a theater-level simulation to a more detailed simulation of small unit operations. This meets one of the top needs voiced by the Combatant Commanders for multi-level simulation capability.</p> <p>(U) Runtime Infrastructure (RTI) development was transitioned to the commercial sector. At present there are four companies producing runtime infrastructures that have been verified by the Government. A greatly improved product with more agile support is the result of allowing the Department to realign its resources to more effectively manage and update the standard.</p>								

(U) HLA RTI Certification and Federation Compliance Test Suites have been completed and documented and are being readied for export to our NATO allies through the Research and Technology Board. By so doing, the US will enhance training for coalition operations without having to provide certification for all non-US simulation components.

(U) The distributed learning standard, Shareable Common Object Reference Model (SCORM), was linked to the HLA to produce a distributed course capability that allows a simulation to be called as part of a learning module. The product is now being enhanced by JFCOM to expedite training users of JTLS.

**(U) Planned Program FY 2004 - 2005:**

(U) Initiate and complete the update of the IEEE 1516 standard to promote continued development of standards-based Joint and coalition operations.

(U) Leverage the development of individual links between simulations and command and control systems to provide a web-based capability for accessing critical tactical databases to initialize and update simulations for operational use.

(U) Complete transition of RTI verification from a research grade to commercial grade provider.

(U) Create readily available framework for subject matter experts to use in developing objective validation procedures for simulations.

(U) Develop a "fitness for use" accreditation methodology for simulation that mirrors the levels of maturity in the Software Engineering Institute's Capability Maturity Model.

(U) Lead the simulation community in evaluating and adopting commercial standards for use in simulation.



Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004				
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Transformation <b>Project B</b>				
Cost (\$ in millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>					
Project Name /No./Subtotal Cost	5.144	0.000	3.500					
<p><b>(U) A. Mission Description and Budget Item Justification:</b> Transformation Initiatives focus on providing the Department of Defense with the next generation of M&amp;S tools and representation of the content of military operations needed to achieve the goals set out by JV2020, Quadrennial Defense Review (QDR), and other Transformation objectives. DMSO investments in transformation are directed at developing consistent architectures and interoperable components to create composable mission space environments consistent with the Services as they, evolve their specific personnel and equipment transformation initiatives. Service and Joint programs involved in DMSO's efforts to enable transformation include: collaboration with Joint Synthetic Battlespace (JSB, USAF), Joint Virtual Battlespace (JVB, USA), Fleet Battle Experiments (FBE, USN), Marine Air to Ground Task Force (MAGTF) Expeditionary Family of Fighting Vehicles (MEFFV, USMC) and Joint Experimentation (DCEE, JFCOM/JWFC).</p> <p><b>(U) B. FY 2003 Accomplishments:</b></p> <ul style="list-style-type: none"> <li>(U) Completed the common Federation Object Model (FOM) shared between the JVB and JSB to enable consistent operation of sensor and command and control simulation entities.</li> <li>(U) Delivered a collaborative environment for program and product development to the MEFFV program. This will enhance the ability of the MEFFV program to exploit the benefits of simulation-based acquisition.</li> <li>(U) As the Transformation Program relies on the output of Project D (Technology Development) to provide essential components to transition, the work in this area will be suspended for a year (FY04) to mature technologies currently under development and to provide support for a new effort, Project F.</li> </ul> <p><b>(U) Planned Program FY 2004 - 2005:</b></p>								

(U) In the FY 2004 - FY 2005 time frame, the project looks to leverage web technologies by providing simulation capabilities as web services. These efforts will translate into enhanced capability to link simulations and operational systems as well as provide easier access to scenario development with the attendant databases.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3			Project Name and Number Asymmetric Warfare and Homeland Security <b>Project C</b>				
Cost (\$ in millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>				
Project Name /No./Subtotal Cost	7.461	4.135	5.000				
<p><b>(U) A. Mission Description and Budget Item Justification:</b> Modeling and Simulation affords decision makers the use of Course of Action (COA) analysis tools to wargame the best response before committing to action. Modeling and Simulation aids in understanding unconventional threats by expanding the scope of decision support tools with predictive human behavior models and advanced system behavior models. The key is to identify the threat before the threat becomes a reality. Improved information operations through computational models and social science theory allow commanders to shape engagement without force. The program leverages existing simulations, databases and interfaces to provide capability for training, mission planning and analysis.</p> <p><b>(U) B. FY 2003 Accomplishments:</b> The work done under this project in the FY03 and FY04 time frame produced mission planning tools and analysis capabilities that became part of the Department's successful execution of Operation Iraqi Freedom (OIF).</p> <p>(U) 3D visualization tools were integrated with the JCATS simulation as part of the Flexible Asymmetric Simulation Toolkit (FAST). The product was deployed as a mission rehearsal and operational toolkit during OIF.</p> <p>(U) Several analysis tools were incorporated into a subsequent version of FAST and deployed to Iraq during the post-conflict phase of OIF. This demonstrated the tool's analytic capabilities in an active asymmetric environment and provided the direction for finalizing FAST and its transition to the Joint Urban Operations Office at JFCOM and the Center for Army Analysis (CAA).</p> <p>(U) The Joint Operations in Urban Synthetic Terrain (JOUST) program demonstrated the ability to provide a common environment for live and synthetic land, sea and air forces in a combined urban conflict. The program provided insights into</p>							

communication and shared perception issues important to the Joint National Training Capability. The cultural feature server provided a means of distributing the complex features of an urban setting to multiple simulations without the need for the significant time and resources normally used in recompiling databases. The products from JOUST were delivered to the Joint Urban Operations Office (JUOO) at JFCOM and to the Training and Experimentation components of JFCOM.

**(U) Planned Program FY 2004 - 2005:**

- (U) The program will exploit developments in communications and web technology to enhance the capability to interface mobile command and control assets with simulations running on readily portable computational system (laptops, Personal Data Assistants (PDAs) and the next generation wearable computers).
- (U) The program will exploit augmented reality capabilities to provide enhanced views of the battlespace on mobile devices.
- (U) As results from the technology programs in human, organizational and cultural behavior provide enhanced predictive capability, these enhancements will be integrated with simulation and planning tools that can be used in an operational environment. Such predictive capability is expected to have a profound influence on effects-based and information operations.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number: Technology Development <b>Project D</b>			
Cost (\$ in millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>				
Project Name /No./Subtotal Cost	20.664	13.650	20.211				
<p><b>(U) A. Mission Description and Budget Item Justification:</b> DMSO supports multi-year technology development programs that enable the creation of agile, cost-effective M&amp;S in support of consistent, interoperable mission spaces that can be used in trade-space analyses, analyses of alternatives and evaluation of emerging technologies, doctrine and tactics for the full spectrum of military transformational initiatives. Investment areas include the development of robust criteria for composable simulation systems, the ability to define and represent the appropriate level of human performance and decision making. This project evolves technologies critical to the effective use of simulation including: composability; the representation and delivery of dynamic, natural environment data; the representation of human performance both in simulations themselves and as intelligent systems to function in the place of simulation controllers; and the linking of simulations to command and control systems for operational use in planning and mission rehearsal. Further, DMSO supports such technical development as is needed to create meaningful verification, validation and accreditation processes and to support implementation of the strategic vision for M&amp;S across the Department. A significant portion of technology development is directed to the identification and/or effective evolution of standards and their efficient use in modeling and simulation.</p> <p><b>(U) B. FY 2003 Accomplishments:</b></p> <p>(U) <u>Composable Mission Space Environments.</u></p> <p>(U) Completed two foundational studies on the technical framework for composability in the context of realistic federations of simulations.</p> <p>(U) Completed the development of Base Object Models (BOMs) as critical foundation elements for building composable components.</p>							

(U) Initiated the evaluation of web standards to support simulation. Completed the initial conversion of an HLA runtime infrastructure (RTI) to web-based technology.

(U) Synthetic Natural Environment Representation:

(U) All nine of the components of the Synthetic Environment Data Representation and Interchange Specification (SEDRIS) achieved final committee draft status in the International Standards Organization (ISO) standardization process. As with the HLA, this will enable the Government to transition future development of SEDRIS products to industry.

(U) Military environment representation:

(U) The Unit Order of Battle (UOB) tool was updated and used by the simulation community.

(U) The Mission and Means Framework was used to frame the Milestone B decision for the Future Combat System.

(U) Integration of Simulations and C4I Systems:

(U) An interface was developed between the track databases in the Global Command and Control System and the JWARS simulation. This interface was used to update the simulation and correct force deployment data. It will become a critical factor in the ability to use JWARS as an analysis tool for Combatant Commands.

(U) DMSO extended the work accomplished by Army in the SIMCI program by web-enabling the transfer of planning data to simulations for initialization. The web interface eliminated the need for a human to use file transfers to download the data.

(U) Representation of Human Performance:

(U) Performance Moderator Function (PMF) technology was used to demonstrate the ability to modify the behavior of a synthetic human in response to fatigue. The demonstration was done in the context of the Unreal Tournament game engine.

(U) The project demonstrated the use of a human behavior server. The server can use different models of human performance and provide modified behavior to the entities in a simulation. The initial tests were done for JWARS and JCATS.

(U) Composable Frameworks for M&S:

(U) Demonstrated the ability to use a web-based portal for viewing simulations during execution.

(U) Initiated transition of an environmental data server (OASES) by demonstrating that it could be run without the presence of an expert.

(U) Provided an environmental effects server for acoustic sensors.

**(U) Planned Program FY 2004 - 2005:**

(U) Synthetic Natural Environment Representation: In many simulations, valid representation of sensors and systems require appropriate representation of the physical environment. DMSO continues to lead the M&S community in establishing standards for environmental representation and the establishing processes to define, produce and deliver environmental data to simulations. This program will continue to emphasize providing valid, appropriately registered static and dynamic data including undersea, ocean, littoral, land, atmosphere and space. Representation of operations in urban terrain place increasing emphasis on providing ports, buildings, civil infrastructures (water, electrical, etc.) and population with the ability to dynamically change all of these features in response to civil and military activity. DMSO will extend current standards development and methodologies to address all of these critically important areas in support of transformation goals.

(U) Knowledge Integration (KI): The ability to assemble scenarios rapidly for execution requires the complete description of the military environment as well as the natural environment. Program emphasis will be placed on developing automated links between the missions portrayed in simulation scenarios and the data that describes the force structures needed to populate the scenario. DMSO will capitalize on the increasing linkage between simulations and operational systems to allow warfighters to develop scenarios on operational planning tools and then transfer them to simulations in a automated fashion. Such capabilities will provide more responsive, less resource-intensive use of simulation.

(U) Integration of Simulations and C4I Systems: Use of simulations in training and in operations requires that simulated entities be represented in the common operational picture in the C4I systems. This is done routinely, but using a variety of

different and, sometimes, incompatible methods. The Department needs a common lexicon and/or data model to establish consistent, bi-directional data and information transfer among simulations and C4I systems,. DMSO is working with the international C4I community to adopt and adapt the NATO LC2IEDM as the foundation for this common terminology. As the operational communication systems move to web-based services, DMSO is exploiting web technology to make the data translation and access capabilities into web services, thus providing greater consistency between operation and simulation systems.

(U) Human Performance Representation (HPR): The ability to represent the human being and their decision making in simulation has been identified as a critical gap by simulation users. The HPR project will capitalize on the performance moderator research, advances in software agent behaviors and architectures, component modularization in distributed learning technology and the coincident establishment of test laboratories for human performance modeling research to provide next generation of human performance representation. The ability to represent threat behaviors will be coordinated with DARPA and key intelligence agencies through the Modeling and Simulation Executive Agent for Threat Representation. To increase the ability to represent effects-based operation, information operations and the effects of non-lethal weapons, emphasis will be placed on understanding and representing the militarily relevant factors in cultural and organizational behavior. At the same time, the program will exploit agent technology to provide intelligent controllers that can replace human controllers in simulation-aided exercises.

(U) Composable Frameworks: Current capability to rapidly compose models with known, measurable accuracy is neither easy nor cost-effective unless simulations are specifically constructed to work together. The first step in establishing robust capability is building the formal foundation and specifying limitations. A key to setting capabilities and limitations is to first understand and then codify the ways the Department uses simulation. Current programs will form the empirical environment in which to evaluate concepts and frameworks. Beyond the use of current tools, the program will focus on the structure of composable modules through use of such technology as base object models and the development of metadata standards for describing the essentials of the modules as the initial step in



automated model selection and integration. New research in component technology for manufacture and test of standard software components and application of systems engineering to the design of componentized systems are expected to provide the basis for validation and certification of the resulting composition.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004			
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3			Project Name and Number Policy and Guidance <b>Project E</b>				
Cost (\$ in millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>				
Project Name /No./Subtotal Cost	8.256	12.605	9.942				
<p><b>(U) A. Mission Description and Budget Item Justification:</b> By DoD policy, the Under Secretary of Defense for Acquisition, Technology and Logistics (USD(AT&amp;L)) has responsibility for modeling and simulation (M&amp;S) management, oversight, and policy development. DMSO, as the USD(AT&amp;L)'s action agent, develops DoD modeling and simulation (M&amp;S) policies, plans and programs that support effective and efficient management of the Department's M&amp;S resources. DMSO also oversees DoD M&amp;S activities to identify opportunities for cooperation, coordination, collaboration and consolidation of effort; establishes Departmental interoperability standards and protocols; promotes the effective and efficient use of M&amp;S within the Department; and supports the DoD M&amp;S management system established by DoD Directive 5000.59. These responsibilities stemming from the DoD Directive 5000.59 and the Congressional language that preceded it can be characterized into four broad categories:</p> <p>(1) Oversight of Departmental M&amp;S plans and programs;</p> <p>(2) Establishment of DoD M&amp;S standards and best practices;</p> <p>(3) Interagency and International M&amp;S cooperation; and</p> <p>(4) Establishment of M&amp;S education and training programs.</p> <p><b>(U) B. FY 2003 Accomplishments:</b></p> <p>(U) Oversight of Departmental M&amp;S Plans and Programs.</p> <p>(U) Ensured alignment of the Department's M&amp;S efforts with the key Administration and Departmental policies and guidance (e.g., President's Management Agenda, the Joint Vision 2020, the Government Performance Results Act, the Training Transformation Strategic Plan, Quadrennial Defense Review, etc.).</p> <p>(U) Initiated development of a DoD M&amp;S Strategic Plan, identifying goals and</p>							

objectives for the next ten years. An Implementation Plan that establishes DoD M&S milestones and funding will follow this effort.

(U) Supported the Department's M&S management structure, the Executive Council for Modeling and Simulation, and its committee structure.

(U) DoD M&S Standards and Best Practices.

(U) Published DoD Instruction 5000.61, "DoD [M&S] Verification, Validation and Accreditation (VV&A)" which updates and enhances Departmental policies increasing user confidence in M&S results. .

(U) Initiated the process of becoming the Lead Standards Agency for M&S under the Defense Standardization Program

(U) Interagency and International M&S Cooperation.

(U) Maintained information exchanges with other US governmental organizations.

(U) Participated in the DoC, National Institute for Standards and Technology's standards meeting on simulation standards and in their conference on Counterterrorism.

(U) Engaged with NASA on issues involving use and defense of air space.

(U) Hosted an international meeting on Operations Other Than War and produced a workshop proceedings

(U) Hosted an initial meeting of the heads of the modeling and simulation offices from Canada, Australia and the United Kingdom directed toward increasing collaboration.

(U) Served as sponsor and key participant in a number of national, international and interagency meetings including regular Modeling and Simulation Working Groups, Simulation Interoperability Workshops and others.

(U) Led NATO activities to provide HLA compliance testing to NATO allies.

(U) M&S education and training programs.

(U) Supported the professional military education of future DoD leaders through support of visiting professors at the military academies and the National Defense University.

(U) Through a DoD M&S Education Consortium, consisting of government and academia, provided guidance and formal direction of M&S education.

(U) Sponsored WARLORDS, a highly successful, simulation-based contest involving all the military academies competing against each other using warfighting and Information Warfare simulations.

**(U) Planned Program FY 2004 - 2005:**

(U) Oversight of Departmental M&S Plans and Programs.

(U) Complete development of an M&S Strategic Plan (MSSP) to tie M&S goals to the priorities of the President's Management Agenda as well as to the existing Government Performance and Results Act.

(U) Serve as the DoD focal point for M&S and as the USD(AT&L)'s action agent for the administration and support of the DoD M&S management structure.

(U) Define the authorities, functions, responsibilities and relationships of DoD Modeling and Simulation Executive Agents (MSEAs). (U) Develop new DoD Issuance on "Transfer and Release of DoD Models and Simulations and Related Technologies" to provide a single source of policy and procedural guidance for the DoD M&S community. This information currently resides in more than 30 different DoD Issuances.

(U) Conduct a five-year review and update DoD 5000.59-M, "DoD Modeling and Simulation (M&S) Glossary."

(U) Conduct a five-year review and update of DoD Directive 5000.59, "DoD Modeling and Simulation (M&S) Management."

(U) Work with the DoD Components to establish an Executive Steering Committee for the Modeling and Simulation Information Analysis Center (MSIAC) to provide broad-based DoD oversight and guidance to enable the MSIAC to better support the larger DoD M&S community.

(U) DoD M&S Standards and Best Practices.

(U) Work as the Standardization Management Activity (SMA)/Lead Standardization Activity (LSA) for DoD Modeling And Simulation. The goal is to develop and maintain M&S standards that improve military operational readiness within the Department of Defense and with our allies and coalition partners, reduce the cost of M&S ownership, and allow for ready insertion of new and transformational M&S capabilities and technologies.

(U) Interagency and International M&S Cooperation.

(U) Establish a forum for interagency coordination, cooperation, and standardization.

(U) Act as the US representative to the NATO Modeling and Simulation Group (NMSG) to ensure support for M&S coordination, cooperation and standardization.

(U) Engage with its foreign military M&S policy counterpart organizations to promote M&S coordination and cooperation.

(U) M&S education and training programs

(U) Sponsor Visiting Professors at the three Military Academies and the National Defense University. Through this effort the DoD M&S initiatives and success stories are incorporated into the school curricula and used to educate the future M&S users (warfighters and support personnel).

(U) Provides awareness education to DoD personnel through presentations at numerous conferences, seminars and meetings.

(U) Publish research papers and articles to increase the knowledge base of DoD decision makers.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification				Date February 2004				
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number (Defense Systems) <b>Project F</b>				
Cost (\$ in millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>					
Project Name /No./Subtotal Cost	0.0	8.500	4.000					
<b>(U) A. Mission Description and Budget Item Justification: Defense Systems</b>								
<b>(U) B. FY 2003 Accomplishments: Defense Systems</b>								
<b>(U) Planned Program FY 2004 - 2005: Defense Systems</b>								

Exhibit R-2a, RDT&E Project Justification								February 2004
DEFENSE-WIDE, RDT&E (400) BUDGET ACTIVITY 3				Joint Wargaming Simulation Management Office PE 0603832D8Z <b>M&amp;S for Improved Acquisition of Defense Systems</b>				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cont'g
<b>M&amp;S for Improved Acquisition of Defense Systems</b>	0.000	9.000	6.000	9.000	9.000	9.000	9.000	Cont'g
<p><b>(U) A. Mission Description and Budget Item Justification</b></p> <p>US military force capabilities are today highly dependent upon interoperability within complex systems-of-systems. The shift toward increasing reliance on network centric operations, and systems of increasing complexity linked together in more complex systems-of- systems, will increase the dependency on seamless interoperability across military service and national boundaries, and effective performance by each individual system. The defense acquisition systems engineering process - to design, develop, and test the systems - must exploit the demonstrated value of M&amp;S more effectively to field improved capabilities soonest, with sufficient confidence the fielded capabilities will perform effectively in the systems-of-systems joint mission environment. It is simply not practical to create actual systems-of-systems environments within the acquisition systems engineering processes, but M&amp;S can provide the capability to represent that environment to properly design, develop, and test the individual systems. An increasing body of evidence, including reports by the National Research Council, industry associations, and various DoD organizations all point to the need to transform the acquisition culture, processes, and technology to leverage and exploit to a greater extent the power of M&amp;S for defense systems engineering and test.</p>								

Accordingly, this project initiates a series of activities to enhance defense systems engineering and test culture, processes, and technology to begin to better leverage M&S technology and collaborative processes. OSD leadership of these activities is essential to provide the focus and interest to assure participation and cooperation of the military departments. All the components must be included in this effort to provide effective joint acquisition environments just as military operations are joint. From the start, this effort will assess progress and problems, develop and implement a strategy, and then continue and sustain the initiative by building upon lessons learned and successes.

(U) B. **Accomplishments.** FY 2004 accomplishments include coordinating user requirements; completing background technical research; and drafting program plans, resource requirements, schedules, and milestones.

(U) C. **Planned Program FY 2004 - 2005:**

**(U) FY 2004 Plans:** In FY 2004, this project will initiate various technical efforts targeted on 2 goals:

1. Establish a centralized, focused effort in OUSD(AT&L) to improve the application of M&S technology across acquisition programs.
2. Plan and initiate a series of technical analysis activities with a goal of developing and instituting a capability to analyze joint integrated architectures to assure they are viable representations of the architecture intended for specific mission areas, and that the generated force capability represented by the architecture is realistic.

Goal 1 Plans: Establish a small community of interest across the DoD acquisition community intended to define a specific vision and roadmap for improving application of M&S in acquisition. FY 2004 is intended to be primarily a planning effort.

Goal 2 Plans: Initiate technical efforts to establish the capability to assess joint integrated architectures. These activities are coordinated with the various Functional Capability Boards of the Joint Staff. Specific objectives include:

- Define a methodology to conduct first order analyses of joint integrated architectures.
- Conduct proof-of-principle implementation of the first order analysis, and determine whether the technology of architecture representation and architecture based analysis is adequate to address user needs.



- Based on findings from the proof-of-principle implementation, define requirements for M&S technology development and application.
- Support development of behavior models and analysis tools to explore solutions to military needs in the precision engagement mission area.
- Support development of a software development roadmap focused on evolution of Service systems to an integrated joint fires network.
- Pursue incorporation of advanced information technologies to resolve interoperability problems.
- Expand M&S tool sets to include trade-space analysis for simulation mission space environments. Support integration of results into Service efforts.
- Initiate activity to develop standards and protocols, including common data models and commercial standards, in order to move toward a consistent, interoperable mission space for trade-off analysis.
- Explore use of software technology to assemble mission scenarios rapidly for execution.
- Integrate data bases associated with establishing a capability for simulation of course of action analysis.
- Investigate underlying technologies and standards to support the ability to rapidly compose mission space models with known, measurable accuracy.
- Assemble a suite of reusable system data to support system level architecture development and analysis.
- Establish baseline portfolios (roadmaps) for current systems in each Functional Capabilities Board.

**(U) FY 2005 Plans:** Initiate a series of RDT&E activities to exploit the capabilities of M&S to improve effectiveness of Systems Engineering (SE) and test of defense systems, and systems-of-systems, to support achievement of joint mission capabilities.

- Define SE M&S policy and guidance necessary to transform culture in defense systems acquisition programs, to facilitate improving effective use of M&S.
  - Establish a small OSD-led steering committee with the military components.
  - Assess and define how M&S is to be integrated into DoD SE and program processes, including use of the Simulation Support Plans. Start by developing a baseline of

- current use, then develop a strategy to achieve the "how to" end state.
- Develop DoD policy and guidance, including policy for M&S and information sharing, M&S and data ownership, contracting, and other areas such as consideration of M&S progress in acquisition decision reviews.
  - Establish a training capability expanding on policy, guidance and best practices; "push" education and training to defense acquisition programs.
  - Initiate and lead focused interchange (SE M&S Community of Interest) between DoD, industry, and academia to maintain and inform the community on best practices.
  - Assess and recommend improvements to M&S infrastructure to facilitate interoperability and consistent exchange of defense systems M&S and data across DoD and industry.
    - Examine the various data standards and define a strategy for use of standards in the system engineering process in a consistent manner across defense acquisition to facilitate M&S data and content interchange. Build upon lessons learned from JDEP reference Federated Object Model.
    - Initiate activity to mature the Joint Distributed Engineering Plant (JDEP) as a key DoD component-level means for systems-of-systems engineering integration and test.
    - Define appropriate directory services for SE M&S information sharing, and develop a plan to provide services.
  - Provide incentives for defense system Program Managers to develop M&S tools which support DoD-wide systems-of-system engineering, and adopt best practices.
    - Establish a council of PM and industry representatives to contribute to prioritization of investments in JDEP infrastructure to support continued maturation of JDEP capability to support all warfare mission areas.
    - Develop a plan and initiate pilot efforts to demonstrate value of systems-of-systems engineering M&S approaches. Pilot projects will include both investment in M&S tools that contribute, and adoption of best practices across the life cycle of a program.

Fiscal Year (FY) 2005 Budget Estimates RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE FEBRUARY 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3 R-1 ITEM NOMENCLATURE					Quick Reaction Special Projects (QRSP) PE 0603826D8Z			
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total Program Element (PE) Cost	24.076	46.566	64.389	89.927	90.408	92.111	94.143	
Quick Reaction Fund Project P826	6.019	15.522	21.463	29.975	30.136	30.703	31.381	
Defense Acquisition Challenge Program Project P827	12.038	17.793	21.463	29.976	30.136	30.704	31.381	
Technology Transition Initiative Project P829	6.019	13.251	21.463	29.976	30.136	30.704	31.381	

**(U) A. Mission Description and Budget Item Justification**

(U)The Quick Reaction Special Projects Program (Program Element 0603826) QRSP supports three separate projects that provide rapid funding to expedite new development and transition of new technologies to the warfighter: Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and Defense Acquisition Challenge (DAC). The Quick Reaction Special Projects (QRSP) program was a new start beginning in FY 2003 and is used to initiate high-priority science and technology projects in the execution year. QRSP provides the flexibility to respond to emergent DoD issues and address technology surprises and needs within the year of execution outside the two-year budget cycle. The DAC and TTI are mandated by Congress and receive high congressional interest. These programs have been very successful in finding projects to solve real time problems.

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(U)The Quick Reaction Fund (QRF) program is focused on responding to emergent needs within the budget execution year cycle as well as taking advantage of technology breakthroughs in rapidly evolving technologies. Examples of the types of projects that are envisioned include: accelerating promising research that will enable transformation; or will fill critical gaps in DoD acquisition programs and will last no longer than 12 months; or maturation of technologies is critically needed by combatant commanders for operations. Typically these projects are on the technology maturity scale where an idea or technology opportunity is proved out and demonstrated. In FY 2003, 130 proposals were reviewed and six projects were funded, three of which are in use, or has been used in Iraq.

(U) The Defense Acquisition Challenge Program was authorized by Title 10, Section 216 of the Defense Authorization Act and provides increased opportunities to insert innovative and cost-saving technologies into formal acquisition programs of the Department of Defense. The program funds the test and evaluation of technologies and products that have the potential to improve performance, affordability, manufacturability, or operational capability of current acquisition programs. In FY 2003, the DAC selected twenty-two projects for funding from over 300 proposals submitted by industry and DoD program managers.

(U)The Technology Transition Initiative addresses the funding gaps that exist between the time a technology is demonstrated and the time it is procured for use in an intended weapons system. The Technology Transition Initiative was authorized under Title 10, Section 215 of the Defense Authorization Act to facilitate the rapid transition of new technologies from S&T into acquisition programs. The initiative's objectives are to accelerate the introduction of new technologies into operational capabilities for the armed forces. In FY 2003, TTI selected thirteen projects from the Services based on recommendations from the AT&L Technology Transition Council, made up of members from the Joint Requirements Oversight Council, and Acquisition Executives and Science and Technology Executives from each military department and each Defense Agency.

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**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	24.572	74.383	99.513
Current FY 2005 President's Budget	24.076	46.566	64.389
Total Adjustments	-.496	-27.817	-35.124
Congressional program reductions		-18.000	
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other	-.496	-9.817	-35.124

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Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: FEBRUARY 2004	
Appropriation/Budget Activity Defense Wide RDT&E (0400) Budget Activity 3				<b>R-1 ITEM NOMENCLATURE</b> PE 0603826D8Z Quick Reaction Special Projects <b>Project P826 Quick Reaction Fund (QRF)</b>				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total Program Element	24.076	46.566	64.389	89.927	90.408	92.111	94.143	
<b>Quick Reaction Fund Project P826</b>	<b>6.019</b>	<b>15.522</b>	<b>21.463</b>	<b>29.975</b>	<b>30.136</b>	<b>30.703</b>	<b>31.381</b>	
Defense Acquisition Challenge Program P827	12.038	17.793	21.463	29.976	30.136	30.704	31.381	
Transition Initiative P829	6.019	13.251	21.463	29.976	30.136	30.704	31.381	
<b>A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b>								
<p>The Quick Reaction Special Projects (QRSP) program supports three separate projects that provide rapid funding to expedite new development and transition of new technologies to the warfighter: Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and Defense Acquisition Challenge (DACP). The fiscal controls above represent an approximate investment of the Quick Reaction Funding.</p> <p>The Quick Reaction Fund (QRF) provides flexibility to respond to emergent warfighter needs within the budget cycle. It takes advantage of technology breakthroughs in rapidly evolving technologies with completion within a 6-12 month period.</p>								
<b>B. (U) Accomplishments/Planned Program</b>								
<b>(U) FY 2003 Accomplishments: Quick Reaction Fund</b>								
<p>FY 2003 was the first year for the Quick Reaction Fund. A limited data call was released on January 23, 2003 requesting proposals in response to emergent operational needs and to capitalize on emerging technologies. The call was limited due to the small dollar value</p>								

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in FY 2003. Candidate proposals were focused in the areas of technology required to reduce the unanticipated risk in acquisition programs, technology opportunities in rapidly evolving disciplines or technology maturation opportunities to support realtime operational needs. Each proposal addressed the description of the technology/concept,

description of any demonstration testing required, description of technical, funding, schedule and risk, proposed executing Service/Agency and User. The proposals were reviewed for technical and warfighter relevance review. Projects awarded with FY 2003 funding were the Thermobaric Hellfire munitions, and the Dragon Eye chemical and biological sensor UAV, both of which were successfully used in Iraq and Afghanistan. Other projects were the Guidance Integrated Fuze, the Low-Cost Guided Imaging Rocket and MANPADs Part 2. Below is more in-depth discussion of each of the projects.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Gryphon</b>	Army	1.5	0	0

The Gryphon is an unmanned aerial vehicle made from special materials which make it resistant to destruction. Details are at the secret level.

**FY 2003 Accomplishments:** The Gryphon project completed flight testing at Yuma on December 4, 2003. The project was successfully tested and met all objectives.

**FY 2004 Plans:** A briefing to the PD(USD)AT&L is scheduled for January 20, 2004. Future plans, including funding needs, will be discussed at that time. There are currently no plans from the QRF to fund this project in FY 2004.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Dragon Eye Sensor Integration</b>	Navy	.800	0	0

The Dragon Eye is a small unmanned aerial vehicle. QRF funding was used to expedite technology development, scale-up the technology and complete prototyping of integrating chemical and biological sensors into the existing Dragon Eye UAV.

FY 2003 Accomplishments: Four Dragon Eye UAV systems with the associated Ground Station and computers were used by Special Forces in Operation Iraqi Freedom. All prototyping including integration of the chemical-biological nose cones into twelve UAV systems was completed with field testing in July 2003. Live agents were used which fully tested the sensor/collection system. After action reports from the Marine Corps and other users validated the utility of this capability for providing reconnaissance for force protection and intelligence

FY 2004 Plans: There are currently no plans to fund this project from the QRF in FY 2004.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Guidance Integrated Fuze</b>	Navy	1.0	0	0

The Guidance Integrated Fuze (GIF) is a low cost fuze that replaces a NATO standard fuze on existing stockpiles and reduces the number of rounds need to defeat targets by a ratio of 20 to 1. The system is uses COTS based power, telemetry, sensor, flight processor, actuator and nose roll bearing systems.

FY 2003 Accomplishments: Completed initial fuze design. Completed 4 roll bearing test fuze gun firings. This verification testing was important to prove that the COTS based components could survive gun launch. Static wind tunnel testing was completed in September 2003.

FY 2004 Plans: Seven flight tests are planned. Based on the success of that test, a contract award is planned for the development of miniature M-code GPS receivers, which is funded outside the QRF work. The Army and Navy have both planed to procure these



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fuzes beginning in FY 2006. There are currently no plans to fund this project in FY 2004 from the FY 2004 QRF.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Low Cost Guided Imaging Rocket</b>	Navy	1.0	0	0

The Low Cost Guided Imaging Rocket (LOGIR) is a prototyping effort to provide a low cost guidance technology to existing weapon systems including the 2.75" rocket. The LOGIR integrates an image based accuracy enhancement kit onto the existing Hydra 70 rocket with a helicopter. The helicopter targeting systems locks onto the target and sends that information to the rocket. The helicopter does not have to point to the target or be exposed during weapon fly-out. This same concept will work for UAVs, and other weapons and platforms.

**FY 2003 Accomplishments:** The majority of the program was funded by the Navy. QRF was used to fund testing. Testing of round 1 demonstrated that the Hydra 70 could be controlled by adding a control actuator system and an auto flight computer and was completed successfully in November 2003. Round 2 testing is scheduled for early FY 2004 and will demonstrate the ability to acquire a target during terminal flight.

**FY 2004 Plans:** Flight testing is continuing of this project thought FY 2004 with one more flight test. Based on the success of the guided flight test, the Navy will make a decision on whether to include this procurement in POM 2006. There are currently no plans to fund this project from QRF in FY 2004.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>WMD Intelligence Processing - Rapid Targeting System</b>	DITRA	1.0	0	0

The WMD Intelligence Processing - Rapid Targeting System (RTS) is a web portal implementation of various intelligence information to allow theater-planning for the Combatant Commanders. Currently, Theater planners, component analysts and national agencies use multiple web portals, many stove-piped with limited interoperability, to monitor, exploit and interdict mobile missile launchers and associated deployments. Integrating multiple portals into a single system decreases analyst workload while

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improving WMD target analysis.

FY 2003 Accomplishments: Key participants from the Joint staff, Combatant Commanders, DTRA, DIA and DOE refined the requirements in December 2002 and designed the architecture in January 2003. The interface, con-ops and User Interface were developed by April 2003 with final Beta testing in May. The initial design was delivered in July 2003

FY 2004 Plans: There are currently no plans to fund this project from QRF funds in FY 2004.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Thermobaric Warhead Integration</b>	Army	.479	0	0

The thermobaric area clearing munition was developed under an ACTD. The munition consists of casing, sensors for detecting enemy presence, two-way communication and specially designed thermo baric material. The system neutralizes the enemy traffic inside cave complexes without harming the cave structure. Integration of this warhead with the hellfire was completed with QRF funding in FY 2003.

FY 2003 Accomplishments: Integration of the thermobaric warhead with the Hellfire missile was completed and the system was deployed for use in Iraq.

FY 2004 Plans: There are currently no plans to fund this project in FY 2004 from the QRF funds. The hellfire thermobaric system is undergoing a formal test program for deployment to the Army and Marine Corps.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>MANPADs Part 2</b>	Navy	.240	0	0

**(U) FY 2003 Accomplishments:** During the period of August to December 2003, completion of support to OSD AR&L on efforts resulting from the MANPADS study in preparation for the FY 2004 start of PLATO ACTD. This included a continued analysis and coordination of

MANPADS defense issues across the service program offices and S&T community which developed a coherent IRCM strategy. Work with transition sponsors was conducted for the Implementation Directive and Management Plan for the PLATO ACTD. This addressed planning for several efforts included in the ACTD; development and intergration of laser IRCM into a pod. Detailed planning for IR signature measurement and engagement modeling and common IRCM interface was development.

**FY 2004 Plans:** There are currently no plans to fund this project in FY 2004.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Quick Reaction Fund (QRF)</b>		0	15.522	21.463

(U) **FY 2003** Accomplishments listed above...

**(U) FY 2004 Plans: Quick Reaction Fund**

Beginning in FY 2004 the data call was expanded to the Combatant Commanders, Service Acquisition Executives and Defense Agencies with a request for top ten projects to be submitted. The evaluation and technical/warfighter relevance reviews will remain the same. While proposals will be accepted at any time during the year with a goal of reviewing them within 45 days, the first call for proposals was in late November for the 2004 candidates. Over 100 proposals were received and are under review by technical experts and the Joint staff. In addition, projects found critical enough during the FY 2003 evaluation process may be considered to be candidates for FY 2004 funding. DDR&E will be the final decision authority and notify the USD (AT&L) of each proposal selected.

**(U) FY 2005 Plans: Quick Reaction Fund**

The project will operate similar to FY 2004 with incorporation of any lessons learned. Many of the projects selected in the FY 2004 support force protection initiatives in response to countering the Improvised Explosive Devices threat in Iraq, which may not be required in FY 2005.

**(U) Other Program Funding Summary: N/A**

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)</b>							<b>DATE</b> <b>February 2004</b>		
<b>APPROPRIATION/BUDGET ACTIVITY</b> Defense Wide RDT&E (0400) Budget Activity Three					<b>R-1 ITEM NOMENCLATURE</b> Quick Reaction Special Projects/ <b>Defense Acquisition Challenge Program</b> <b>PE 0603826D8Z P827</b>				
<i>COST (In Millions)</i>	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	Cost to Complete	Total Cost
Total Program Element	24.076	46.566	64.389	89.927	90.408	92.111	94.143		
<b>(DACP P827)</b>	<b>12.038</b>	<b>15.522</b>	<b>21.463</b>	<b>29.976</b>	<b>30.136</b>	<b>30.704</b>	<b>31.381</b>	Continue	Continue

**A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:**

The Quick Reaction Special Projects Program (Program Element 0603826) has three sub-elements: Defense Acquisition Challenge Program (DACP), Technology Transition Initiative (TTI) and Quick Reaction Special Projects (QRSP).

Authorized by Title 10, Section 2395b, the Defense Acquisition Challenge Program (DACP) provides increased opportunities to insert innovative and cost-saving technologies into acquisition programs of the Department of Defense. DACP funds the test and evaluation of technologies and products that have the potential to improve performance, affordability, manufacturability, or operational capability of current acquisition programs at the component, subcomponent, or system level.

As a result of the Defense Acquisition Challenge Program's rapid establishment in mid-FY 2003, the Comparative Testing Office and its Foreign Comparative Testing (FCT) Program were selected by AT&L as the infrastructure to support the DACP pilot business model. Currently, U.S. Special Forces Command, U.S. Army, U.S. Marine Corp, and the Navy's Naval Sea Systems Command, Naval Air Systems Command, and Naval Space and Naval Warfare Systems Command are supporting DACP with the current FCT service infrastructure. The U.S. Air Force and the remainder of the U.S. Navy have not decided how to support DACP.

The DACP pilot business model leverages off the successful FCT personnel and business processes where possible except OSD DACP will issue a Broad Agency Announcement (BAA) annually inviting interested parties to submit summary proposals. As a result of DACP's

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rapid establishment in 2<sup>nd</sup> Quarter FY 2003, the FY 2003 BAA served as the only call for proposals in FY 2003 and FY 2004. The FY 2005 cycle will begin with a BAA in early CY 2004.

More than 300 summary proposals were submitted during Phase I by industry and government representatives in response to the March 2003 BAA. Approximately one third of the proposals were rejected during an administrative review for lack of proper documentation. The remaining proposals were prioritized for potential benefit to Program of Records (POR). Nearly 125 Program Managers were contacted during Phase II and asked to consider proposed technologies for use within their program. Program managers from all Services and USSOCOM submitted more than 80 final proposals, covering a broad range of technologies, to compete for FY 2003 and FY 2004 new start funding. Twenty proposals were selected for FY 2003 new start funding. An additional eight proposals were selected for FY 2004 new start funding.

The DACP process is a two-phased annual process. During Phase I, interested parties, within and outside the DoD, are invited through a BAA to submit summary proposals. Summary proposals are evaluated and prioritized based on merit and their potential to benefit a DoD POR. In Phase II, candidate summary proposals are matched to the PORs that have the potential to benefit from the proposed technology. POR Program managers, in collaboration with the weapon prime where applicable, evaluate and either "accept" or "reject" the proposed technology. A "reject" is defined as the POR has determined that the technology can not benefit the POR. An "accepts" is defined as the POR determines the technology has potential benefit and wishes to compete for funding. The POR then develops a final proposal to compete for DACP funding to test and evaluate the proposed technology. The final proposal contains a brief description of the issue and how the proposed technology resolves the issue, test and evaluation strategy, and procurement and transition strategy if the technology meets the PORs requirements. Final proposals are submitted into OSD DACP by the POR where the proposals are evaluated and prioritized, and selected for funding by the OSD DACP Program Manager.

The fiscal controls above represent an approximate investment of the Quick Reaction Special Projects Program funding for the Defense Acquisition Challenge Program effort.

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**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Portable Continuity of Operations Communication Appliance</b>	Army	0.549	0.765	0

This project will evaluate the capability of Web Assured Response Protocol (WARP) to provide disaster recovery and continuity of operations (COOP) solutions to the U.S. government. WARP, if successful, will provide a solution to enable users to continue to perform vital IP-based functions over damaged or overloaded networks. This capability is vital in Continuity of Operations environments. This is extremely critical during periods of emergencies, such as terrorist attack, severe weather, etc.

Vendor: Circadence Corporation, Boulder, CO  
 Program Office of Record: Army Chief Information Officer/DoD COOP Integrated Network (DCIN)

**FY 2003 Accomplishments:** Project approval. Initiate: management/measurement design; network configuration/automation; WARP configuration/automation.

**FY 2004 Plans:** Complete the above. Conduct training. Conduct testing and evaluation. Prepare/finalize final report.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Transcritical CO2 Environmental Control System</b>	Army	0.154	0.366	0.300

This project will evaluate CO<sub>2</sub> technologies (refrigerant, compressors, and condensers) for insertion into the Up-Armored HMMWV program as logistics improvements, and provide cooling and heating. If successful, CO<sub>2</sub> technologies will replace current environmentally-harmful synthetic refrigerants and systems with smaller size, weight and improved efficiency systems which are vital to the legacy fleet, the Future Tactical Truck System (FTTS), and the Future Combat System (FCS). This is extremely critical for the US Army to meet international environmental protocols, in order to allow it to operate worldwide in several different countries.

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Vendor: Modine Manufacturing, Harrodsburg, Kentucky  
 Program Office of Record: Army PM-Light Tactical Vehicles (LTV), PEO Combat Support & Combat Service Support (CS/CSS)

**FY 2003 Accomplishments:** Project approval. System integration.

**FY 2004 Plans:** Conduct/complete/report Phases I and II testing/evaluation.

**FY 2005 Plans:** Conduct/complete/report Phase III testing/evaluation. IPR decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Mini Combat Trauma Patient Simulation System</b>	Army	0.195	0.368	0

This project will evaluate a newly developed low cost, physiologically modeled Emergency Care Simulator (ECS™) that can provide a military medical simulation system for training, test and evaluation. The ECS in a Mini CTPS configuration will enhance portability, affordability and ease of deployment with active forces. It is hoped that training on this system will lead to more quick and realistic assessments of battlefield casualties, thus greatly increasing Soldier survivability.

Vendor: Medical Education Technologies, Inc. (METI), Sarasota, FL  
 Program Office of Record: Army PEO Simulation, Training and Instrumentation (PEO STRI)

**FY 2003 Accomplishments:** Project approval. Contract preparation and award.

**FY 2004 Plans:** Conduct/complete/report technical/operational testing/evaluation.

IPR decision. Production buys.

	Service	FY 2003	FY 2004	FY 2005
<b>Dismounted Infantry Virtual Simulation for Military Operations in Urban Terrain</b>	Army	0.478	0.651	0.150

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This project will evaluate a virtual training system that if successful will lay the foundation for rapid technology insertion into three major acquisition programs: (1) Integrated MOU Training System (I-MTS); (2) Virtual Emergency Response Training System (VERTS); and (3) Soldier Combined Arms Tactical Trainer (Soldier CATT). This dual use technology can be used to immerse a war fighter or emergency responder into a networked simulation, providing a training capability for homeland security, urban operations, and Weapons of Mass Destruction (WMD) detection. This capability is critical due to the ever increasing scarcity of real-life training resources, such as time, space (terrain), and funding.

Vendor: Advanced Integrated Systems, Reality By Design, Orlando, FL  
 Program Office of Record: Army PEO Simulation, Training and Instrumentation (PEO STRI)

**FY 2003 Accomplishments:** Project approval. Complete contract preparation and award.

**FY 2004 Plans:** MOUT site acquisition. System modifications/integration. Conduct and complete technical testing and limited user testing and evaluation.

**FY 2005 Plans:** Complete final evaluation reports. IPR decision to support production buys. Production buys.

	Service	FY 2003	FY 2004	FY 2005
<b>New Secure Version of Army Wireless Intercommunication System</b>	Army	0.820	0.863	0

This project will evaluate a secure wireless intercom system for close range communications capability for aviation operations. Current unencrypted communication systems can compromise security. This technology has the potential to decrease risk of mission compromise, increase mission effectiveness and soldier safety, and achieves ORD objectives by eliminating interception of communication between aircrews and ground stations. This technology is an excellent candidate for horizontal technology insertion with joint service application.

Vendor: Telephonics Corporation, Communication Systems Division, Farmingdale, NY  
 Program Office of Record: Army PEO Soldier/PM Air Warrior

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**FY 2003 Accomplishments:** Project approval.

**FY 2004 Plans:** Contract prep/award. Conduct software incorporation into communication devices and platform installation. Test and evaluation, reporting conducted and completed. Training/tech data packages delivered. Production decision/buys.

	Service	FY 2003	FY 2004	FY 2005
<b>Spray Cool™ Counter Targeting System (CTS)</b>	Army	1.447	0.105	0.208

This project will evaluate a new technology insertion to enable spiral development of the Counter Targeting System (CTS). CTS utilizes an infra-red (IR) sensor at high frame rates to detect sniper, mortar, RPG, and large caliber weapons fires. This system will assist in near real-time targeting and situational awareness for direct support of combat troops in operations such as Iraq and Afghanistan. If successful, the Spraycool technology will reduce CTS weight of 400+ pounds to less than 100 pounds. First test articles will be field tested in Iraq.

Vendor: Isothermal Systems Research (ISR), Inc., Clarkston, WA  
 Program Office of Record: Army Intelligence and Security Command

**FY 2003 Accomplishments:** Project approval.

**FY 2004 Plans:** Contract prep/award. System development/integration. Conduct/complete qualification testing/evaluation.

**FY 2005 Plans:** Tactical assessment. Safety release. Final evaluation report. Procurement Decision. Transition plan.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Enhanced Optical System - Rolling Airframe Missile (RAM)</b>	Navy	1.149	0.322	0

This project will evaluate an alternative optical system to an existing production design that will improve performance, manufacturability, and operational capability while providing several million dollars in cost savings.

Vendor(s): Exotic Materials, Murrieta, CA; Crystal Systems, Salem, MA; Precise Surface Finishing, Murrieta, CA; Dexter Magnetic Technologies, Fremont, CA; Janos Technology, Townshend, VT; Optical Coating Corporation, Natick, MA; Optimum Optical Systems, Inc, Camarillo, CA; Scarrott Metallurgical, Los Angeles, CA; Schmitt Measurements Systems, Inc., Portland, OR; Telic Optics, Inc., North Billerica, MA  
 Program Office of Record: PEO (IWS3) RAM/CIWS project office

**FY 2003 Accomplishments:** Subcontracts have been issued to the above vendors for design and fabrication work for a new optical system.

**FY 2004 Plans:** Deliveries of the new optical components will commence in mid FY 2004. The components will be forwarded to the RAM Prime contractor, for design evaluation, missile incorporation and eventual flight-testing in early FY 2005/2006.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Ship Hull Inspection and Harbor Security Autonomous Underwater Vehicle</b>	Navy	1.795	0.905	0

This project will evaluate a Ship Hull Inspection and Harbor Security Unmanned Underwater Vehicle (UUV) System, which inspects ship berthing, piers, and ship hulls for explosives or weapons of mass destruction. The system comprises a portable un-tethered UUV with unique inspection sensors and navigation capabilities and support hardware and software, which reduce manpower requirements and risks. If successful, UUVs will result in a 450% increased in search rate and reduce risk to both divers and shipboard platforms.

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Vendor: Lockheed Martin Perry Technologies, Riviera Beach, FL  
 Program Office of Record: PEO Littoral and Mine Warfare (PMS EOD)

**FY 2003 Accomplishments:** Held initial IPT project meeting. IPT attendees included representatives from Lockheed Martin (vendor), Office of Naval Research, Explosive Ordnance Disposal Technology Division, Space and Naval Warfare, System Center, EOD Mobile Unit Seven (fleet user) and PEO-LMW (PMS-EOD). Agenda items included drafting of contract, development of program exit criteria, operational environment definition and refined plan of action and milestones. Contract was refined and initial submission of contract to SSCSD contracts office.

**FY 2004 Plans:** Major program FY 2004 milestones included, but are not limited to: 1) Finalize DACP POA&M, 2) Draft and publish project plan, 3) Finalize and gain approval of IPT charter, 4) Hold quarterly IPT meetings, 4) Award contract with Lockheed Martin, 5) Conduct initial User Operational Evaluation with prototype system, 6) DACP UUV system delivery, and 7) Test IAW defined exit criteria.

	Service	FY 2003	FY 2004	FY 2005
<b>Low Cost Aerogel Insulation for Shipboard Fire and Thermal Protection</b>	Navy	0.308	1.265	0

This project will evaluate a flexible aerogel thermal insulating blanket for use on the DD(X). The proposed nano-porous material has the potential to provide a fire barrier protection layer with large weight and volume savings compared with compatible composite and steel structures. The Aerogel Insulation has the potential to provide a thermal barrier, reduced signature and blast mitigation.

Vendor: Aspen Aerogel, Marlborough Massachusetts  
 Program Office of Record: PM for Auxiliaries, Recoverability and Materials

**FY 2003 Accomplishments:** Program was initiated in late FY 2003, with program work focused on development of integration strategy for the DD(X) program, including development of FY 2004 test plans and schedules. Additionally, test requirements necessary for shipboard implementation were discussed and identified for the program test plan.

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**FY 2004 Plans:** Design the insulation material to meet the DDX program performance requirements; such as thermal, toxicity and fire protection; Initiate a tiered test and evaluation process of the Aerogel insulation material consisting of both laboratory & prototype testing, including full-scale fire tests.

	Service	FY 2003	FY 2004	FY 2005
<b>WDM Fiber Optic Global Position System Anti-Jam Antenna</b>	Navy	0.451	0.173	0.750

This project will evaluate Wave Division Multiplexing (WDM) technology with shipboard GPS Anti-Jam antenna assembly to determine if it can provide for transmission of multiple RF signals through a single optic fiber. If successful, this project will enable relocation of the GPS antenna electronics from high on the mast to below decks where it is protected and readily accessible for maintenance.

Vendor(s): Gould Fiber Optics, Millersville, MD; Optiwork, Fremont, CA; JDS Uniphase Corp., San Jose, CA; Tempo Research, Camarillo, CA; Fiber-Span LCC, Piscataway, NJ

Program Office of Record: SPAWAR PEO Command, Control, Communications, Computers, and Intelligence and Space (PMW/A-156)

**FY 2003 Accomplishments:** WDM GAS-1 assembly specification is being conducted to purchase COTS WDM hardware components. The phase one WDM test plan has been developed and is out for technical review. The WDM components list has been sent to the Reliability Assessment Center for a Quick-Look assessment on interoperability.

**FY 2004 Plans:** An Industry survey of integration vendors will be conducted. A production representative hardware module from each vendor containing the WDM and laser components will be produced and integrated into the GPS anti-jam antenna assembly. A reliability analysis of the production representative antenna assemblies will be conducted. The key performance parameters to be evaluated are GPS system jamming performance use WDM technology, environmental qualification for

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high risk area, and shipboard operational test to certify readiness for fleet implementation.

	Service	FY 2003	FY 2004	FY 2005
<b>Mortar Plating System using Vacuum Arc Vapor Deposition (VAVD) Technology</b>	Marine Corps	0.821	0.581	0.275

This project will evaluate this process for plating the interiors of worn 60mm and 81mm mortar tubes that are wearing faster than expected. Specifically this project examines the use of Vacuum Arc Vapor Deposition (VAVD) technology. If this process is successful, the USMC will be able to plate material in worn areas and economically restore the infantry mortar tubes to a serviceable condition, providing a more cost-effective method in restoring the mortars to combat ready status.

Vendor: Alpen Technology Group, Inc., Brownsboro, AL  
 Program Office of Record: USMC Warfighting Laboratory, Quantico, VA 22134

- FY 2003 Accomplishments:** Contract prep and award.
- FY 2004 Plans:** Perform test planning and receive test items (mortar tubes); Mortar tubes plated with *Vacuum Arc Vapor* deposition technology; Initiate technical and operational tests (destructive and non-destructive tests)
- FY 2005 Plans:** Complete technical and operational tests. Procurement Decision

	Service	FY 2003	FY 2004	FY 2005
<b>Miniature - Controlled Receive Pattern Antenna (MCRPA)</b>	Navy	0.410	1.392	0.384

This project will provide anti-jamming GPS capability to Navy platforms that have size and weight restrictions for antennas, such as the UH-1Y and AH-1Z helicopters and submarines.

Vendor: Titan Corporations, Greenbelt, Maryland  
 Program Office of Record: PEO C4I, PMW/PMA-169 Navy

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**FY 2003 Accomplishments:** Conducted initial assessment of MCRPA utilization in a submarine mast.

**FY 2004 Plans:** Finalization of the aperture, feed card and nulling card designs. Prototype fabrication, mechanical ruggedization and systems testing.

**FY 2005 Plans:** Pre-production fabrication and testing of antenna system.

	Service	FY 2003	FY 2004	FY 2005
<b>Enhanced Gunfire Detection System</b>	USSOCOM	0.513	0.805	

This project will evaluate system enhancements (i.e., addition of sensors and processors) which have the potential to significantly improve the accuracy of the Gunfire Detection System (GDS) and locate a sniper prior to the sniper's first shot. This improved technology will be brought about through the integration of selected sensors (e.g., hyperspectral imagers, unattended ground sensors, visible microsensors, infrared sensors, etc.) in the GDS and through the inclusion of automatic processing software.

Vendor(s): Multiple U.S. Vendors

Program Office of Record: US Army, Close Combat Systems Program Office

**FY 2003 Accomplishments:** Obtained project approval.

**FY 2004 Plans:** Award contract for system modification. Complete integration of sensors into the gunfire detection system. Initiate technical testing.

**FY 2005 Plans:** Complete technical testing. Conduct operational testing and user evaluation. Compile test results and prepare documentation in support of a milestone decision. Award contract for production buys.

	Service	FY 2003	FY 2004	FY 2005
<b>Embedded Integrated Broadcast Service (IBS) Receiver (EIR)</b>	USSOCOM	0.821	1.323	0

This project will evaluate the next generation IBS receiver which is smaller, lighter, and less costly than current equipment. EIR will provide timely receipt of intelligence data required by the tactical war fighter. The tactical war fighter, especially aircraft, relies heavily on near real-time intelligence information for threat avoidance, detection, targeting, blue force tracking and personnel recovery.

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Vendor: L-3 Communications, Telemetry-West, San Diego, CA  
 Program Office of Record: USSOCOM PEO, Intelligence and Information Systems  
 (IIS/SP)

**FY 2003 Accomplishments:** Obtained project approval. Drafted contract documentation for design modification.

**FY 2004 Plans:** Award contract for design modifications and production-representative systems. Conduct technical, operational, and interoperability testing.

**FY 2005 Plans:** Compile test results and prepare project close out documentation. Incorporate results into production configuration.

	Service	FY 2003	FY 2004	FY 2005
<b>Enhancements for Fly Away SATCOM (FASC)</b>	USSOCOM	0.436	0.937	0

This project will evaluate operational enhancements to SOF's Fly Away Satellite Communications (FASC) Terminals. This project, if successful, will provide critical operational enhancements to the FASC terminals enabling faster world wide deployments, higher transmit and receive high bandwidth/performance, ease-of-use, and Ka Band communication satellite integration.

Vendor:SWE-DISH Satellite Systems, Inc., Washington, DC  
 Program Office of Record: USSOCOM PEO, Intelligence and Information Systems/Special Projects (IIS/SP)

**FY 2003 Accomplishments:** Obtained project approval in late FY 2003.

**FY 2004 Plans:** Complete system modification and receive test hardware. Complete technical evaluation to determine area of coverage, quality of service, and data rates. Complete operational suitability and effectiveness testing. Compile test data and prepare documentation in support of a milestone decision.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Usage Based Small Arms MX: SOPMOD Host Weapons Shock Profile Database</b>	USSOCOM	0.368	0	0

This project will record shock profiles digitally for each weapon using an assortment of Special Forces munitions and accessories to establish a complete inventory of profiles. These profiles will then be replicated using an electro-magnetic exciter to reproduce the effects of firing those weapons when testing accessories (e.g. night vision scopes, thermal sights, etc.). This method of testing will eliminate the expenditure of ammunition and destruction of weapons, and save of thousands of man-hours during future testing.

Vendor: Bruel and Kjaer Testing Support, Norcross, Georgia.  
Program Office of Record:Special Operations Peculiar Modification (SOPMOD) Program Office, NWSC Crane

**FY 2003 Accomplishments:** Obtained project approval in late FY 2003.

**FY 2004 Plans:** Acquire ammunition, procure weapons for testing, and develop test fixtures. Conduct technical and operational testing to develop shock profile data. Compile results and prepare the database.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Second Generation Rail Interface System (RIS II) for M4 Carbines</b>	USSOCOM	0.153	0	0

This project will evaluate a ruggedized M4 Rifle interface with the current grenade launcher. The current interface can lose alignment during normal operations. This project will implement an improved design that is more rugged than the current interface and is easier for the field operator to maintain.

Vendor:Multiple U.S. Vendors  
Program Office of Record:Special Operations Peculiar Modification (SOPMOD) Program Office, NWSC Crane

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**FY 2003 Accomplishments:** Project approval in late FY 2003.

**FY 2004 Plans:** Award contract for prototype systems. Prepare developmental and operational test plans. Conduct testing and obtain safety certification. Compile test results and prepare documentation in support of a procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Integrated Schedule/Process for Global Hawk Spiral Development</b>	Air Force	0	0.319	0

To date neither industry nor Government program offices have developed an effective means of implementing existing integrated scheduling techniques into the spiral development process. This project seeks to provide the Global Hawk program with an integrated schedule to be used daily with schedule risk tools and at all reviews, to optimize program management and reduce future program risk. If successful, this project will provide defense organizations a more robust and disciplined process to use in scheduling spiral development (multiple spirals) programs.

Vendor: Dayton Aerospace, Inc., Dayton, OH  
 Program Office of Record: Global Hawk Program Office

**FY 2004 Plans:** Develop test plan, execute test, procurement decision.

	Service	FY 2003	FY 2004	FY 2005
<b>Integrated Defensive Countermeasures Alternative</b>	Air Force	0.677	0.345	0.360

This project will evaluate a fiber optic (FO) alternative to a towed decoy presently deployed to the warfighters. This proven technology has shown superior performance in the laboratory and requires engineering efforts to establish a qualified commodity for Air Force platforms integration and testing.

Vendor: Raytheon Space & Airborne Systems, Goleta, CA  
 Program Office of Record: Air Force Towed Decoy

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**FY 2003 Accomplishments:** Identified thermal hardening and wrap solution of the fiber optic towline to allow deployment envelope expansion testing on the F-15 through the engine plume. Resulting design changes being built into 12 decoy mass models for flight test in FY 2004. Also upgrading integrated multi-platform launcher controllers to accelerate future F-15 flight testing.

**FY 2004 Plans:** Complete flight test of 12 decoy mass models with refined thermally hardened FO towline and improved towline wrap while expanding deployment envelope and FO continuity duration. Analyze flight test results, identify needed fixes, and incorporate those fixes into FY 2005 flight test Mass Models (MM) for final flight envelope expansion. Build 2 electronic decoys with improved design changes for effectiveness testing in FY 2005.

	Service	FY 2003	FY 2004	FY 2005
<b>Speech Recognition Technology for AWACS</b>	Air Force	0.492	0	0

This project will evaluate a speech recognition technology that will allow the operator to control and configure the Primary AWACS Display, rapidly access necessary workstation functions and information, and will allow multiple manual functions to be performed all with voice command.

Vendor: Syntronics, Dayton, Ohio

Program Office of Record: E-3 Airborne Warning and Control System (AWACS)

**FY 2003 Accomplishments:** Contract award with Syntronics. Conduct initial planning and requirements definition. Conduct test and evaluation of speech recognition technology and develop prototype system for operational use in a 40/45 AWACS.

**FY 2004 NEW START PROJECTS:**

	Service	FY 2003	FY 2004	FY 2005
<b>Collapsible Stocks for Special Operations Machine Gun</b>	USSOCOM	0	0.100	0

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This project will evaluate an enhanced collapsible stock for the MK46 and MK48 machine guns. Incorporating a collapsible stock will make the weapons more effective for operations in an urban environment, Close Quarters Combat and in vehicles. One stock design will interface with both MK46 and MK48, thereby, reducing the logistics burden.

**FY 2004 Accomplishments:** Project approval. Award contract for design modifications and prototype systems. Conduct technical, operational and interoperability testing. Compile test results and prepare project close out documentation to support procurement decision.

	Service	FY 2003	FY 2004	FY2005
<b>Restore Effective Survival in Shock (RESUS)</b>	Air Force	0	1.380	1.500

This is a trial of bovine polymerized hemoglobin for the prehospital resuscitation of casualties in hemorrhagic shock. The item is a low volume and weight, room temperature stable substitute for blood transfusions. It is expected to significantly decrease combat casualty morbidity and mortality. Hemorrhage accounts for 60% of potentially salvageable combat casualties. Because 90% of these deaths occur prior to evacuation to a forward surgical theater, decreasing combat morbidity and mortality must focus on optimizing pre-evacuation resuscitation. Unlike older WWII and Vietnam resuscitation fluids, such as plasma, new products are effective as oxygen carriers and are highly likely to decrease hemorrhagic shock casualties, which remain at 30-100% depending on severity. The benefit of this program is that it will save lives of combat troops. Hemopure circulates directly in plasma when infused, increasing oxygen diffusion to the body's tissues and is compatible with all blood types, can be stored for 3 years without refrigeration, and is pathogen free.

Vendor: BIOPURE Corporation, Cambridge, Massachusetts  
Program Office of Record: 311 HSW, Human Systems Program Office, Brooks Air Force Base, Texas

**FY 2004 Plans:** RESUS is a two-stage phase IIb/pivotal clinical trial project to compare the relative efficacy and safety of Hemopure with standard care products. Complete institutional review boards approvals for test protocols. Secure FDA

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allowance for project investigational new drug. Complete phase IIb trial (Stage I of program) testing. Initiate pivotal trial testing (Phase II) program.

**FY 2005 Plans:** Complete pivotal trial testing (Phase II protocol).

**FY 2006 Plans:** Compile pivotal trial data to support FDA approval for prehospital resuscitation of hemorrhagic shock casualties.

	Service	FY 2003	FY 2004	FY2005
<b>X-Cor as a Replacement for Conventional Honeycomb</b>	Army	0	0.920	1.005

X-Cor is a lightweight, damage tolerant core material that replaces conventional honeycomb in aerospace structures. A 10% weight reduction over the baseline honeycomb on Comanche (RAH-66) is estimated. This is critical because weight reduction is quite significant to the Comanche program in two respects. First, it greatly increases helicopter performance, particularly in vertical lift/rise capability, which greatly increases aircraft survivability and capacity; and, second, this 10% reduction could amount to a 25% RDT&E cost avoidance over other weight reducing alternatives.

Vendor: Aztex, Inc, Waltham, MA

Program Office of Record: PM-Comanche

**FY 2004 Plans:** Project approval. Contract prep/award. Conduct coupon level and element level testing to support manufacturing scale-up.

**FY 2005 Plans:** Conduct core design and qualification testing to support manufacturing implementation and program insertion decision for Aircraft 7 flight test.

**FY 2006 Plans:** Final evaluation report. Continue flight testing. Conduct production review for insertion into the Comanche.

	Service	FY 2003	FY 2004	FY2005
<b>"On Aircraft" Laser Additive Repair of Titanium Components</b>	Air Force	0	0.827	1.710

This project will implement the process of Laser Additive (on Aircraft) repair of damaged titanium B-2 airframe surfaces. This technology will improve mission readiness,

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currently compromised by cracks which develop on the aft deck. The proposed technology insertion program will improve the maintenance of mission readiness which is currently compromised by cracks which develop on the Aft Deck. The program will be enabled by the integration of a laser head and titanium feeding mechanism with a portable, adaptive, multifunctional machine tool pod incorporating a conformal inert gas shielding shroud and the development of a comprehensive process to fill cracks with micro-welded titanium alloy to restore the stealth integrity of the damaged surfaces.

Vendor: Triton Systems, Inc., Chelmsford, MA  
 Program Office of Record: B-2 Systems Program Office

**FY 2004 Plans:** Initiate Laser Additive Repair (LAR) process validation and qualification testing.

**FY 2005 Plans:** Continue and complete validation and qualification testing to support Certification decision for use on B-2.

**FY 2006 Plans:** Develop technical data packages and close out report.

	Service	FY 2003	FY 2004	FY2005
<b>Automated EPLRS Planner</b>	Marine Corps	0	0.507	0

The Automated Enhanced Position Location Reporting System (EPLRS) Planner is a "technology insertion" into the Systems, Planning, Engineering, and Evaluation Device (SPEED) software application that assists and automates. The product fills a critical USMC need to automate planning for communications supporting the tactical data network at Regiment and below; including the more efficient use of reduced manpower to plan and manage an EPLRS network, and the potentially life saving ability to step through planning processes of a military operation.

Vendor: Northrop Grumman Information Technology, Winter Park, FL  
 Program Office of Record: PM Communications, Marine Corps Systems Command, 2200 Lester Street, Quantico, VA 22134

**FY 2004 Plans:** Perform Software Requirements Analysis and determine Software Design. Perform code and unit test of software. Execute integration testing and conduct Functional Qualification Testing to support procurement and field decision.

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	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY2005</b>
<b>Speed QoS Planner</b>	Marine Corps	0	0.406	0

The Systems, Planning, Engineering, and Evaluation Device (SPEED) Quality of Service (QoS) Planner is a "technology insertion" into the SPEED software application. The project proposes to enhance the capability of radio frequency (RF) path engineering tool to ensure quality performance for networks such as the Enhanced Position Location Reporting System (EPLRS) with applicability to the Joint Tactical Radio System (JTRS). A SPEED QoS will enable the communications planner to dynamically engineer and plan networks as needed to ensure that the flow and data priority are supportable.

Vendor: Northrop Grumman Information Technology, Winter Park, FL  
 Program Office of Record: PM Communications, Marine Corps Systems Command, 2200 Lester Street, Quantico, VA 22134

**FY 2004 Plans:** Perform Software Requirements Analysis. Determine software design and perform code and unit test of software. Execute testing to include Integration Testing, Functional Qualification Testing, and final Acceptance Test and Evaluation to support procurement and field decision.

	<b>Service</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY2005</b>
<b>Common Tactical Picture Ground Mobile and Air Based Command and Control Systems</b>	Marine Corps	0	1.761	0

The EFV(C) C4I suite integrates multiple coordinated Army Fire Zone and USMC blue and red force databases to provide a ground mobile Common Tactical Picture (CTP). The C4I suite is on the move capable, hardened for harsh environments, and can be readily integrated with satellite communications as with Sea Viking. EFV and Sea Viking will be conducting two limited technical assessments (LTAs) for wheeled vehicle use in preparation for OIF implementation in June/July 2004. With additional testing and further maturation of the spray cooling technology on which this system is based, the Ground Mobile CTP can be transitioned to airborne command elements.

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Vendor: Isothermal Systems Inc., Clarkston, WA  
 Program Office of Record: DRPM AAA, Worth Avenue Technology Annex, 14041 Worth Ave,  
 Woodbridge, VA 22192

**FY 2004 Plans:** Conduct System Development and Integration; Receive test articles (6 systems); Conduct qualification testing; Conduct Quarterly Integrated Product Team (IPT) Meetings; Conduct Wheeled Vehicle Demonstration (Sea Viking); Conduct Rotary Wing Demonstration (USMC AH1 or Army H60); Procurement Decision.

	Service	FY 2003	FY 2004	FY2005
<b>Friction Stir Processing for Virginia Class Submarines</b>	Navy	0	0.288	0.600

Friction Stir Processing (FSP) allows rapid repair of surface and subsurface casting defects, improves the surface layer mechanical properties, and may substitute for conventional welding. FSP will greatly improve current weld and weld repair techniques for naval propellers and has the potential to cut manufacturing and repair time from 12 months to 3 months.

Vendor: General Tool Company, Cincinnati, OH; MTS Corporation, Eden Prairie, MN 55344

Program Office of Record: PMS450 VIRGINIA Class Submarine Acquisition Office, Naval Sea Systems Command, 614 Sicard Street SE Stop 7022, Washington Navy Yard, DC 20376-7022

**FY 2004 Plans:** Design and procure friction stir machinery, compatible with the Naval Foundry and Propeller Center infrastructure, using the Friction Stir Processing technology as a cost and time effective alternative for metal repair and surface enhancement for US Navy Ni Al bronze (NAB) propulsors/propellers

**FY 2005 Plans:** Install and support startup operation of the friction stir machinery at the Naval Foundry and Propeller Center, Philadelphia, PA. Friction Stir Processing allows rapid repair of surface and subsurface casting defects, improves the surface layer mechanical properties, and may substitute for conventional welding.

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FSP will greatly improve current weld and weld repair techniques for naval propellers and has the potential to cut manufacturing and repair time from 12 months to 3 months.

**FY 2005 DACP Program Plans:**

For FY 2005, the DACP program will continue to fund testing activities on 11 projects executing \$8.739 million in FY 2005 funding. Services and USSOCOM will begin the FY 2005 DACP

Proposal selection process beginning in March 2004 with submission of their recommended proposals. The FY 2005 DACP New Start selections will be made by the Deputy Assistant Secretary of Defense (Advanced Systems & Concepts) (DUSD(AS&C)) in September 2004.

C. (U) **OTHER PROGRAM FUNDING** NA



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)							DATE February 2004		
APPROPRIATION/BUDGET ACTIVITY Defense Wide RDT&E (0400) Budget Activity Three					R-1 ITEM NOMENCLATURE Quick Reaction Special Projects/ <b>Technology Transition Initiative (TTI) Program</b> <b>PE 0603826D8Z P829</b>				
COST (In Millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	Cost to Complete	Total Cost
Total Program Element	24.076	46.566	64.389	89.927	90.408	92.111	94.143		
<b>TTI P829</b>	<b>6.019</b>	<b>13.251</b>	<b>21.463</b>	<b>29.976</b>	<b>30.136</b>	<b>30.704</b>	<b>31.381</b>	<b>Continue</b>	<b>Continue</b>

**A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:**

The Quick Reaction Special Projects Program (Program Element 0603826D8Z) has three sub-elements: the Defense Challenge Program, the Technology Transition Initiative and Quick Reaction Special Projects (QRSP). The fiscal controls above represent an approximate investment of the Quick Reaction Special Projects Program funding for the Technology Transition Initiative (TTI) Program.

Authorized by Title 10, Section 215 of the FY 2003 Defense Authorization Act, the Technology Transition Initiative (TTI) Program addresses the funding gaps that exist between the time a mature technology is demonstrated and the time it can be procured for use in an intended weapons system or operational capability for the warfighter. The TTI Program facilitates the rapid transition of mature technologies from the S&T base into procurement or acquisition programs. The initiative's objectives are to accelerate the introduction of new technologies into operational capabilities for the armed forces and to successfully demonstrate new technologies in relevant environments.

Technology Transition projects are selected by the Technology Manager in consultation with representatives of the Technology Transition Council (TTC). (The TTC is comprised of the Acquisition and S&T executives from each service and Defense Agency and representatives from the JROC.) The call for Technology Transition Proposals goes to the DoD Services and Agencies through the Technology Transition Working Group (TTWG) members, designated by the TTC. The TTWG gather the proposals from the service/agency S&T base and then prioritize them based on Joint, Service or Agency capabilities needed and submit

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them to the Technology Manager. The Technology Manager's senior staff merges the lists and evaluates the Service/Agency recommendations and prepare a recommended list to the Technology Manager for funding. The Transition Manager in coordination with the TTC select the highest priority proposals for funding.

**(U) PROGRAM ACCOMPLISHMENTS AND PLANS:**

**FY 2003 New Start Projects**

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Missile Health Monitoring</b>	Army	1.417	1.595	0

The Army has no capability to remotely monitor and assess the long-term storage health of its missile systems. Missiles not fired during recent deployments cannot be retrograded and returned to storage without inspection and in some cases re-certification because of unknown serviceability and potential safety issues. This has resulted in a number of critical missile assets being condition coded for demilitarization, repair, and/or training-use-only from Operation Iraqi Freedom, Desert Storm and other recent deployments. Additionally, extensive operating and support costs have been expended in attempts to determine the condition of retrograded missiles. Devices are needed throughout the military to monitor the missile stockpile in long term storage in order to ensure only serviceable assets are deployed for combat use. This program will transition prototype health monitoring technology to the Army Patriot Advanced Capability-3 and Theater Area Air Defense System missiles.

**FY 2003 Accomplishments:** A program was initiated to transition missile health monitoring technology developed under the Remote Readiness Asset Prognostics/Diagnostics System (RRAPDS) Science and Technology Objective program. This effort is focused on application and transition of missile health monitoring technology to the PATRIOT Advanced Capability - 3 (PAC-3) missile system. This PAC-3 effort will be the first spin-off of RRAPDS technology to address issues of missile degradation noted for PAC-3 in Operation Iraqi Freedom, as well as other serious missile degradation concerns noted for other Army systems in recent deployments. In FY 2003, a final design study for PAC-3 missile monitoring was completed, a requirements specification was generated, and preliminary design efforts were begun.

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**FY 2004 Plans:** Final design efforts will result in a complete prototype system to be built in FY 2004 with full functionality to monitor the health of the PAC-3 four-pack canister and missiles. Testing of these prototypes will be initiated in FY 2004, as well as the installation and preliminary demonstration of prototype devices in fielded PAC-3 assets. Efforts will also begin in FY 2004 to modify the PAC-3 design for application to the Theater Area Air Defense (THAAD) missile.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Terminal Attack Control (TAC) Earplugs</b>	Air Force	0.680	0	0

The TAC Earplug system is a custom-molded device integrated with tactical radios and an external microphone. The TAC Earplug TTI project will: (1) convert the analog TAC Earplug System to digital one-box design; (2) Convert compression technology to digital circuitry; (3) Increase connectability with USB/computer access; (4) Reduce the weight with Injection Molded design; (5) Convert the power source from 9-volt to AA; and (6) Harden internal circuitry for operational use. It provides blast protection while increasing communications in high noise environments, and allows for enhanced natural hearing in quiet, clandestine environs. The potential exists for additional procurement by all Services.

**FY 2003 Accomplishments:** Contract award and delivery of 200 units to field operators; field test evaluation with operator feedback on design and functionality; field test evaluation revealed four major areas of improved capability needs: modularize the box to fit with field armor equipment; improve power (i.e., battery life too short); make earpieces independent of the processing box; and create interface connector for Armored Personnel Carrier (APC). Overall field evaluation feedback, "system fulfills 85% of communication needs. . .this is a product that will make a difference". Transition plan - AFSOC preparing to purchase additional units (approx. 200) for their personnel. Army and Navy are interested/waiting to see results of the digital modifications and operational testing.

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	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Battlespace Terrain Reasoning Awareness (BTRA)</b>	Army/NIMA	1.020	0.990	0

Battlespace Terrain Reasoning Awareness (BTRA) is a software product constructed on the stability of a premier Commercial-Off-the-Shelf (COTS) Geographic Information System. BTRA tactical decision aids (TDAs) integrate terrain and weather (current and forecasted) data and provide actionable, integratable, predictive information regarding their effects on platforms, sensors, systems, small units, large forces and their associated tactics and behaviors. BTRA provides specific analysis tools addressing positions of advantage, mobility and maneuver and effects on sensors (imaging, seismic and acoustic). BTRA also provides predictive terrain and weather decision tools addressing maneuver, situation and threat analysis and Intelligence, Surveillance and Recognizance (ISR) management within Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) processes. BTRA capability addresses several joint systems requirements for terrain and weather tactical decision aids (TDAs) from Army (Digital Topographic Support System (DTSS) and All-Source Analysis System-Light (ASAS-L)), Air Force (Time Critical Targeting Facility (TCTF) of their Theater Battle Management Core System (TBMCS) C4ISR), and DISA/NIMA's Commercial Joint Mapping Toolkit (CJMTK) Software Requirement.

**FY 2003 Accomplishments:** (1) BTRA technology has been officially identified by NIMA as a capability for inclusion in the 2 FY 2004 releases (V2.0 and 3.0) of Commercial Joint Mapping Toolkit (CJMTK). *Note: CJMTK is the enterprise terrain and weather application for Joint C4ISR.* 2) Initiated design of embedded applications, information services and database constructs consistent with CJMTK requirements. 3) Transitioned technology to USAF Time Critical Target Facility (TCTF). Two prototypes fielded with 32AOG Ramstein AFB and HQ 12thAF at Davis Monthan AFB. 4) Provided test support to TCTF developmental and operational testing. 5) BTRA was used in Iraq through engineering soldiers using DTSS version 8.0.

**FY 2004 Plans:** (1) Two transition(s) of BTRA to CJMTK; (2) CJMTK transition is the basis for transition and system specific transitions to the Army Digital Topographic Support System (DTSS) and Digital Common Ground Station - Army (DCGS-A); USAF's Theater Battle Management Core Systems (TBMCS and the USMC's Topographic Production Capability (TPC).

Specific mission and system tailoring for DTSS, DCGS-A, TBMCS, TCTF and TPB.

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	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Unmanned Vehicle Spiral Upgrade (IROS3 Spartan)</b>	Navy	0.623	0.605	0

IROS3 is a network centric overarching Anti-Terrorism/Force Protection (AT/FP) system which integrates sensor information while combining semi-automated engagement capability to provide shipboard protection, pierside, at anchorage and transiting restricted waterways.

Spartan is a modular, reconfigurable, multi-mission, high-speed, semi-autonomous unmanned sensor and weapon system against asymmetric threats.

This project will conduct a spiral upgrade of the IROS3 system to accommodate the integration of an unmanned vehicle. Concept will be proven using the Spartan USV ISR/FP module as a sensor inputs to IROS3.

**FY 2003 Accomplishments:** Long lead items have been procured, research and design approach for open system-to-system communication completed, operational and design requirements have been evaluated, and action plan, test schedule and statements of work have also been completed.

**FY 2004 Plans:** Complete interface development and system integration to perform a full-scale demonstration of SPARTAN sensor control via the shipboard IROS3 systems console. Demonstration will be\*- used to develop concept of operations for SPARTAN to be used with IROS3 to perform future AT/FP shipboard mission.

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Lightweight Steel Track</b>	Marine Corps	0.170	0.193	0

The U.S. Marine Corps is seeking a lightweight steel track for the Advanced Amphibious Assault Vehicle (AAAV). The German track manufactured by Diehl has a candidate ultra-light steel prototype track, which has the potential to meet or exceed AAAV's track performance criteria. This track weighs approximately 40% less than typical steel track (at comparable cost) and is expected to have a minimum life of 3,000 miles. This ultra light steel track is significantly more robust than the current aluminum now being used on AAAV, is less expensive, and weighs the same. The goal of this TTI project is to

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procure and test the Diehl Ultra-light Steel Track on an AAV with the intent to purchase additional track sets if performance meets expectations. Test will demonstrate and validate the track integrity and robustness suitable for a harsh Marine field environment.

**FY 2003 Accomplishments:** Procure and install German track into prototype AAV test vehicle. Conduct initial track testing.

**FY 2004 Plans:** Complete track testing, conduct data analysis and complete final report.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Low-Cost Flame Resistant Coveralls</b>	Army	0.227	0.341	0

There is a critical need to address the high cost of flame resistant material used to protect our warfighters. Currently aviators and tankers wear protective clothing made from woven Nomex and Kevlar fiber. However, these fabrics are too expensive to issue to every infantry soldier. A study was undertaken to evaluate and develop new materials that provide a 30%-50% cost savings over existing flame resistant materials as well as camouflage protection, comfort and durability. This new fabric is a lightweight, open, air-permeable construction, spun-laced and non-woven fabric that is enhanced to military specifications. It is estimated to save more than 40% in costs from the current materials, potentially increasing the number of warfighters protected by 40%.

**FY 2003 Accomplishments:** Material development including functional finishes; test and evaluation and fabric manufacturing; Garment enhancements to include design, sizing and garment manufacturing

**FY 2004 Plans:** Conduct wear trials; questionnaire development, wear trial support, data analysis and report preparation.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Joint Theater Logistics</b>	DARPA/DISA	0.408	0	0

There are twenty-eight (28) applications that comprise the Joint Theater Logistics (JTL) Advanced Concept Technology Demonstration (ACTD). The Military Utility Assessment was

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inconclusive for the entire package but there are two applications that could be transitioned with minimal modification that could satisfy immediate requirements for the Global Combat Support System (GCSS) user community. The two JTL applications ready for immediate transition are: Watchboard and Forces Library.

Watchboard is designed to convey summary status information to the commander and his staff in an easy to comprehend manner to quickly identify the areas that require attention. Each commander and each situation will require variations of the items that should be tracked in this status visibility tool, therefore, the local user will be able to tailor his/her display to the organizations and the subordinate units and/or scheduled queries executed from available data sources. This tool will save many hours of staff work preparing reports for the commander and will provide more accurate and timely information.

Forces Library allows the user to define the organizational relationships of a task force. Current Forces Database (CFDB) contains the administrative hierarchy of units. JOPES contains information about the organizational hierarchy of units designated for an Operations Plan. An authorized individual within the J3/Assistant Chief of Staff for Operations and J4/Assistant Chief of Staff for Logistics will be able to define and refine over time the task force unit relationships. This data will be used in many GCSS applications, such as tracking deployments and redeployments, asset queries associated with a task force.

**FY 2003 Accomplishments:** Complete transition of the Watchboard and Forces Library applications into the Global Combat Support System (GCSS).

	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Overwatch</b>	Army	0.510	0.495	0

Overwatch helps the warfighter detect, locate, and classify hostile firings. It also conducts area surveillance in real time to assess, neutralize, and mitigate the enemy by providing counterfire targeting data. Overwatch is focused on developing and testing an on the move tactical Overwatch Weapon Recognition Equipment tactical, which is mountable on ground vehicles.

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**FY 2003 Accomplishments:** Components and initiated of Field of View Trades to increase area of regard

**FY 2004 Plans:** Complete the build and testing of the STARE; deliver to PACOM/ONR Gunslinger Project.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Special Operations Forces (SOF) Demolition Kit</b>	SOCOM	0.227	0.385	0

The Special Operations Forces (SOF) Demolition Kit provide the front-line warfighter with a replacement kit for the Army's 1950 vintage demolition kit. The kit contains Explosively Formed Penetrator (EFP) warheads, linear cavity charges, conical cavity charges, and a variety of attachment devices. The charges provide the user the ability to attack targets at close range or at standoff distances up to 100 meters against a variety of targets, including rolled homogeneous armor and reinforced concrete columns.

**FY 2003 Accomplishments:** Accelerate existing development effort being managed by the Army, Office of the Project Manager for Close Combat Systems, Picatinny, NJ to add pre-loaded EFPs for increased demolition capabilities.

**FY 2004 Plans:** Develop and demonstrate other demolition kit enhancements. Options under evaluation to be applied real-time based on evolving SOF priorities that satisfy a capabilities-based operational requirement, include: (1) Rapid Wall Breaching Blanket; (2) Mechanical Breaching System; (3) Rapid Re-bar cutting device; and (4) Prefabricated Explosive Carriers for Tactical Explosive Entry.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Special Operations Forces (SOF) Alternative Power Sources</b>	USSOCOM	0*	1.562	0

This effort transitions advanced alternative power sources (e.g., cell, solar panels, and mini diesel engines) to various DoD Science and Technology efforts products that an SOF Team can field test to reduce the weight of the SOF operator rucksack. This project will

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evaluate six (6) different alternative power sources: (1) Ball Direct Methanol Fuel Cell (DMFC); (2) MTI Fuel Cell - SISA; (3) MTI Fuel Cell - PDA; (4) Jadoo SuRE II Fuel Cell; (5) AET Generator; and (6) Uni-Solar Uni-Pac.

(NOTE: The Commercial Operations and Support Savings Initiative (COSSI) Program (Program Element 0604804D8Z) supported the FY 2003 purchase (\$100K) and demonstrate the Jadoo SuRE II Fuel Cells and the 20-watt Ball Direct Methanol Fuel Cell (DMFC).)

**FY 2004 Plans:** Purchase and demonstrate the MTI Fuel Cell - SISA; MTI Fuel Cell - PDA; AET Generator and Uni-Solar Uni-Pac alternative power sources.

	Service/Agency	FY 2003	FY 2004	FY 2005
<b>Titanium Nitride (TiN) Coating for T-58 Engine Compressor Blades</b>	Marine Corps	0.482	0.468	0

The U.S. Marine Corps H-46 helicopter is experiencing a high rate of premature engine removals while operating in Afghanistan and Iraq. Substantial engine performance loss results from compressor airfoil erosion due to particle ingestion during routine operation in desert environments. TiN coating for the T-58 engine will double compressor life in a sand environment and is projected to save about \$56 million in Life Cycle Costs through FY 2012 and will increase compressor life in a sand environment by a minimum factor of two. The airfoils will be installed in nearly 300 new T-58-16A ERIP compressor cores procured for USMC CH-46 helicopters beginning in FY 2005 through FY 2007.

**FY 2003 Accomplishments:** Proof of concept coating completed; initial Fatigue Testing completed; laboratory Erosion Testing completed; first set of manufacturing tooling designed and fabricated; and initial coating airfoil distortion evaluation completed

**FY 2004 Plans:** Complete fatigue testing of coated airfoils; fully coat (2) sets of T58 compressor airfoils; build a Lead the Fleet engine with coated airfoils to be evaluated in South West Asia; build (2) sand ingestion test engines, one coated - one uncoated, for final qualification of coating; complete the design change and approve the ECP; perform all coating vendor substantiation engineering; and modify the ERIP contract to include coated airfoils in module production

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	<b>Service/Agency</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Water Purification System/ Water Pen</b>	DARPA	0.255	0.413	0

For tactical situations in which deployed troops do not have quick and easy access to potable water, the water purification pen will allow soldiers to treat up to 300 liters of any available, non-brackish water source, eliminating the risk of their exposure to diseases and bio-chemical pollutants.

Mixed oxidants electrochemically generated from common table salt via several small lithium camera batteries kill a wider range of resistant microorganisms (e.g., Cryptosporidium, Giardia, and E.Coli) present in contaminated, non-brackish water than more traditional means of disinfection (e.g., chlorine and iodine).

**FY 2003 Accomplishments:** Through a GSA Schedule contract, procured 2,494 water purification pens and distributed them throughout the Services and U.S. Special Operations Command (SOCOM).

**FY 2004 Plans:** Through the same GSA Schedule contract, procure 4,157 additional water purification pens and distribute them throughout the Services and U.S. Special Operations Command. After all water purification pens (total 6,650) are procured and distributed, each Service (Army, Air Force, Navy and Marine Corps) and U.S. SOCOM will receive 1,200 pens each with remaining pens distributed to stock testing units who will evaluate item.

**FY 2004 New Start Projects:**

The selection process for the FY 2004 TTI Projects is in the final stages with recommendations being made to the Technology Manager and the Technology Transition Council (TTC) for consideration. The FY 2004 budget plans for \$13.251 million. Prior FY 2003 continuing TTI project funding requirements will leave \$6.068 million for FY 2004 TTI New Start Projects. Projections indicate we may have 4-6 FY 2004 new start projects serving the DOD community with project leads in the Air Force, Army, Navy, MDA, SOCOM, DISA and NGA.

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<b>Fiscal Year (FY) 2005 Budget Estimates</b>							<b>DATE</b>	
<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>							February 2004	
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense Wide/BA 3						<b>R-1 ITEM NOMENCLATURE</b> Software Engineering Institute (SEI) <b>PE 0603781D8Z</b>		

COST(In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
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Total Program Element (PE) Cost	21.535	22.324	21.599	23.296	23.286	23.524	24.052	
Project 781/SEI	19.166	19.868	19.223	20.733	20.724	20.936	21.406	
Project 782/ Software Intensive Systems	2.369	2.456	2.376	2.563	2.562	2.588	2.646	

**(U) A. Mission Description and Budget Item Justification**

U) Software is key to meeting DoD's increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems. This project funds the technology transition activities of the Software Engineering Institute (SEI) at Carnegie Mellon University. The SEI is an R&D Laboratory Federally Funded Research and Development Center (FFRDC) sponsored by the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics. It was established in 1984 as an integral part of the DoD's software initiative to identify, evaluate, and transition high-leverage software engineering technologies and practices. The SEI fosters disciplined software engineering practices by DoD acquisition and life-cycle support programs and by the industrial base where the bulk of defense software is produced. The Institute works across government,

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industry, and academia to: (1) improve current software engineering activities from acquisition, technical, and management perspectives; (2) facilitate rapid, value-added transition of software engineering technology into practice; and (3) evaluate and calibrate emerging software engineering technologies to determine their potential for improving the evolution of software-intensive DoD systems.

(U) The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution. The SEI focuses on software technology areas judged to be of the highest payoff in meeting defense needs. FY 2003 focus areas are: Acquisition Practices for DoD Software-Intensive Systems (including pilot demonstrations of new technologies, dissemination of lessons learned, and provision of selected important services to the DoD acquisition community); Software Engineering Technical Practices (including Survivable Systems practices, Software Architecture technology, and Integration of Software-Intensive Systems); and Software Engineering Management Practices [including personal and team software development processes and Capability Maturity Model Integration (CMMI)].

(U) This funding line also includes support of the Software Intensive Systems Office (SISO), a DoD office under the Office of the Secretary of Defense (Acquisition, Technology, and Logistics) Acquisition Resource and Analysis. This DoD function is not affiliated with the Software Engineering Institute.

(U) Current initiatives include: Stress Software Process and Past Performance; Establish Independent Expert Program Reviews (IEPRs); Improve Software Education and Training; Document and Promulgate Best Practices; and Strengthen the Technology Base.

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**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	22.189	22.652	22.627
Current FY 2005 President's Budget	21.535	22.324	21.599
Total Adjustments	.654	.328	1.028
Congressional Program reduction			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other	.654	.328	1.028

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, DW/ BA 3				Project Name and Number 781/Software Engineering Institute (SEI) PE 0603781D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE	21.535	22.324	21.599	23.296	23.286	23.524	24.052	
Software Engineering Institute P781	19.166	19.868	19.223	20.733	20.724	20.936	21.406	
<b>A. Mission Description and Budget Item Justification: P781</b>								
(U) Software is key to meeting DoD's increasing demand for high-quality, affordable, and timely national defense systems. There is a critical need to rapidly transition state-of-the-art technology and best practices to improve the acquisition, engineering, fielding, and evolution of software-intensive DoD systems.								
(U) The SEI enables the exploitation of emerging software technology by bringing engineering discipline to software acquisition, development, and evolution.								
<b>B. Accomplishments/Planned Program</b>								
Acquisition Practices for DoD Software	FY 2003	FY 2004	FY 2005					
Accomplishment/ Effort/Subtotal Cost	.750	2.091	2.050					
<b>(U) Acquisition Practices for DoD Software-Intensive Systems</b>								
<b>FY 2003 Accomplishments:</b>								
- Conducted Acquisition Support Program, initiating pilot demonstrations of adopting new technology within the DoD program-office environment, coordinating and broadly disseminating lessons learned from these pilots, and providing selected and strategically important software engineering services to the DoD acquisition community.								
- Conducted more than 30 training courses in information security for technical staff, managers, and executives from the DoD, federal agencies, and industry. Course attendance at the SEI's security-related courses more than doubled, from 400 in FY 2002 to 950 in FY 2003.								

- Enhanced support to those responsible for acquiring software in the Army, Navy, and Air Force, actively working with each service to establish a Strategic Impact Program (SIP) for software-intensive systems.
- Provided systems engineering and software engineering support to DoD programs identified as top priorities by the principal SEI sponsor, the Office of the Secretary of Defense (Acquisition, Technology, & Logistics), and increased interaction and support to DoD agencies and joint programs.
- Conducted a research-and-development project that examined system-of-systems interoperability, studying the full range of barriers to achieving interoperability among systems, including programmatic, constructive, and technical problems, and proposed solutions to those problems.
- Explored simulation and gaming techniques as a low-cost approach for DoD acquisition managers to experience the typical risks of program management.
- Developed and administered a survey to 150 Army acquisition program managers to help the U.S. Army Strategic Software Improvement Program (ASSIP) evaluate its acquisition environment.

**FY 2004 Plans:**

- Work with key acquisition programs to continually understand and meet the needs of the acquisition community.
- Build delivery teams to support the needs of Army, Air Force, Navy, and civil agency acquisition programs.
- Develop and pilot a Software Acquisition Survival Skills course and Mission Rehearsal workshop.
- Conduct a conference on the acquisition of software-intensive systems for government acquisition organization employees, their support agencies (i.e., support contractors, FFRDCs), and federal government contractors.

**FY 2005-2006 Plans:**

The SEI Acquisition Support Program (ASP) helps the DoD and other government acquirers make evolutionary and revolutionary improvements in the acquisition of software-intensive systems. The DoD has provided to the SEI an approved set of challenge problems that form the foundation of the SEI's program of work. In addition, SEI-managed independent research and development (IR&D) activities are focused on the DoD-approved challenge problems in the following areas: security and survivability; interoperability; software technology research and development; acquisition management; software metrics for acquisition management; sustainment; and commercial off-the-shelf (COTS) products.

Specific activities will also include:

- Conducting pilot projects that give acquisition organizations access to SEI technologies and expertise while giving the SEI an opportunity to observe these technologies in real-world

acquisition environments. These engagements will contribute to a growing body of knowledge about best practices in the acquisition of software-intensive systems.

- Developing and refining architecture guidelines for DoD acquisition organizations.
- Analyzing results of independent technical assessment to characterize the state of practice in acquisition programs and their industry partners.

Software Engineering Technical Practices	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	10.666	13.024	12.910	

#### **U) Software Engineering Technical Practices**

##### **FY 2003 Accomplishments:**

- Created documentation and support materials for COTS Usage Risk Evaluation (CURE) method, enabling the method to be administered by organizations without direct support from the SEI.
- Worked on a standard for the Avionics Architecture Description Language (AADL) under the auspices of the Society of Automotive Engineers (SAE) Avionics System Division (ASD) and with funding from the U.S. Army Aviation and Missile Command (AMCOM). The standard is based on more than 10 years of DoD-funded research and should be applicable in domains ranging from avionics to robotics and automotive systems.
- Published the second edition of *Software Architecture in Practice*, written by SEI staff members to help practicing architects.
- Introduced a software architecture curriculum, made up of six courses and three certificate programs, that helps equip software professionals with state-of-the-art practices for designing, documenting, evaluating, and implementing software architectures.
- Through a Predictable Assembly of Certifiable Components initiative, provided technical leadership by helping to solve DoD-approved challenge problems such as the needs to
  - "develop improved, enhanced or new processes, principles, methods, and tools for determining expected properties of software systems before they are built and for confirming their as-built properties";
  - explicitly address the system properties of security, survivability, availability, interoperability
  - find a way to more effectively obtain benefits from commercial off-the-shelf (COTS) components.
- Hosted sixth DoD Software Product Line Workshop.
- Released OCTAVE-S, a variation of the Operationally Critical Threat, Asset, and Vulnerability Evaluation (OCTAVE) method that meets the needs of small organizations. Like the original OCTAVE



method, OCTAVE-S is a risk-based information security assessment that an organization can perform using a team of its own personnel.

- Developed a set of new software tools for analyzing large-scale, fluid datasets nearly in real time. The operational use of these tools has resulted in a major advance in the survivability of critical networks.

**FY 2004 Plans:**

- Work with U.S. Army to train Army personnel in SEI software architecture courses, principles, and methods.
- Develop and widely distribute books, support aids, case studies, and guidelines that assisted developers and acquirers in using effective software architectural practices.
- Develop technologies in support of survivable systems engineering; established techniques for modeling and predicting survivability attributes of systems; and matured technology necessary for active network defense.
- Analyze malicious code to determine defenses against it and to identify trends that enable the DoD, federal agencies, and the private sector to anticipate the future evolution of threats from attack technology.
- Research and develop advanced technical analytical techniques for strategic situational awareness; researched technical threat areas, identified indicators for those threats, and evaluated their contextual relevance.
- Provide integrated, easily accessible knowledge repositories of software product line technology and experience.
- Develop software product line courses and certificate programs.
- Define key practices for constructive and programmatic interoperability, and developed and piloted tools and technologies to support the key practices.
- Provide case study analyses of actual systems that have experienced performance, dependability, and interoperability problems to show the utility of proposed specification, modeling, and analysis techniques.
- Provide a handbook of techniques for developing credible predictions of operational properties of software-intensive systems.

**FY 2005 Plans:**

- Survivable Systems: Ensure that appropriate technology and systems management practices are being used to design and implement networked systems so they recognize, resist, and recover quickly from attacks.
- Product Line Practice: Enable the Department of Defense (DoD) to reduce the cost and schedule for

producing similar systems by employing software product line techniques used effectively by commercial industry. •

- Software Architecture Technology: Improve DoD system cost, schedule, and quality by making engineering tradeoffs at the software architecture design level. Provide effective practices for the analysis, documentation, definition, and reconstruction of software architectures. •

- Predictable Assembly from Certifiable Components: Provide support for predicting properties of assemblies of components. Ensure that the builders of systems have the ability to select software components on the basis of their predicted runtime behavior within specific assemblies and therefore to predict the runtime behavior of these assemblies or systems.

- Integration of Software-Intensive Systems: Provide the acquisition community with principles, methods, and techniques to accomplish broad-based and sustainable integration and interoperation across components, systems, and systems-of-systems.

- Performance-Critical Systems: Establish methods for credibly analyzing and predicting performance, dependability, and interoperability properties of software systems prior to implementation and test.

Software Engineering Management Practices	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	7.75	4.753	4.263	

**(U) Software Engineering Management Practices****FY 2003 Accomplishments:**

- Developed Team Software Process (TSP) for Secure Software (TSP-Secure), based on proven TSP practices and the CERT Coordination Center's extensive security skills and knowledge. The goal of the SEI TSP-Secure project is to develop a TSP-based method that can predictably produce secure software.
- Accelerated pace of CMMI adoption. CMMI course attendance increased by 60% in FY 2003. To date, more than 7,000 people have received training in CMMI. There was also a 17% increase in the number of CMMI transition partners licensed by the SEI to teach Introduction to CMMI, and a 59% increase in transition partners licensed to conduct CMMI appraisals.
- Developed credentials program in software engineering process management.
- Developed a diagramming technique that is helping project managers gain greater insight into measurement data and make more informed business decisions.
- Piloted CMMI appraisal methods to determine if they could be used efficiently and effectively in acquisition environments. The SCAMPI method incorporates the best ideas of several process improvement appraisal methods to baseline process capabilities based on CMMI models. Pilot participants included the National Reconnaissance Office (NRO) and the Space and Missile Systems Center (SMC).
- Developed measurement and analysis approaches to help accelerate an organization's efforts to improve software processes. During FY 2003, two of these approaches—the goal-question-indicator-metric (GQIM) technique and Six Sigma for Software—were applied at Warner Robins Air Logistics Center and at the U.S. Air Force Human Resource Command & Control Systems Program Office.
- Through application of the Team Software Process, helped a team at NAVAIR to achieve SW-CMM Level 4 at an accelerated pace.

**FY 2004 Plans:**

- Set direction for Version 1.2 of the CMMI Product Suite based on input from the user community, analysis, and research.
- Produce interpretive guidance for use of CMMI Product Suite in software-only organizations and in acquisition environments.
- Work with DoD, government, and industry software developers and acquirers to apply TSP to software development and gather the data and experience to mature the technology to meet early-majority needs.
- Develop and disseminate guidance regarding how to rigorously and systematically assess the value and impact of selected innovations to the engineering of software, systems, and acquisition.
-

**FY 2005 Plans:**

- Capability Maturity Model Integration: Provide stewardship for and transition into practice an integrated Capability Maturity Model (CMM) product suite that provides the DoD and industry with support for process and product improvement.
- Team Software Process: Define explicit team process techniques whose use predictably improves the cost, schedule, quality, and survivability of software-intensive systems developed by an integrated engineering team. Determine cost, schedule, and quality performance that the DoD can expect from teams using the TSP and establish metrics for use in software acquisition.
- Software Engineering Measurement and Analysis: Develop measurement and analysis guidance, information resources, and practices that assist DoD and industry software organizations in managing and improving their software engineering practices.

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, DW/ BA 3				Project Name and Number <b>P782/Software Engineering Institute PE 0603781D8Z</b>				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE	21.535	22.324	21.599	23.296	23.286	23.524	24.052	
Software Intensive Systems <b>P782</b>	2.369	2.456	2.376	2.563	2.562	2.588	2.646	
<b>A. Mission Description and Budget Item Justification: P782</b>								
<p>U) P782 Software-Intensive Systems (SIS). The Software Intensive Systems (SIS) Directorate's mission is to improve DoD SIS acquisition and sustainment. The SIS Directorate is the focal point for DoD initiatives that reduce software risk. SIS is founded in the recommendations of the FY 2000 DSB Task Force on Software, and guided by the SIS Steering Group (SISSG) chaired by OUSD(AT&amp;L) with senior software representatives from ODUSD(S&amp;T), ASD(C3I), and the Services. SIS activities are organized into elements that ensure coverage of the breadth of responsibilities necessary to achieve the mission of improving SIS acquisition performance, and to act as the DoD software community focal point. These elements focus on Policy &amp; Guidance, Education, Best Practices, Software Engineering Technology, and Collaboration. SIS conducts its efforts by understanding DoD needs, issues, and solutions; and acting on/transitioning improvements to DoD Enterprise-, Program- and practitioner-levels. SIS maintains and coordinates the Defense Software Collaborators, an organization of more than 30 defense and other government organizations that are involved with the development, maintenance, and/or acquisition of software-intensive systems.</p>								
<b>B. Accomplishments/Planned Program</b>								
<b>(U) FY 2003 Accomplishment:</b>								
Policy and Guidance:								
<ul style="list-style-type: none"> <li>- Implement Defense Authorization Section 804 language on Process Improvement, develop guidance for implementation by the Services and Agencies, monitor their implementation, and establish a clearinghouse for best practices.</li> <li>- Develop software acquisition management guidance to account for the recent update to the DoD 5000 policy series.</li> <li>- Transition the use of the Safety and Security Capability Maturity Model extension.</li> </ul>								

Best Practices:

- Independent Expert Program Reviews (IEPRs): Continue the Tri-service Assessment Initiative assessment and systemic analysis activities. Publish and disseminate report on systemic findings; begin to formulate corrective action strategies based upon the systemic root causes identified. Improve the systemic analysis tool and continue partnering with other DoD IEPR organizations to promote use of a single methodology.
- Measurement: Support Practical Systems/Software Measurement program research into evolutionary acquisition measures and measures to track process improvement programs (in response to Section 804 language). Continue efforts of the DoD Measurement Initiative.

Software Engineering Technology:

- Participate in the DUSD(S&T) study into software engineering technology gaps and investment needs.
- Continue the software expertise and experience factory support to the Army's Future Combat Systems program, collect lessons learned from this experience database and analyze data for application to other DoD programs and acquisition processes.
- Identify additional pilot opportunities in the Services to evaluate software engineering technologies.

Collaboration:

- Continue the Bi-lateral Software Acquisition Working Group with the UK, and the parallel relationship with Australia. Identify areas for joint study and develop/initiate cooperative study plans.

**FY 2004 - FY2005 Plans:**

Policy and Guidance:

- Continue Section 804 implementation activities, track establishment of Process improvement programs in the Services and DoD Agencies

Best Practices:

- IEPRs: Implement regular adoption of IEPRs by program managers, implement use of the systemic analysis as an enterprise level resource for tracking software acquisition performance issues and improvements. Begin to predict software acquisition performance shortfalls and use this information to impact acquisition decisions.
- Measurement: Publish Practical Systems/Software Measurement research into evolutionary acquisition and process improvement measures. Use the DoD Measurement Initiative to provide tools, training and guidance for implementing measurement into program and enterprise decisionmaking.

Technology:

- Further the use of the Center for Empirically Based Software Engineering experience factory pilots in DoD acquisition programs; use data from experiences to influence DoD software acquisition policy, guidance and education.

- Continue the technology watch activities, software engineering technology needs studies

Collaboration:

- Continue collaborative efforts across DoD and the international community

**Fiscal Year (FY) 2005 Budget Estimates  
Exhibit R-2, RDT&E Budget Item Justification**

February 2004

Appropriation/Budget Activity RDT&E, D BA3				R-1 Item Nomenclature: High Performance Computing Modernization Program PE-0603755D8Z				
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Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	185.221	202.492	186.666	191.114	193.090	196.715	200.211

**A. Mission Description and Budget Item Justification:**

**BRIEF DESCRIPTION OF ELEMENT**

The Department of Defense (DoD) High Performance Computing (HPC) Program (HPCP) supports the needs of the warfighter for technological superiority and military dominance on the battlefield by providing advanced computational services to U.S. weapons system scientists and engineers. By exploiting continuous advances in high performance computing technology, the defense research, development, test and evaluation (RDT&E) community is able to resolve critical scientific and engineering problems more quickly and with more precision. The results of these efforts feed directly into the acquisition process by improving weapons system designs through an increased fundamental understanding of materials, aerodynamics, chemistry, fuels, acoustics, signal image recognition, electromagnetics, and other areas of basic and applied research as well as enabling advanced test and evaluation environments that allow synthetic scene generation, automatic control systems and virtual test environments. As such, HPC has been identified as a key enabling technology essential to achieving the objectives of the DoD's science and technology (S&T) and test and evaluation (T&E) programs.

The HPCP has established and supports four major shared resource supercomputing centers (MSRCs) as well as several smaller, special-purpose distributed supercomputing centers (DCs). These centers directly support the DoD S&T and T&E laboratories and test centers and are accessible to local and remote scientists and engineers via high-speed network access. An integral part of the program is providing for the adaptation of broadband, widely used applications and algorithms to address S&T and T&E requirements, along with continued training of users as new system designs and concepts evolve. The program pursues continuous interaction with the national HPC infrastructure, including academia, industry, and other government agencies to facilitate the sharing of knowledge, tools, and expertise.



The HPCP user base includes 4,320 Scientists and Engineers at over 100 sites (Department of Defense Laboratories and Test Centers, academic institutions and commercial businesses). The integrated HPC program consists of Shared Resource Centers; the Defense Research and Engineering Network; and Software Application Support. The MSRCs are responsible for as large a fraction of DoD's S&T and T&E computational workload as feasible. These MSRCs provide extensive capabilities to address user requirements for hardware, software, and programming environments. A limited set of smaller shared resource centers, Distributed Centers (DCs), augment the MSRCs to form the total HPCP computational capability. Distributed Centers address critical HPC requirements that cannot be met at MSRCs, such as real-time, and near real-time computing requirements, and leverage significant HPC and mission expertise located at these remote sites. The MSRCs and DCs are currently interconnected with all S&T and T&E user sites via the Defense Research and Engineering Network (DREN). Additionally, the Software Application Support Initiative develops critical common DoD applications programs that run efficiently on advanced HPC systems, supports technology transition activities with academic and commercial institutions, trains users, builds collaborative programming environment, and develops mechanisms to protect high value HPC application codes.

True modernization of DoD's HPC capability and fulfillment of the program's vision and goals requires an on-going program strategy that addresses all aspects of HPC. While advancing the level of hardware performance is critical to success, the higher objective is to enable better scientific research, test and evaluation environments, and technology development for superior weapons, warfighting, and related support systems. The goals of the HPCP are to:

- Provide the best commercially available high-end HPC capability.
- Acquire and develop joint-need HPC applications, software tools and programming environments.
- Educate and train DoD's scientists and engineers to effectively use advanced computational environments.
- Link users and computer sites via high-capacity networks, facilitating user access and distributed computing environments.
- Promote collaborative relationships among the DoD HPC community, the National HPC community and MSIs in network, computer and computational science.

There are currently 13 distributed centers. In FY 2003 five existing centers were upgraded, and funding exists in the 2004 Procurement budget to upgrade or establish approximately four distributed centers. Currently supported distributed centers and their locations are as follows:

- Aberdeen Test Center, Aberdeen, MD
- Air Force Research Laboratory/ Information Directorate (AFRL/IF), Rome, NY
- Army High Performance Computing Research Center (AHPCRC), Minneapolis, MN
- Arnold Engineering Development Center (AEDC), Arnold AFB, TN
- Arctic Region Supercomputing Center (ARSC), Fairbanks, AK
- Fleet Numerical Meteorology and Oceanography Center, Monterey, CA
- Joint Forces Command (J9), Wright-Patterson AFB, OH and Maui, HI
- Maui High Performance Computing Center (MHPCC), Maui, HI
- Naval Air Warfare Center - Aircraft Division (NAWC-AD), Patuxent River NAS, MD
- Naval Research Laboratory (NRL-DC), Washington, DC
- Redstone Technical Test Center, Huntsville, AL
- Space and Missile Defense Command (SMDC), Huntsville, AL
- Space and Naval Warfare Systems Center, San Diego, San Diego, CA

In FY03 two MSRCs were upgraded and funding exists in the 2004 Procurement budget to upgrade 2 centers. The four MSRCs are:

- Army Research Laboratory (ARL), Aberdeen Proving Grounds, MD
- Aeronautical Systems Center (ASC), Wright-Patterson AFB, OH
- US Army Engineer Research and Development Center, Vicksburg, MS
- Naval Oceanographic Office, Stennis Space Center, MS

The Defense Research and Engineering Network (DREN) provides wide area network (WAN) connectivity among the Department's S&T and T&E communities. The DREN is implemented through an Intersite Services Contract awarded to MCI (WORLDCOM) during FY 2002. DREN currently provides services to sites throughout the continental United States, Alaska, Hawaii, and can be extended overseas where necessary. Minimal access is DS-3 (45 Mbps) with potential high-end access of OC-768 (40 Gbps) over the next 9 years. Current site connectivity ranges from DS-3 to OC-12 (622 Mbps), with the four MSRCs moving to OC-48 during FY04. A Secret DREN using common Secret systems high key with NSA certified Type-1 encryptors that can transport classified traffic at OC-3 (155 Mbps) has also been deployed.

The HPCMP employs state-of-the-art WAN security as well as strong host and user security creating a Defense-In-Depth security architecture.

**B. Program Change Summary:** The Program was transferred by direction of Congress from the Department of the Air Force to the Department of Defense for FY 2004 execution.

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	209.642	0	0
Current FY 2005 President's Budget	185.221	202.492	186.666
Total Adjustments	24.421	202.492	186.666
Congressional program reductions	-7.986	-2.990	
Congressional rescissions			
Congressional increases		205.482	186.911
Reprogrammings	-12.858	-.245	
SBIR/STTR Transfer	-3.577		
Other			-.245

\* The FY 2004 President's Budget Request (PBR) reflected the transfer of this program to the Air Force. Congressional action denied this transfer.

**Fiscal Year (FY) 2005 Budget Estimates  
Exhibit R-2a, RDT&E Project Justification**

February 2004

Appropriation/Budget Activity RDT&E, D            BA3				Project Name and Number High Performance Computing, PE-0603755D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
High Performance Computing	185.221	202.492	186.666	191.114	193.090	196.715	200.211	

**A. BRIEF DESCRIPTION OF ELEMENT**

The Department of Defense (DoD) High Performance Computing (HPC) Program (HPCP) supports the needs of the warfighter for technological superiority and military dominance on the battlefield by providing advanced computational services to U.S. weapons system scientists and engineers.

The HPCP has established and supports four major shared resource supercomputing centers (MSRCs) as well as several smaller, special-purpose distributed supercomputing centers (DCs).

The HPCP user base includes 4,320 Scientists and Engineers at over 100 sites (Department of Defense Laboratories and Test Centers, academic institutions and commercial businesses). The integrated HPC program consists of Shared Resource Centers.

True modernization of DoD's HPC capability and fulfillment of the program's vision and goals requires an on-going program strategy that addresses all aspects of HPC.

There are currently 13 distributed centers. In FY 2003 five existing centers were upgraded, and funding exists in the 2004 Procurement budget to upgrade or establish approximately four distributed centers.

In FY03 two MSRCs were upgraded and funding exists in the 2004 Procurement budget to upgrade 2 centers.

The Defense Research and Engineering Network (DREN) provides wide area network (WAN) connectivity among the Department's S&T and T&E communities.

The HPCMP employs state-of-the-art WAN security as well as strong host and user security creating a Defense-In-Depth security architecture.

**B. Accomplishments/Planned Program**

Shared Resource Centers	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	104.126	120.372	99.368

**FY 2003 Accomplishments:**

*Shared Resource Centers:* The program sustained existing capability and continued modernizing HPC systems, storage, and scientific data analysis and visualization capabilities to fulfill a significant portion of the science and technology (S&T) and test and evaluation (T&E) community HPC requirements. Acquisition activities for follow-on technical support contracts at the MSRCs were completed.

MSRC Sustainment: The program sustained and supported the integration, operation and use of HPC computational resources at the four MSRCs. (\$79.401 million)

*Distributed Center Sustainment:* Due to program funding limitations recognized in 1996, a decision was made to typically only support investments in HPC systems at new or existing DCs with HPCP procurement funding. In return for the HPCMP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCP equipment located at the site. There are two exceptions. The program budget includes funds for sustainment and operations at the Maui High Performance Computing Center and the Arctic Region Supercomputer Center in FY 2002. (\$24.725 million)

**FY 2004 Plans:**

*Shared Resource Centers:* The program sustained existing capability and continued modernizing HPC systems, storage, and scientific data analysis and visualization capabilities to fulfill a significant portion of the science and technology (S&T) and test and evaluation (T&E) community HPC requirements.

MSRC Sustainment: The program will sustain and support the integration, operation, and use of HPC computational resources at the four MSRCs. (\$ 78.106 million)

Distributed Center Sustainment: Due to program funding limitations recognized in 1996, a decision was made to typically only support investments in HPC systems at new or existing DCs with HPCP procurement funding. In return for the HPCP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCP equipment located at the site. There are two exceptions. The program budget includes funds for sustainment and operations at the Maui High Performance Computing Center and the Arctic Region Supercomputer Center. FY 2004 funding was increased \$18.100 million by Congress. (\$ 42.266 million)

**FY 2005 Plans:**

Shared Resource Centers: The program sustained existing capability and continued modernizing HPC systems, storage, and scientific data analysis and visualization capabilities to fulfill a significant portion of the science and technology (S&T) and test and evaluation (T&E) community HPC requirements.

MSRC Sustainment: The program will sustain and support the integration, operation and use of HPC computational resources at the four MSRCs. (\$76.833 million)

Distributed Center Sustainment: Due to program funding limitations recognized in 1996, a decision was made to typically only support investments in HPC systems at new or existing DC with HPCP procurement funding. In return for the HPCP investment, the DC organization agreed to appropriately fund the sustainment and operations of the HPCP equipment located at the site. There are two exceptions. The program budget includes funds for sustainment and operations at the Maui High Performance Computing Center and the Arctic Region Supercomputer Center. (\$22.535 million)

Defense Research and Engineering Network	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	31.697	32.554	29.347	

**FY 2003 Accomplishments:**

Operation of security systems and enhancements continued. Collaborative work continued with the Federal networking community and standards associations to assure DREN remained compatible with future technology change. A follow-on contract was awarded to MCI WorldCom Communications, Inc; however, transition of network services was delayed into FY2003 due to protests, but completed. DREN was configured to support an IPv6 Test bed in support DoD IPv6 transition testing needs.

**FY 2004 Plans:**

Network services will be provided. Operation of security systems and enhancements will continue. The DREN will expand internet protocol (IPv-6) testing for the Department of Defense and upgrade to full point-to-point encryption of the network. Collaborative work will continue with the Federal networking community and standards associations to assure DREN remains compatible with future technology change.

**FY 2005 Plans:**

Network services will be provided. Operation of security systems and enhancements will continue. Collaborative work will continue with the Federal networking community and standards associations to assure DREN remains compatible with future technology change.

Software Applications Support	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	49.398	49.566	57.951	

**FY 2003 Accomplishments:**

Development efforts in the CHSSI program continued to mature as some CHSSI projects were completed, and others begun. The CHSSI projects continued developing shared scalable applications to exploit scalable HPC assets. The Programming Environments and Training effort continued to provide computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. A program was established to develop technologies and methodologies to protect and limit end-use of high

performance computing applications software while minimizing the burden on authorized end-users. This effort is intended to strengthen DoD's protection mechanisms thus reducing the risk that these high value applications could be employed by an unauthorized user.

**FY 2004 Plans:**

Development efforts in the CHSSI program will continue to mature as some CHSSI projects are completed, and others begin. A new Academic Outreach Program will be implemented to encourage and support computational science in universities across the United States. New CHSSI Institutes will be created to better develop shared scalable applications to exploit scalable HPC assets. The Programming Environments and Training effort will continue to provide computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. Efforts will continue to develop technologies and methodologies to protect and limit end-use of high performance computing applications software while minimizing the burden on authorized end-users.

**FY 2005 Plans:**

Development efforts in the CHSSI program will continue to mature as some CHSSI projects are completed, and others begin. The CHSSI projects will continue developing shared scalable applications to exploit scalable HPC assets. The Programming Environments and Training effort will continue to provide computational and computer science support to the DoD HPC user community through interaction and collaborative projects with academic and industrial partners. Efforts will continue to develop technologies and methodologies to protect and limit end-use of high performance computing applications software while minimizing the burden on authorized end-users.

**C. Other Program Funding Summary:**

		FY 2003	FY 2004	FY2005 <sup>1</sup>	FY 2006 <sup>2</sup>	FY 2007	FY2008	FY2009
0902198DZ	Major Equipment OSD	47,212	48,535	50,147	51,018	52,111	53,490	54,591



**Acquisition Strategy. N/A**

**Major Performers:**

Five major contracts to support the MSRCs were competitively awarded between fourth quarter FY 2002 and first quarter FY 2003. These contracts provide comprehensive support services for up to eight years.

- Computer Science Corporation, Huntsville, AL (awarded two contracts)
- Lockheed Martin of Herndon, VA
- Raytheon E-Systems, Garland, TX

The DREN is implemented through the follow-on DREN Intersite Services Contract (DISC) awarded in FY 2002 and fully transitioned in FY 2003

- MCI WorldCom Communications, Inc, McLean, VA (FY 2002 - FY 2012)

Two contracts to provide programming environment and training services were awarded in FY 2001.

- Mississippi State University, Starkville, MS
- High Performance Technologies, Inc. (HPTi), Arlington, VA.

Other Major Contracts.

- Instrumental, Inc., Garland, TX (FY 2003)
- University of Alaska., Fairbanks, AK (FY 2002)

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<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		<b>Date:</b> February 2004
<b>APPROPRIATION/BUDGET ACTIVITY</b> RDT&E, Defense-wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> ADVANCED CONCEPT TECHNOLOGY DEMONSTRATION (PE 0603750D8Z)	

Cost (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
ACTD/P523	195.136	218.167	213.901	202.510	204.714	209.705	214.405

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT:** The Department of Defense (DoD) places increased emphasis on the need to rapidly develop and field new joint technological capabilities, and to explore innovative and transformational concepts associated with these capabilities. This emphasis recognizes technology superiority as America's asymmetric military advantage and a critical driver in efforts to equip a transformed military force. Advanced Concept Technology Demonstrations (ACTDs) are low-to-moderate risk vehicles for pursuing those objectives. ACTDs are capability demonstration and evaluation programs in which the technology and operational concepts are explored in parallel by the military end-users. The demonstrations typically involve a material development organization that tailors the mature technology applications and a warfighting sponsor that assesses military utility. In addition to stimulating innovation, ACTDs offer three other significant opportunities: 1) they provide experienced joint combat commanders with an opportunity to develop operational concepts and operational requirements to fully exploit the technologies provided; 2) allow the users an opportunity to assess the military utility of the proposed capability prior to a major acquisition commitment; 3) provide military Services a mechanism for compressing acquisition cycle time, significantly improving their response to priority operational needs. As such, while the ACTD program is not an "acquisition program," these timely joint demonstrations do play a key role in the DoD acquisition excellence process. ACTDs do not substitute for formal DoD acquisition procedures, but they "jump-start" the acquisition process for rapid, effective operational employment of

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joint technologies which are verified by combatant commands to have demonstrated military utility.

Since FY 1999, ACTDs have also served as a key contributor to the Joint Experimentation process under U.S. Joint Forces Command (JFCOM). The Deputy Under Secretary of Defense (Advance Systems and Concepts) (DUSD (AS&C)) works closely with JFCOM on experimental campaign plans to insure ACTDs integrate technology and develop new concepts of operation into future joint experiments. ACTDs continue to fill a critical and unique role in addressing joint warfighting requirements of the major regional and specified Combatant Commanders. In many cases, ACTDs focus attention on capabilities required by joint commanders that cannot be satisfied by the acquisition investment of a single military Service and address joint capabilities not ascribed to a single Service's core military mission.

DUSD (AS&C) works closely with the Joint Staff to identify investment opportunities from the new Joint Capabilities Integrated and Development System (JCIDS). The AS&C staff is functionally organized to parallel the Joint Staff's new Functional Capability Boards (FCBs), and aims to design ACTDs that specifically address gaps in joint capability roadmaps developed by these joint requirements oversight groups. AS&C meanwhile cultivates a close and direct dialog with all major joint Combatant Commanders, and continues to recognize their needs as the primary thrust of ACTD efforts.

Ideally, the Military Departments and Defense Agencies provide a majority of the funding required to successfully demonstrate an ACTD (which includes dedicated-in-kind resources). However, the Defense Wide RDT&E funding managed by AS&C is meant to offer a joint leverage to encourage Service/Agency commitment to the ACTD.

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Funding from this program element is used: 1) to support actual demonstrations and experimental employment; 2) provide hardware, software and communications to demonstrate military utility; and 3) fund transition, interim capability operations and support for up to two years after the operational demonstration phase of the ACTD. This one-to-two-year phase, sometimes referred to as an "extended user evaluation," provides the Combatant Commanders, Services, Agencies, and operators with adequate time to continue addressing transition issues of supportability, maintainability and training identified by the ACTD.

Since program commencement in 1994, DUSD(AS&C) has initiated 129 ACTDs. Fifty-five of these were completed by the end of Fiscal Year (FY) 2003, resulting in over 130 distinct products, most of which have transitioned to either hardware acquisition programs of record or integrated with current operational software systems (such as Global Command and Control System (GCCS) and Global Combat Support System (GCSS)). In addition, the majority of ACTD products have previously been, or currently are, operationally deployed. Over twenty ACTDs were used during Operation Allied Force, some of which are still actively employed in peacekeeping operations. Subsequently, products from more than thirty ACTDs have been employed in support of Operations Enduring Freedom, Iraqi Freedom and Noble Eagle. ACTDs have also been employed in support of Homeland Security and Homeland Defense operations.

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**B. Program Change Summary**

<b>PE: 0603750D8Z</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Previous President's Budget	<b>200.881</b>	<b>213.361</b>	<b>214.183</b>
Current FY 2005 President's Budget	195.136	218.167	213.901
<b>Total Adjustments:</b>	<b>-5.745</b>	<b>+4.806</b>	<b>-0.282</b>
Congressional Program Reductions		<b>-3.244</b>	
Congressional rescissions			
Congressional increases		<b>+10.150</b>	
Reprogrammings	<b>-1.700</b>	<b>-2.100</b>	
SBIR/SSTR Transfer	<b>-3.761</b>		
Other	<b>-0.284</b>		<b>-0.282</b>

**C. Other Program Funding Summary: N/A**

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<b>RDT&amp;E Budget Item Justification Sheet (R-2a Exhibit)</b>						<b>Date:</b> February 2004	
<b>Appropriation/Budget Activity</b> RDT&E, Defense Wide/BA-3			<b>R-1 Item Nomenclature</b> Advanced Concept Technology Demonstration (ACTD): PE 0603750D8Z				
Cost (\$ in Millions)	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	<b>FY 2006</b>	<b>FY 2007</b>	<b>FY 2008</b>	<b>FY 2009</b>
ACTD/P523	195.136	218.167	213.901	202.510	204.714	209.705	214.405

**A. Mission Description and Budget Item Justification**

**BRIEF DESCRIPTION OF ELEMENT:** The Department of Defense (DoD) places increased emphasis on the need to rapidly develop and field new joint technological capabilities, and to explore innovative and transformational concepts associated with these capabilities. This emphasis recognizes technology superiority as America's asymmetric military advantage and a critical driver in efforts to equip a transformed military force. Advanced Concept Technology Demonstrations (ACTDs) are low-to-moderate risk vehicles for pursuing those objectives. ACTDs are capability demonstration and evaluation programs in which the technology and operational concepts are explored in parallel by the military end-users.

**ACTD Selection Process:**

The Science and Technology (S&T) and operational communities submit ACTDs to DUSD (AS&C) each year for consideration. The community includes the military Services, Combatant Commanders, and the defense industry. Coalition partners can also submit ACTD candidates to be considered during the annual review cycle. The candidates proposed by the S&T community reflect technological opportunities enabled by recently demonstrated

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mature technology.

The candidates proposed by the warfighter community (Joint Chiefs of Staff (JCS), Unified Combatant Commanders, Military Services and Federal agencies) respond to a deficiency in military capability or to an emerging military need. For each candidate, it is necessary to confirm that the proposed concept is based on technology that is sufficiently mature for rapid exploitation, and that the capability addresses a priority military need. For FY-2005, candidates will be organized into the JCIDS operational areas of Battlespace Awareness and Intelligence, Command and Control, Force Application, Protection and Focused Logistics.

The maturity of the technology and relevant need of the proposed capability is assessed by the DUSD (AS&C) with assistance from senior members of the S & T and operational communities. This forum has historically been referred to as the "Breakfast Club." The proposed ACTD candidates are then ranked by the military Services and Combatant Commanders, then forwarded to DUSD (AS&C) who brings the ranked candidates to the Joint Requirements Oversight Council (JROC) for further prioritization and validation. The JROC validates mission need and establishes the priority of the ACTD candidates by military need. The principal management tools for the ACTD are the Implementation Directive (ID), Management Plan (MP) and the Transition Plan (TP). Each approved ACTD will be described in these top-level documents which provides details of the demonstration/evaluation, the main objectives, approach, critical events, measures of success, transition options, participants, schedule, and funding. The review of ACTD proposals for initiation in FY 2004 began in January 2003. Fourteen ACTD candidates were prioritized and validated by the JROC and were included in the ACTD Congressional Report forwarded in October 2004 to the congressional defense committees. Funding for new FY 2004 ACTDs, including potential midyear starts, is approximately \$40 million.

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The typical timeline of one-to-three years for the operational demonstration phase of an ACTD is compressed compared to normal acquisition timelines for fielding an operational capability. Executives and managers for ACTD projects are encouraged to "spiral out" proven elements of ACTDs with interim Military Utility Assessments (MUAs) that permit rapid technology transition during the course of the demonstration rather than awaiting demonstration completion to transition technologies to acquisition and sustainment programs of record. These shorter schedules are made possible because ACTDs incorporate mature or nearly mature technology and, therefore, forgo time-consuming technology development and technical risk reduction activities. At the end of the ACTD, the user sponsor is able to determine if the capability provided by the ACTD technology has sufficient utility to warrant procurement. If there are significant shortcomings, their options are either to pursue an advanced technology demonstration to improve performance, return the technology to the research and development technology base for further maturation, or not to pursue the technology any further. In cases where the operational user is satisfied the prototype has significant military utility, the prototype can be retained as an interim capability. The Department then moves quickly to enter the formal acquisition process to acquire needed quantities or, if sufficient, to make fully operational those residual assets already produced as demonstration prototypes. Each of the ACTD project summaries which are detailed in the R-2a submission includes reference to the year of final demonstration and the year of completion (if occurring in the FY03 - FY05 timeframe). The final demonstration concludes the operational demonstration phase and is the basis for the military utility assessment. In most cases, a residual support/pre-transition phase (sometimes used for extended user evaluation) follows. After the residual phase (if one is required), the ACTD is defined as being complete. Completion assumes no further program resources will be expended by any participating ACTD project partner.

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**B. PROGRAM ACCOMPLISHMENTS AND PLANS - FY 2003 THROUGH FY 2005:**

**FY 2003 General Program Accomplishments**

Advanced Systems and Concepts (AS&C) strengthened ties for cooperative ACTD programs with countries closely supporting the United States in Operations ENDURING FREEDOM and IRAQI FREEDOM. Significantly, Australia and the United Kingdom expressed commitment to expanding integration of efforts with programs that closely parallel the ACTD model.

By virtue of the recognized success of the ACTD Program as a catalyst for transformation, AS&C has been invited to participate in a number of senior Defense Integrated Process Teams focusing on transformation. From consideration of acquisition models for joint capabilities to development of plans to transform the military to new levels of integration, AS&C has been tapped to provide lessons learned for transformation of tactics, techniques, procedures and technologies. Experience with ACTDs also increasingly places AS&C in a pivotal role for technology transition with a portfolio of technology transition programs feeding improved capabilities to the warfighter in the field.

The close collaboration between AS&C and Combatant Commanders conferred a relevance to ACTD projects confirmed by requirements emerging from the Global War on Terrorism. In many cases, management teams formed to execute ACTDs were tapped to accelerate fielding of technologies to defeat emergent terrorist threats. These management teams and ACTD-based technologist networks played a leading role in feeding solutions to the Combating Terrorism Technology Task Force (CTTTF) led by Director, Defense Research and Engineering (DDR&E). An AS&C oversight executive for ACTDs was tapped to serve as the CTTTF Chairman

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reporting to DDR&E. ACTD management teams generating rapid-response technologies and TTPs included many ACTDs: Thermobarics, Counter-Bomb/Counter Bomber (CB/CB), Military Operations in Urban Terrain (MOUT), Joint Blue Force Situational Awareness (JBFSA), Adaptive Joint C4ISR Node (AJCN), Deployable Cargo Screening, Night Vision Cave & Urban Assault, Overwatch, Theater Support Vessel, Tunnel Target Defeat, Urban Recon, Active Denial System, Agent Defeat Warhead, Contamination Avoidance at Seaports of Debarkation, Expendable Unmanned Aerial Vehicle, Joint Explosive Ordnance Disposal, Language and Speech Exploitation Resources, Pathfinder, SPARTAN, Adaptive Battlespace Awareness, Area Cruise Missile Defense, Coalition Theater Logistics, and Joint Area Clearance.

Twelve ACTDs were completed in Fiscal Year 2003. The Airbase/Port Biological Detection sensors and the Precision Targeting Identification detection and sensor systems transitioned to acquisition. Eighteen ACTD software products were integrated within operational systems, such as four Joint Logistics software tools to the Global Combat Support System. Some ACTD products remained in theater as part of Kosovo peacekeeping operations. Over thirty ACTDs participated in Operations Enduring Freedom and Iraqi Freedom, as well as Homeland Security/Homeland Defense operations. Fourteen new ACTDs were started in FY 2003 (see specific accomplishments below): Adaptive Joint C4ISR, Deployable Cargo Screening, Counter Bomb/Counter Bomber, Foliage Penetration Synthetic Aperture Radar, Gridlock (Precision Engagement), High Altitude Airship, Joint Blue Force Situational Awareness, Midnight Stand, Night Vision cave and Urban Assault, Overwatch, Tactical IFSAR Mapping, Theater Support Vessel, Tunnel Target Defeat, Urban Recon.

The data call for FY 2004 ACTDs began during the 1<sup>st</sup> Quarter of Fiscal Year 2003. Thirty-one ACTD candidates, of the one hundred and eighteen received from the Unified Combatant Commands, the Services, Defense agencies and industry, were considered for final selection. Candidates covered a broad range of technologies and needs, prominently

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including the Global War on Terrorism, network-centric warfare, adaptive combat logistics support, coordination of coalition logistics, future energy-efficient ground transportation technologies, expanded employment of unmanned vehicles, signals intelligence for special operations units, expanded capabilities for psychological operations, and computer tools to enable effects-based operations. These candidates were screened for technical maturity, operational relevance and transition potential by the "Breakfast Club" and prioritized by each of the Combatant Commands and Services. The JROC then completed final prioritization, validating military requirements for 14 candidates. Based upon funding availability, 13 new ACTDs were selected to start in FY 2004 (see specific details below).

The ACTD budget request for FY 2003 totaled \$200.881 million. Congress added an additional \$8.3million for three initiatives: 1) An additional \$3.0 million for the Homeland Security Command & Control (HLSC2) ACTD; 2) \$2.5 million to pursue a non-ACTD demonstration of a Portable Radiation Search Tool (PRST); and 3) \$2.8M for the Secure Hardware Data Encryption Device (Secured) project. The Current FY 2003 estimate is \$195.136 million.

**FY 2004 and FY 2005 General Program Plans:**

AS&C will continue the process of transitioning and initiating ACTDs. Emphasis for the FY 2004 ACTDs continued to be placed on serving the unique requirements of joint Combatant Commanders, with coalition and transformational aspects highlighted as "value added" attributes of new and continuing demonstrations. As in FY 2003, a strong commitment to early and aggressive transition management will aim to sustain the capabilities successfully demonstrated in ACTDs.

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Exploration of new coalition partnership agreements and integration of efforts with the Joint Staff JCIDS process will characterize ACTD staff support efforts. As noted earlier, thirteen FY 2004 ACTDs were approved to start this year. These ACTDs are Advanced Tactical Targeting Technology, Agile Rapid Global Combat Support, Coalition Reception Staging and Onward Movement, Coalition Shared Intelligence Network Environment, Future Tactical Truck System, Joint Precision Airdrop System, Joint Unmanned System Common Control, Man-Portable Threat Warning System, Multi-Sensor Aerospace/Ground Joint ISR Interoperability Coalition, Psychological Operations (PSYOP) Global Reach, Theater Effects-Based Operations and a classified demonstration. Protected Take-Off and Landing (PLATO) is validated, with execution held in abeyance pending decisions on coordinated MANPADs countermeasure efforts by the Department of Defense and the Department of Homeland Security. Numerous demonstrations will be conducted for those ACTDs initiated in previous years. Nominations of proposed FY 2005 ACTDs were received in January 2004, with proposal staffing and refinement continuing through February 2004. Funding will continue in FY 2004 for active ACTDs initiated in Fiscal Years 1997 through 2003 that have not been completed or transitioned to acquisition programs. In FY 2004, Congress added \$10.150 to ACTDs and joint enabling technologies that hold promise for break-through technologies, including continuing the Syntroleum technology initiative (Flexible JP-8 Pilot Plant) and the Joint Norwegian ISSP technologies. Funding for the new FY 2004 ACTDs, including potential midyear starts, is approximately \$40 million.

Funding will continue in FY 2005 for active ACTDs initiated in Fiscal Years 2000 through 2004 that have not been completed or transitioned to acquisition programs. Numerous demonstrations will be conducted for those ACTDs initiated in previous years. Funding available for initiating new FY 2005 ACTDs will be approximately \$45 million. (Total ACTD funding in FY05: \$213.901 million).

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**ACTD Direct Program Support:** Last year's FY 2004 budget submission contained three new budget lines broken-out from the specific ACTDs projects. The direct funding line is used to provide support for the entire ACTD program (versus individual ACTDs). These three budget lines include (1) Unified Combatant Commander; (2) ACTD Pre-Transition Support; and (3) Interagency Classified Projects. A fourth line is included in this budget submission to highlight joint enabling technologies that are either directed by congress or initiated by AS&C.

- 1) **Unified Combatant Commander (UCC) Direct Support:** The UCC's play an essential role in the selection, validation, demonstration, and transition of ACTDs. Many ACTDs have funding allocated for the UCCs from within their specific program funding lines. Additionally, in previous years AS&C would attempt to provide direct ACTD support from OSD if resources became available. This direct support allows for a timely allocation of resources to the UCCs, based on the number of ACTD programs being sponsored and the intensity of effort required. The Department also envisions that the UCCs will play a greater role in the development, support and coordination of ACTDs that are coalition oriented (within their specific AOR). In fact, two new FY 2004 ACTDs were submitted by NATO organizations and were approved to start this year. Due to this critical warfighter role and increased coalition potential, the direct ACTD support was formalized in the ACTD budget submission. UCC direct program funding is estimated between \$3.0 and \$4.0 million per year.
  
- 2) **ACTD Pre-Transition Support:** The ACTD program has been highly successful in rapidly developing and demonstrating new technologies and complementary concepts of operations for the warfighter. In order to successfully transition more ACTDs to the warfighter, the SECDEF established the goal of increasing the number of ACTDs evolving into formal acquisition programs. In order to enhance this transition

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effort, the ACTD program has created a pre-transition support line as highlighted in the FY 2004 budget submission. FY04 and FY05 funding is estimated at \$3.0 million per year for pre-transition initiatives.

**3) Interagency Classified Support for ACTDs:** ACTDs also support a limited number of classified efforts which are coordinated with other agencies and detailed in separate DoD budget exhibits. FY04 and FY05 funding for this direct program support is estimated at \$9.0 million each year.

**4) Joint Enabling Technologies:** Over the past several years congressional committees have highlighted the potential of mature, joint technologies and provided resources to the ACTD program to investigate the potential for military utility. AS&C also becomes aware of promising technologies which may have transformational application to ACTDs. These technologies may be uncovered during a ACTDs final demonstration, and usually have broader application across several functional capabilities addressed by various ACTDs. Four enabling technologies are highlighted in this year's budget submission:

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Rosetta STONE</b>	1.0	3.0	2.0

Rosetta STONE (Single integrated picture Topology-driven Optical Nonlinear Engine-SIP-STONE) is a promising joint enabling technology. The Department will develop this enabling technology capable of integrating multi-source sensor data/track inputs from all available sources, correlating the data and fusing it into a single integrated picture. The technology combines the Rosetta gateway technology from the LINK 16 ACTD (1999) that enables multi-datalink translation and forwarding of data with the STONE optical

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correlator to provide near real-time fusion, sensor registration and correlation of information sources. The overall objective is to reduce engagement decision time, improve target location estimates, and provide enhanced combat identification (CID) from disparate sensors.

- **FY 2003** - Participated in JCIET/JCIDEX 2003 to further demonstrate Rosetta gateway capabilities and begin algorithm development for the STONE correlator with a few information sources.
- **FY 2004** - Further STONE algorithm development with increased number of sensor information sources. Participate and demonstrate expanded capability in JEFX 2004 at Nellis AFB NV.
- **FY 2005** - Operational demonstration of Rosetta STONE full capability at demonstration site TBD.

	<b>FY 2003</b>	<b>FY 2004</b>
<b>Secure Hardware Data Encryption Device (Secured)</b>	2.8	2.4

Congress provided additional resources in FY 2003 and FY 2004 for the Secure Hardware Data Encryption Device (Secured) project. The Department will develop an enabling capability to insert encryption methods to protect information at rest by interrupting the data bus to hard disk drive path within the computer, improving operational security in the event of lost or overrun computer assets.

- **FY 2003** - Developed hardware and software integration in a laboratory breadboard implementation to demonstrate the concepts for hard disk data encryption. Defined user security profile and began certification process.
- **FY 2004** - Complete the U.S./European certification process, present the product to potential DoD and other federal government agencies using reality based operational

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scenarios, and continue the design and development of Secured to expand functional capabilities and applicability to new target platforms.

	<b>FY 2003</b>	<b>FY 2004</b>
<b>Remote Unattended Sensing System (RUSS)</b>	0	2.1

Congress provided additional resources in FY 2004 for the Remote Unattended Sensing System (RUSS).

- **FY 2004** - Support the Pacific Area Bio Ops Project to develop Bio Defense Capabilities through the Chemical Biological Radiological Technology Alliance (CBRTA). Develop urban unattended ground sensors, in conjunction with CBRTA, to support the Night Vision Cave and Urban Assault ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>
<b>JP-8 Pilot Program</b>	0	2.0

Congress provided additional resources in FY 2002 (\$3.5M) and again in FY 2004 for the syntroleum technology JP-8 Pilot Program.

- **FY 2003** - Developed a preliminary marine and chemical engineering design for a barge-mounted plant to produce synthetic JP-8/JP-5 from natural gas using Gas-to-Liquids (GTL) technology and Fischer-Tropsch (F-T) synthesis. This design achieves a production capability of 567,000 gallons (~13,500 barrels) per day of JP-5 fuel and fuel storage capability of up to 2 million gallons. This plant, as currently designed, will be totally self-contained and will operate in sea state 3 conditions. Initial estimates state that this fuel can be delivered for approximately \$1.20 per gallon. Completed a Military Utility Assessment (MUA) to determine the true benefits to the military of the barge-mounted synthetic fuel plant concept. This assessment found that the gas-to-liquids barge presents a viable complement to other bulk fuel sources,

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improvements in supply chain efficiency across a spectrum of military operations, and cost savings and avoidance from reduced reliance on Navy Combat Logistics Fleet & Military Sealift Command charter tanker assets and related reductions in fuel consumption and charter-hire crewing costs. Developed a draft specification for synthetic JP-8/JP-5 fuel developed through a Joint Agency DoD-DoE research and testing program involving the Army, Air Force and Navy fuels labs, along with DoE's National Energy Technology Laboratory. This work was completed under a Memorandum of Agreement to conduct collaborative research and development in the assessment of alternative fuels, particularly synthetic fuel produced from GTL and F-T technology. This program provided approximately 900 gallons of synthetic JP-5 fuel produced for this effort.

- **FY 2004** - Optimize the hull design for the barge for reduced weight and cost of the hull while increasing storage capability. DoD and DoE labs will assess viability of the draft specification developed in FY03 by completing additional testing using a surrogate synthetic aromatic component and when available, fuel with the synthesized aromatic. Conduct a Military Utility Assessment for the modular synthetic fuels plant having a capability of providing fuel, power and water to forward-based forces. Continue development of a formulation for synthetic JP-8 / JP-5, expressed as a draft specification, which ensures the fully synthetic fuel is freely interchangeable with conventional fuel in the legacy fleets.

**FY 2003 - FY 2005 ACTD Individual Project Accomplishments and Plans (by ACTD year group).** The following list of accomplishments, plans and estimated resources is provided for each ACTD starting in FY 1997. Additionally, section "F" of this exhibit provides a resource summary of the entire ACTD program by ACTD year group.

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• **FY 1997 ACTDs**

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Counterproliferation II (CP II)</b>	0	0	0

Increased U.S. European Command's (USEUCOM) precision guided gravity weapons capability and counterforce concept of operations.

- **FY 2003** - Accomplished remaining Chemical Combat Assessment System (CCAS) verification testing and training and an operational demonstration. Prepared for CCAS residual transition and transition to acquisition. Completed Hard Target Smart Fuse (HTSF) sled testing. Completed BLU-116 Advanced Unitary Penetrator (AUP) sled testing and obtained target response data from tests of the AUP against hardened, simulated weapons of mass destruction (WMD) facility. Executed final two ACTD operational demonstrations using a hardened, cut-and-cover simulated chemical production and storage facility and the Tomahawk Tactical Penetrator Variant (TTPV), CCAS and ITPTS Version 2 ACTD products. Executed one final operational demonstration of AGM-86D CALCM penetrator against a hardened, simulated chemical production facility using fully functional HTSF. Performed MUAs on the TTPV, CCAS and Integrated Target Planning Tool Set (ITPTS). Produced four CCAS ACTD-residual modification kits. Completed the interim capability support phase, the final military utility assessment (MUA) test and demonstration of the ACTD.
- **FY 2004** - Conduct Extended user evaluation by USEUCOM of the CPII residuals. Complete the final written MUA report based on tests completed in FY 2003. Complete the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Extending the Littoral Battlespace/JTF Warnet (ELB/JTFW)</b>	13.800	0	0

Demonstrated an enhanced capability to enable rapid employment/maneuver/fire support from the sea of dispersed units operating in extended littoral battlespace. Provide enhanced near real-time situational awareness at all tactical levels of command.

- **FY 2003** - Completed ELB / JTFW sub-system level and system level tests, followed by installation of the Tier 2 and Tier 3 communications, translator, collaboration capability, and system management tools that will provide the horizontal connectivity between the tactical components to enable the common tactical picture. Completed operational personnel training, Hawaii and Japan regional tests and a distributed pre-deployment exercise in preparation for an early FY04 deployment culminating in COBRA GOLD 04. Completed development of CONOPs, TTPs and training package by operational forces. Transitioned technology to the Joint Tactical Radio System and over 20 programs of record. ACTD completed.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Advanced Health and Usage Monitoring System (JAHUMS)</b>	1.200	0.800	0

Provide a means to monitor the health and usage of individual aircraft utilizing onboard sensors and diagnostics. Demonstrate an open architecture so that modules from multiple vendor can be inserted in baseline systems.

- **FY2003** - Completed installation of JAHUMS software/hardware on a 3<sup>rd</sup> Navy SH-60B helicopter at the Navy Helicopter Anti-Submarine Squadron Light (HSL-41), Naval Air Station, North Island, California; completed JAHUMS software for the Operational Test

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(OT) phase of the IMD system; fielded two JAHUMS Integrate Support System prototypes for UH-60 Blackhawk helicopters at the Army 101<sup>st</sup> Airborne Division, Ft. Campbell, Kentucky which subsequently deployed with JAHUMS hardware to OIF in Iraq. Conducted developmental tests on an SH-60B helicopter with a real-time satellite based aircraft maintenance data link (a first for a DOD helicopter) and demonstrated an animated flight playback and pilot debrief capability.

- **FY 2004** - Conduct system training and operational fielding of JAHUMS technologies to units at the Navy HSL-41 squadron and at the Army 101<sup>st</sup> Airborne Division. Develop and refine the CONOPS for satellite data link utilization and a post-flight animation debrief, refine expert system diagnostics software, provide technical support to the units for maintenance, training and modifications. Maintenance and operations data for the military utility assessment will be collected and analyzed and JAHUMS technologies will be evaluated with regard to supporting the goal of a 50% reduction in mishaps and accidents as stated in Secretary Rumsfeld's "Reducing Preventable Accidents" Memorandum of May 2003. Complete the final demonstration.
- **FY 2005** - Conduct extended user evaluations at HSL-41 and at the 101<sup>st</sup> Airborne to refine system software. Support interim capability and conduct necessary modifications, testing and analysis to support transition to the Navy H-60R/S production line with the IMDS and to the UH-60M. End the ACTD.

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**• FY 1998 ACTDs**

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Adaptive Course of Action (ACOA)</b>	0	0	0

Demonstrated web-base planning tools to cut initial crisis action response time by 50 percent and allow joint planning by multiple participants during crisis action planning.

- FY 2003** - Completed transition of ACOA operations and maintenance responsibilities to Defense Information Systems Agency (DISA) into the Global Command and Control System (GCCS). Concluded interim capability support period and completed the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Line-of-Sight Anti-Tank (LOSAT)</b>	0	0	0

Developed an anti-tank kinetic energy missile integrated into an expanded capability High-Mobility Multipurpose Wheeled Vehicle.

- FY 2003** - Continued ballistic and guided missile flight tests at White Sands Missile Range (WSMR). Completed deployability assessment at Ft Bragg. The military utility assessment (MUA) was conducted at Eglin AFB. Field Tactical Trainer (FTT) Readiness was conducted. Transition Design Activities were completed and incorporated into ACTD prototypes for testing and demonstration. An extension to the LOSAT ACTD from FY 2003 to FY 2004 was approved due to operational sponsor diversion of current real world operations.
- FY 2004** - Continue ballistic and guided missile flight tests. Transition production activities in process for FY04 production award. The first period of operational testing is planned. Limited Rate Initial Production award is planned following

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completion of operational testing. Complete the final demonstration and transition to the Army. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Theater Precision Strike Operations (TPSO)</b>	0	0	0

Provide ground component commanders with the automation need to plan and direct counterfire and precision strike operations. Its Automated Deep Operations Coordination System (ADOCS) is currently being used by operational Combatant Commanders.

- **FY 2003** - Conclude the interim capability support phase and complete the ACTD. Transition the capabilities to programs of record. 1,000 ADOCS employed worldwide and used extensively in Operation Iraqi Freedom.

• <b>FY 1999 ACTDs</b>
------------------------

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Battle Damage Assessment in the Joint Targeting Toolbox (BDA in JTT)</b>	0	0	0

Prove a Significant BDA capability by combining battle damage indicators, observed physical damage and inferred functional damage into an accurate assessment of combat operation

- **FY 2003** - Concluded interim capability support phase and completed the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coherent Analytical Computing Environment (CACE)</b>	0.400	0	0

Demonstrate advanced data warehousing concepts, on-line analytical processing decision

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support, and intelligent analytical computing tools to access and utilize joint aviation asset information.

- **FY 2003** - CACE tools used successfully during Operation Iraqi Freedom (OIF). Limited Military Utility Assessment (LMUA) and final demonstration completed; CACE judged to have military utility. LMUA limited due to OIF deployment of a significant portion of the assessment squadron. Implemented residual support for MAG-13 and detachments. Developed final CONOPS and continued transition planning. Chosen for follow-on R&D by ONR as the CARTE project which includes a signed Technology Transition Agreement with Joint Strike Fighter/Lockheed Martin Autonomic Logistics Information System (ALIS).
- **FY 2004** - Continue to refine, update and install the CACE residual tools. Complete the transition plan. Begin transition to an acquisition program. Continue residual support for MAG-13 and detachments. Support the JSF LM ALIS PDR. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Common Spectral MASINT Exploitation Capability (COSMEC)</b>	0	0	0

Demonstrated the COSMEC technologies, end-to-end, to an operational user, showing the tactical utility of MASINT spectral analyses to the warfighter.

- **FY 2003** - Transitioned software to the Digital Common Ground Station (DCGS) and the Joint Intelligence Center. Concluded the interim capability support period and completed the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Compact Environment Anomaly Sensor II (CEASE II)</b>	0.100	0	0

Demonstrated the utility of integrating small sensors onboard a satellite to monitor the space environment.

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- **FY 2003** - Concluded interim capability support phase and completed the ACTD. System is onboard DSP 21 ready for operational users. Also used commercially for Spacebus 4000 communication satellites.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Force Medical Protection/Dosimeter (FMP/D)</b>	0	0	0

Demonstrated the technologies and concept of operations of chemical biological agent sampler technology for individuals and small groups.

- **FY 2003** - Completed test and evaluation of improved active, alarming chemical threat air sampler. Completed the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Human Intelligence and Counterintelligence Support Tools (HICIST)</b>	1.700	0	0

Provided mature commercial and government off-the-shelf technology to human intelligence and counterintelligence personnel.

- **FY 2003** - Completed extended user evaluations and transitioned ACTD products to programs of record. In response to the Global War on Terrorism, fielded initial capabilities to forces in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). HICIST products for weapons of mass destruction analysis were accelerated for use in Operation Iraqi Freedom. A HICIST product providing a deployable biometrics identification system was accelerated for fielding to intelligence forces performing interrogations of suspects and enemy combatants in OIF, OEF and Camp X-Ray. Completed the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Medical Operations - Telemedicine (JMO-T)</b>	0	0	0

Demonstrated the ability to integrate the services' deployable theater medical telepresence for improved force health protection, reduced force attrition, and minimized medical evacuations.

- **FY 2003** - Refined logistical support concepts and operational tactics, techniques and procedures (TTP). Completed extended user evaluation and final MUA including findings from the extended user evaluations. Transitioned JMO-T products to the OSD Health Affairs program of record - Theater Medical Information Program (TMIP). At the Secretary of Defense's request, some JMOT-assessed capabilities accelerated for fielding in Operation Iraqi Freedom, as the Interim TMIP. Completed the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Theater Logistics (JTL)</b>	0	0	0

Produced and transitioned advanced logistic and operational planning and execution capabilities using web-based planning tools to the warfighter.

- **FY 2003** - Commenced pilot services at DISA AITS-JPO. Residual products (software, source code, training materials, and limited hardware) began transfer to the DISA AITS-JPO for transition to the Global Combat Support System (GCSS).
- **FY 2004** - Complete transition of JTL products to the GCSS. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Theater Air and Missile Defense Interoperability (TAMDI)</b>	0.500	0	0

Integrated separate Navy and Army air defense systems allowing them to exchange target track information to achieve an integrated air defense picture.

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- **FY 2003** - Conclude interim capability support phase and completed the ACTD. Transitioned to Patriot/Aegis Cooperative Engagement Capability (CEC) targeting capability and to the Korean Theater Integrated Air Picture for U.S. Forces Korea.

• <b>FY 2000 ACTDs</b>
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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Aerial Surveillance and Reconnaissance</b>	2.400	3.000	0.600

Develop a concept of operations and tactics, techniques and procedures for coalition employment of moving target indicators and synthetic aperture radar operations .

- **FY 2003** - Conducted a military utility assessment in a simulated exercise with live feeds from distributed sensors. Produced measures of performance/effectiveness analysis. Began transition of CAESAR products to the participating nations, NATO and SHAPE. Products include tools (e.g. trackers and coalition test bed); Operational Concepts for interoperability (TTPs, measures of effectiveness (MOEs), measures of performance (MOPs)), and architecture and design (interfaces, interface control diagrams (ICDs) and Standard NATO Agreements (STANAGs)).
- **FY 2004** - Continue transition of CAESAR products to the participating nations, NATO and SHAPE. Transition responsibility for NATO Command, Control and Communications Agency (NC3A) testbed functions to Allied Command Transformation (ACT). Products include tools (e.g. trackers and coalition test bed); Operational Concepts for interoperability (TTPs, measures of effectiveness (MOEs), measures of performance (MOPs)), and architecture and design (interfaces, interface control diagrams (ICDs) and Standard NATO Agreements (STANAGs)). Complete the final demonstration.

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- **FY 2005** - Conduct final live-fly exercise in US and utility assessments. Conclude the interim capability support phase and complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>CINC 21</b>	6.000	1.500	0.400

Develop, demonstrate, assess and transition the concept of operations, hardware and software necessary to provide a theater Combatant Commands with a command and control (C2) environment that addresses improved situational awareness and decision making tools across multiple simultaneous crisis operations and theater engagement activities.

- **FY 2003** - Conducted Military Utility Assessment during Terminal Fury 03 at PACOM. Conducted Extended User Evaluation of residual capability at PACOM and STRATCOM. Continued to work transition to next-generation of GCCS and DJC2. Continued development of CONOPS, TTPs to mesh with standing joint force headquarters (SJFHQ) evolving concepts and development of training package. Ensured decision-focused C2 capability supports all Combatant Commands. Worked scalability/software refresh issues.
- **FY 2004** - Complete Extended User Evaluation at Pacific Command (PACOM) and Strategic Command (STRATCOM). Install and support CINC 21 capability in European Command (EUCOM). Complete computer-based training, CONOPS, TTPs, and transition. Ensure software refresh and functionality. Transition capability to next-generation GCCS and/or deployable joint command and control (DJC2). CINC21 capability being incorporated into STRATCOM program called D-Side to support National and Strategic Planning for Global Strike. Complete the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Communication/Navigation Outage Forecasting System (C/NOFS)</b>	2.000	0.500	0

Predict the satellite space environment and alert control operators to place satellites in protective mode when disturbed, ionospheric conditions are likely.

- **FY 2003** - Conducted payload test, spacecraft integration and launch vehicle integration. Continued Scintillation Network Decision Aid (SCINDA) assessments and user evaluation.
- **FY 2004** - Continue conducting payload test, spacecraft integration and launch vehicle integration, SCINDA assessments, and user evaluation. Complete final demonstration.
- **FY 2005** - Launch spacecraft, conduct on-orbit checkout, enter survey and forecasting modes with limited operational use. Continue survey and forecasting modes, perform extended user evaluation.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Computerized Operational MASINT Weather (ComWX)</b>	1.200	0	0

Provide near real-time cloud pictures for high-value targeting support, using existing national assets with a foundation to exploit future systems.

- **FY 2003** - Completed dissemination architecture for rapid dissemination of data to theater. Implemented suggested improvements to algorithms as a result of operational demos in FY02/03. Conducted formal military utility assessment (MUA). Produced/coordinated CONOPS and future sensor requirements.
- **FY 2004** - Coordinate CONOPS and future sensor requirements with additional commands. Operations and maintenance for ACTD infrastructure developed. Extension of effort under consideration due to new operational needs, otherwise complete the final demonstration.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Content-Based Information Security (CBIS)</b>	0	0	0

Demonstrate a multi-level security solution that can support joint, coalition, and interagency operations

- **FY 2003** - Continued contracting efforts to develop a Type 1 cryptographic device prototype. Drafted systems and security engineering specification. Began prototyping, certification and incremental product delivery. Developed plan for FY04 initial operating capability and FY05 transition to NSA product line.
- **FY 2004** - Continue module development for incremental delivery of certified Type 1 multi-security enclave encryption device for joint, interagency and coalition application. Conduct preliminary military utility assessment in conjunction with Coalition exercise and Standing Joint Force Headquarters prototype testing. Prepare for hand-off of certified residual devices to transition manager and deployment authority for implementation on DoD and Coalition networks.
- **FY 2005** - Finalize transition to NSA initial operating capability product line. Commence delivery of certified Type 1 multi-security enclave encryption devices to Regional Combatant Commanders for use in joint, interagency and coalition networks. Complete the final demonstration and the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Global Monitoring of ISR Space Systems (GMSIS)</b>	0.300	0.200	0

Demonstrate the value of providing near-real-time information on potential threats to theater operations posed by commercial space systems.

- **FY 2003** - System development completed and military utility of interim system demonstrate. Limited operations initiated.

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- **FY 2004** - Complete demonstration of the military utility of the interim system. Continue limited operations. Complete the final demonstration and ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Intelligence, Surveillance and Reconnaissance (JISR)</b>	0	0	0

Provide the Joint Force and Early Entry Force commanders the ability to integrate tactical reconnaissance and tactical operational sensors to improve situational awareness.

- **FY 2003** - Refined and enhanced JISR interfaces to source systems based upon user defined TTP/CONOPS (Lucky Sentinel 03, MEFEX 03, Ulchi Focus Lens 03). Integrated and fielded JISR prototype into Army Brigade evaluation. Continued working relationships with PM IF and other program offices to include TES/NFN, Joint Digital Fires Network and Digital Common Ground Station - A (DCGS-A) to demonstrate JISR added value. Planned and executed additional formal assessment by Joint Interoperability Test Center (JITC), Joint Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Battle Center and warfighter assessments by USCENTCOM and I MEF.
- **FY 2004** - Complete final assessment of military utility, operational effectiveness, suitability, and interoperability during demonstration to include Defense Information Infrastructure/ Common Operating Environment (DII/COE) certification. Transition Memoranda of Agreement will be executed with proposed programs executive officer's (PEO's) with responsibilities for programs of record. Review and approve assessment plan by the Council of Colonels prior to execution of the demonstration.
- **FY 2005** - Complete sustainment support to respective service and joint C4ISR user warfighters of the JISR product delivered in FY04. Complete the final demonstration and the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Ground-To-Air Passive Surveillance (GAPS)</b>	1.200	0	0

Evaluate passive surveillance systems for counterdrug operations for JIATF-S and SOUTHCOM.

- **FY 2003** - Exercised the delta cost purchase option of the "lease/option to buy contract" to acquire residual system to allow independent government demonstration, testing, and MUA to proceed within budget established. Assessed corrections to minor problems discovered during previous demonstrations and tests. Completed MUA of passive coherent location (PCL) technology. The assessment includes operational user training and support. Maximum use of Joint exercises and tests was used as part of the operational assessment.
- **FY 2004** - Complete planning to insure successful transition to the user. This includes assessments of the reliability, maintainability, and availability of the system to determine/verify the level and type of support required for the operational system. This will be used to assess the life cycle costs. Complete the final demonstration and provide final assessment reports. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Multiple Link Antenna System (MLAS)</b>	3.900	0	0

Provide two-way communications with four different platforms simultaneously while on the move using a single antenna.

- **FY 2003** - Commenced proof of concept demonstration preparations. Refined and updated antenna application to operational concepts, CONOPS and network procedures within an Army operational venue in pursuit of follow-on Joint Warfighter Exercise opportunity. Prepare for transition to acquisition activity. Prepared demonstration analysis and findings. Operational considerations (Warfighter engagement in real world operations) deferred demonstration/evaluation to FY2004.

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- **FY 2004** - Conduct extended user evaluation and further CONOPS development. Prepare MLAS transition. Complete the final demonstration and the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Quick Bolt (QB)</b>	5.800	0	0

Integrate five different guidance technologies into the High-Speed Anti Radiation Missile (HARM) used to destroy mobile enemy radar systems that can threaten friendly systems. Provides a significant increase in Kill Probability of legacy missile.

- **FY 2003** - Completed captive and live-fire flight testing. Details of QB-1 and QB-2 missile firings are classified. Both shots were successful. QB-3 (additional firing) was deferred due to lack of funding. Completed the final demonstration.
- **FY 2004** - Commence interim capability support phase. Provide captive inert training missile capability with Embedded National Tactical Receiver (ENTR) for use with Advanced Anti-Radiation Guided Missile (AARGM) capability and Weapons Data Link Battle Damage Assessment (BDA) capability.
- **FY 2005** - Conclude interim capability support phase and complete the ACTD. Ensure System Development & Demonstration (SD&D) phase is supported by ACTD MUA and technical findings.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Restoration of Operations (RestOps)</b>	1.700	1.700	0

Demonstrate the tools required to prepare for and immediately react to a chemical and biological (CB) weapon attack against a combatant commander-identified port, airfield or logistics facility.

- **FY 2003** - Conducted final demonstrations and utility assessments at Osan Airbase, Korea, and Dugway Proving Grounds, Utah. Enhanced RestOps capabilities from the

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baseline systems and based on findings from preliminary demonstrations. Continued user training. Revised concept of operations.

- **FY 2004** - Publish final report. Transition technology and lessons learned. Conduct residual training and support.
- **FY 2005** - Conclude interim capability support phase to complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Tri-Band Antenna Signal Combiner (TASC)</b>	0	0	0

Provides increased information flow for a lighter, more mobile force to meet immediate military needs.

- **FY 2003** - Complete Military Utility Assessment. Transition interim capability support to acquisition and complete the ACTD.

• <b>FY 2001 ACTDs</b>
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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Active Network Intrusion Defense (ANID)</b>	1.800	1.900	1.200

Demonstrate a capability to respond in real-time to network intrusions by making changes to network devices like routers, firewalls, intrusions sensors ...

- **FY 2003** - Transitioned Operational Manager responsibility from US Space Command to US Strategic Command. Demonstrated the collection, correlation, and notification capabilities of the agents; the collaborative interfaces; the automated capability to convene a distributed "virtual" team; and, a rapid coordinated response capability. Demonstrated local environment correlation, analysis and visualization capabilities. Completed and demonstrated Spirals 1, 2 and 2.5. The Joint Intelligence Operations

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Center (JIOC) reviewed the system. Deployed spiral 2 to several CONUS and OCONUS sites for JWID 03.

- **FY 2004** - Conclude the development of ANID and begin transition efforts. Add the following functionality: Enterprise Messaging, Survivability, Autonomic Response, Enterprise Correlation, Security, and Visualization Enhancements to enable managers to share data; quickly recognize and resolve major cyber attacks; continue functions when despite a cyber attack environment; react and contain certain attacks without human intervention. Conduct Military Utility Assessment (MUA). Deploy ANID Build 3 to prototype sites at JFCOM, STRATCOM, ARSTRAT, and JIOC, including upgrade from prior version at JFCOM and STRATCOM. Complete CONOPS, Tactics, Techniques and Procedures development and documentation.
- **FY 2005** -. Complete final report on military utility. Transition software tools and modules to DISA Information Assurance services. Complete the final demonstration and the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Adaptive Battlespace Awareness (ABA)</b>	3.400	1.8 00	1.200

Demonstrate the potential of the Global Command and Control System (GCCS) Common Operating Picture (COP) to provide relevant information to support Combatant Commanders.

- **FY 2003** - Developed task-driven, automated, relevance-based information profiles for smart "push/pull" relevance-based dissemination in time-critical decision making. Demonstrated further enhancements in EUCOM area of responsibility. Evaluated spiral upgrade assessment by extended user evaluation sites. Initiated Military Utility Assessment (MUA) and integration plan for GCCS-I3.
- **FY 2004** - Integrate spiral releases of ABA systems into Common Operating Environment, GCCS-I3 versions as user evaluations of residuals are evaluated with training plans and

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concept of operations. Begin implementation of transition plan. Review ABA adoption by other combatant commanders. Complete the final demonstration.

- **FY 2005** - Complete final MUA, incorporating extended user evaluations of residuals. Finalize concept of operations. Execute plan for transitioning ABA into GCCS-I3. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Tactical Laser (ATL)</b>	5.800	5.800	3.500

Integrate a moderate power laser, uncoiled optics, and existing fire-control systems onboard a C-130 aircraft.

- **FY 2003** - Continued development of the ATL ACTD system. Initial efforts at the start of the fiscal year focused on completion of the SBR, in Dec 02. The SBR established the technical baseline for the ATL system, allowing us to allocate performance requirements and system integration constraints to the various ATL ACTD system components. Design was begun for the laser device system hardware (i.e. fluid supply system, resonator cavity and optics, energy flow path elements), surveillance and beam control (i.e. acquisition system, laser beam turret, beam control mirrors and sensors and software) and the hardware/software for the operator workstation. A Preliminary Design Review (PDR) of the ATL hardware and software was conducted in the fourth quarter. This intermediate review verified the subsystem components and requirements allocations will allow the ATL system to continue to meet program objectives. Extensive work is being accomplished to analyze and assess the ATL system lethality vs. the design reference mission targets. Materials testing and analysis will be accomplished.
- **FY 2004** - Complete the design and begin the build-up of the Advanced Tactical Laser ACTD system. Accomplish the subsystem and system Critical Design Reviews (CDRs), the

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final reviews of the system component designs before assembly and check out. Procure long-lead components and begin acquisition and delivery of ATL ACTD system hardware and software. Begin the Military Utility Assessment (MUA) using ATL simulations and component hardware testing in conjunction with military exercises.

- **FY 2005**—This year’s effort is devoted to integrating and testing the weapon on a C-130 aircraft under controlled conditions. It includes integrating the tactical laser onto C-130 aircraft, verifying turret, beam control, and laser spot size during flying missions; and developing crew work stations for acquisition and firing. Final activity centers around flying tests against AFSOC designated targets. In addition the ACTD will continue to refine lethality data against a variety of targets, for future reference.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Technology Ordnance Surveillance (ATOS)</b>	0.700	0.700	0.800

Demonstrate a small hybrid integrated circuit chip incorporating the most recent industry advances in miniaturized electronics technology.

- **FY 2003** - Produced 1,000 tags for operational demonstrations and military utility assessments and implemented redesign of handheld reader for optimal operation use.
- **FY 2004** - Conduct field demonstrations and complete the Military Utility Assessment (MUA); commence integration into ammunition management systems of services opting for Advanced Technology Ordnance Surveillance (ATOS) integration; conduct site surveys and system installation planning; incorporate any design improvements identified during MUA; maintain residual ATOS system used in final demonstration by European Command (EUCOM) .
- **FY 2005** - Complete service integration, continue installation planning and commence full-scale system integration. Replace residual ATOS system used in final demonstration by USEUCOM. Complete the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Area Cruise Missile Defense (ACMD)</b>	1.800	0	0

Initially chosen as an ACTD to demonstrate technology that will provide surge response to cruise missile attacks and low flying unidentified air threats. ACMD integrates various agency air-tracking sensors and facilitates a real-time response through the North American Air Defense Command channels. Technology proved to provide an excellent air-tracking coordination tool. ACMD was accelerated into operations due to real world events beginning with the 9-11 terrorist attacks. Technology demonstrated in the ACMD ACTD plays an important role today protecting the National Capital Region (NCR).

- **FY 2003** - Conducted the Joint-Based Expeditionary Command and Control Center (JBECC)-Rapid Deployment Demonstration (#3). Served as the final demonstration for the military utility assessment (MUA). Demonstrate JBECC capability to deploy and provide an integrated air picture to a NORAD air defense sector anywhere within the CONUS. Commence transition and sustainment of residual capability. Develop operator and maintenance training program. Continue support of Operation NOBLE EAGLE. Provided presidential support during deployments of Air Force One to various CONUS locations.
- **FY 2004** - Complete transition and conclude interim capability support phase. Continue to provide real world support in the Continental United States (CONUS). Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Combat Identification (CCID)</b>	5.800	4.600	3.100

CCID is demonstrating and transitioning CID solutions that significantly reduce fratricide and enhance combat effectiveness of allied and coalition forces operating in both traditional and ad-hoc coalitions.

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- FY 2003 - Continued Radio Based Combat Identification (RBCI) improvements for U.S. and exportable radios. Initiated integration of RBCI interface functionality into Apache helicopter and Personal Forward Entry Device (PFED) for dismounted Forward Observers. Completed development of Battlefield Target Identification Device (BTID) Standard Agreement (STANAG)- compliant systems, developed STANAG test plan in conjunction with NATO allies and conducted successful technical and interoperability testing with UK and French BTIDs. Conducted multinational Military Operations in Urban Terrain (MOUT) exercise to evaluate the military utility of Dismounted Soldier Identification Devices (DSID) in urban warfare; the Joint Combat Identification and Experimentation Team (JCIET) assessed technologies, CONOPS and TTPs and generated a final report. Continued coordination on potential allied CCID exercises. Initiated the development of a Virtual - Simulation Operational Exercise with CCID technologies and Allies. Continued development of CONOPS, TTPs for the various mission areas. Continued DSID STANAG development.
- **FY 2004** - Complete RBCI improvements for ground responders and helicopter, Forward Observer / Forward Air Controller and Beyond Line of Sight (BLOS) interrogators. Technically test RBCI to insure specification compliance and operationally demonstrate in CJFTEX-04 and C4ISR On the Move exercises. Provide RBCI capability to infantry battalion during deployment to Operation Iraqi Freedom (OIF) for use and assessment. Initiate feasibility study of integrating RBCI into United Kingdom BOWMAN radio; technically test interoperability in VHF voice mode. Continue BTID technical interoperability testing with UK, France and Germany and begin operational demonstrations of the BTID during CJFTEX-04 and C4ISR On the Move exercises. Begin evaluation of Radio Frequency Tags and RBCI for use in Fixed Wing to Ground Close Air Support applications. Continue coordination for allied CCID exercises in 2005. Finalize setup of Virtual - Simulation Operational Exercise with CCID technologies and

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Allies; begin experiments. Implement and continue to refine CONOPs / TTPs in operational CCID exercises and virtual experiments. Begin warfighter evaluation of NATO BTID and RBCI.

- **FY 2005** - Joint Interoperability Test Command (JITC) will conduct an interoperability test of RBCI, SINCGARS radios and fielded Situational Awareness systems to insure compatibility and interoperability. The ACTD will implement and refine CONOPs and TTPs and complete the Warfighter evaluation of the NATO BTID, RBCI and DSID during the FY05 multinational operational demo and assessment; analyze data from the Warfighter evaluation; and execute the CCID transition plan for Extended User Evaluation and production and fielding. Complete the final demonstration.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Theater Logistics (CTL)</b>	0.300	2.300	0

Integrate logistics information and combat support tools among coalition forces.

- **FY 2003** - Demonstrated the second objective (plan and execute supply and sustainment) during Cobra Gold 03. Continued to refine first objective (plan and execute strategic deployment and redeployment). Continued interim Military Utility Assessment (MUA). Prepared for final Military Utility Assessment in FY 2004. Refined transition plans to the Global Combat Support System (GCSS).
- **FY 2004** - Integrate capabilities to support combatant commands within the architecture framework. Complete all technical testing and integration. Conduct the final demonstration and MUA. Coordinate GCSS transition plans, begin transition and prepare to field residual capabilities.
- **FY 2005** - Continue to harden and expand focused logistics/operations shared view and transition to GCSS. Complete the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Hunter Standoff Killer Team (HSKT)</b>	8.400	6.300	4.300

Integrate, demonstrate and transition cognitive decision-aiding technologies into various aircraft, UAVs, ground tactical operations centers and service ships providing seamless tactical command and control of airborne manned and unmanned sensors/shooters.

- **FY 2003** - Awarded contract to integrate TCDL and precision targeting sensor on one (1) Hunter UAV which will yield the only Army UAV possessing precision targeting sensor with laser designation capability. Completed two (2) software builds for Mobile Commander's Associate (MCA) and one (1) software build for Warfighter Associate (WA). Completed A2C2S / MCA simulator assembly and conducted simulation tests of the first MCA build. Continued manned / unmanned teaming simulations and continued development of tactics, techniques, and procedures (TTPs). Completed Integrated Assessment Plan (IAP). Integrated TCDL into one Hunter UAV system. Completed hardware in the loop integration bench tests of the first MCA A2C2S and continued hardware in the loop integration bench tests of the WA Longbow Apache system. Continued integration on the Army first A2C2S helicopters. Initiated development of HSKT operational training plan and continued development of training materials for WA and MCA.
- **FY 2004** - Award contract to integrate TCDL and precision targeting sensor on UAV. Complete final software builds for Mobile Commander's Associate (MCA) and Warfighter Associate (WA), and simulation tests for MCA, WA, and F/A-18. Complete integration of Hunter UAV precision targeting sensor with laser designation capability, and initiate UAV integrated TCDL / sensor control testing. Complete manned / unmanned teaming simulation and continue developing tactics, techniques, and procedures (TTPs). Complete integration of A2C2S MCA with LINK-16, and AH-64 WA Longbow Apache integration flight vehicles for use in manned / unmanned team testing. Complete all hardware in the loop integration tests of the MCA A2C2S with LINK-16 and the WA Longbow Apache

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systems. Continue development of CONOPs, TTPs and training package. Complete development of HSKT operational training plan and continue development of HSKT exportable training package to be used by HSKT operational pilots and operators.

- **FY 2005** - Complete HSKT team test and evaluations and install hardware and software into production AH-64 D aircraft. Complete development of CONOPS, TTPs and warfighter training for Joint Military Utility Assessment (JMUA) CONUS demonstrations. Conduct operational demonstrations (including final demonstration) as part of the Extended User Evaluation (EUE) and commence interim capability support phase. Initiate HSKT pre-production acquisition / fielding implementation pending successful JMUA.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Area Clearance (JAC)</b>	1.500	1.100	0

Demonstrate de-mining and explosive ordnance disposal equipment for area clearance of airfields, fuel/ammunition distribution points, hospital ships, main supply routes and other rear-area activities.

- **FY 2003** - Conducted two MUA demonstrations and developed an interim MUA. Completed Change Detection Workstation and conduct respective technical test and MUA demonstration for potential use in Operation Iraqi Freedom (OIF); continued transition planning continues.
- **FY 2004** - Continue efforts to deploy the Change Detection technology to real world operations in support of route clearance missions; conclude the MUA demonstration process with MUA III at Camp Lejeune, North Carolina in March 2004; prepare final MUA report and staff operational requirements for technology insertions into existing programs or new stand-alone requirements; and finalize requirements for ACTD products and prepare for transition to acquisition. Complete the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Loitering Electronic Warfare Killer (LEWK)</b>	0.200	0.200	0

Planned to demonstrate a low-cost unmanned combat aerial vehicle weighing 60 pounds and capable of carrying a combined 200 pound lethal and non-lethal payload, with eight hours of endurance.

- **FY 2003** - Due to issues of technological maturity, this project was placed on hold in mid 2003 pending an Oversight Review Group (ORG) meeting. The ORG recommended the ACTD be concluded and the technology returned to the technical base for further development.
- **FY 2004** - Minimum close-out cost are estimated as this ACTD is concluded.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Network-Centric Collaborative Targeting (NCCT)</b>	5.800	5.700	1.200

Network operation intelligence, surveillance, and reconnaissance sensors to significantly improve the capability to detect, identify, and locate time-critical targets within their cycle times.

- **FY 2003** - Conducted additional Phase I demonstration to integrate precision targeting capabilities using existing data links and current TTPs. Initiated Phase II by integrating Phase I demonstration residuals into NCCT Core Technology Prototype development. Continued to develop Participant Integration Modules (PIM) for airborne platforms and ground stations. Continued to integrate NCCT Communications Equipment into the NCCT Prototype design.
- **FY 2004** - Conduct Spiral 2 Live-Fly Demo. Complete final demonstration and Military Utility Assessment. Commence interim capability support phase.

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- **FY 2005** - Transition Spiral 3 Live-Fly Demonstration at Roving Sands 05 to include all participants. Update interim MUA to final. Conclude interim capability support phase and complete the ACTD. Provide support to USAF for entering SD&D phase.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Personnel Recovery Extraction Survivability Aided by Smart Sensors (PRESS)</b>	5.800	5.200	0

Demonstrate and transition real-time, automated, precision evader location, tracking, and re-supply devices and systems, and integrate extraction platform survivability technologies and options.

- **FY 2003** - Continued space hardware and miniature GPRS design and testing. Conducted initial integration design and preliminary testing of HH-60G Pavehawk extraction survivability sensors and suite. Developed demonstration and assessment plans, CONOPs, TTPs and training package for operational demonstrations and the Joint Military Utility Assessment. Fielded GPRS ground stations (3) and devices (3) with the 301<sup>st</sup> Rescue Squadron to support Operation Iraqi Freedom which reduced rescue response time by 90 minutes. Initiated acquisition and testing of Monocular Infrared (IR) Scope for survivor / evader.
- **FY 2004** -. Complete miniature GPRS design, fabrication and testing. Develop prototype space relay capability and test in high-altitude/tactical applications. Complete integration and testing of HH-60G Pavehawk survivability suite. Conduct technical and operational demonstrations (including the final demonstration) and Joint Military Utility Assessment of integrated PRESS systems, including survivability, C4ISR, and survivor / evader technologies. Continue development of CONOPs, TTPs and training package for Extended User Evaluation. Continue transition planning activities for follow-on warfighter acquisition of PRESS technologies

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- **FY 2005** Continue evaluation of PRESS technologies during Extended User Evaluation of PRESS ACTD systems and technologies. Continue transition activities and initiate acquisition of PRESS ACTD systems and technologies for follow-on development, procurement and fielding based on successful JMUA. Finalize CONOPs, TTPs, training package and Doctrine, Organization, Training, Materiel, Leadership, Personnel and Facilities (DOTMLPF) recommendations.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Tactical Missile System - Penetrator (TACMS-P)</b>	10.900	0.600	0

Demonstrate integration of the Army Tactical Missile System booster with a Navy reentry vehicle to provide a high-availability, all-weather, survivable, and short-response-time means to destroy hard and deeply buried targets.

- **FY 2003** - Missile prepared for flight test. Additional resources shifted into TACMS-P to ensure timely testing of asset.
- **FY 2004** - Complete and evaluate flight testing and the final demonstration. Deploy residual weapons. Continue evaluation for consideration of a transition to programs of record. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Theater Integrated Planning Subsystem (TIPS)</b>	0.700	0.700	0.300

Automate and network the current manual processes to produce decision documents to assist in weapons of mass destruction targeting for the theater Combatant Commanders.

- **FY 2003** - Provided automated conventional and nuclear planning, to include intelligence and analysis functions. Refined existing production procedures.
- **FY 2004** - Migrate nuclear and conventional planning tools to the Theater Planning

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Response Cells (TPRC) to support a deployable configuration. Initiate crisis action and immediate planning capability. Refine COMM links to Theaters. Conduct MUA demonstrations (including final demonstration) and exercises.

- **FY 2005** - Commence interim capability support phase. Complete the ACTD.

• <b>FY2002 ACTDs</b>
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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Active Denial System (ADS)</b>	1.700	7.700	3.700

Demonstrates a breakthrough, non-lethal technology that uses millimeter wave electronic energy to stop, deter, and turn back an advancing adversary from a relatively long range.

- **FY 2003** - Preliminary Design Review accomplished. Detailed design completed. First and second limited military utility assessment successfully completed. Joint concept of operation, transition strategy development, and effects testing continuing. System integration (battle management system, HMMWV, and beam director) started. Field demonstration conducted using system zero.
- **FY 2004** - Concept of operations finalized. Source optimization, effects testing, system integration continuing. Field Test in 3<sup>rd</sup> quarter. Military utility assessment (MUA) begun.
- **FY 2005** - Effects testing and MUA finalized. Final optimization of Battle Management System and HMMWV completed. Residual handed over to transition manager.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Notices (AN)</b>	3.500	0.600	0.600

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Demonstrate tools and techniques for destruction of certain weapons of mass destruction production facilities.

- Classified content only.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Agent Defeat Warhead (ADW)</b>	2.400	3.400	4.300

Demonstrate a high temperature, thermal radiation, incendiary, kinetic energy penetrator warhead to destroy biological and chemical manufacturing and storage facilities. Provide a robust means to neutralize chemical/biological agents while minimizing collateral damage.

- **FY 2003** - Conducted subsystem hardware testing and sled testing of dispensing system. Completed preliminary effectiveness predictions and testing.
- **FY 2004** - Complete the initial lethality kill rate experiments in order to determine the increase of kill/neutralization of CHEM/BIO agents provided by a unique ACTD fill. Conduct deceleration sensing fuse testing and sled testing of the final configuration.
- **FY 2005** - Conduct flight testing against biological and chemical targets with stimulant agent. Complete fabrication of the residual round and commence interim capability support phase. Conduct final demonstration. Support SD&D milestone decision through technical data from ADW ACTD. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Agile Transportation (AT21)</b>	2.000	3.100	1.000

Demonstrate capability to optimize and schedule all transportation requirements (personnel and equipment) against available lift assets for movement to, from, and within the various theaters of operation.

- **FY 2003** - Completed demonstration of time-phased force and deployment data (TPFDD)

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visualization in a collaborative environment; implemented beta test sites; and conducted demonstration of strategic-level optimization and scheduling.

- **FY 2004** - Conduct USTRANSCOM operator test of strategic-level capabilities using USCENTCOM movement requirements and apply lessons learned. Conduct initial Military Utility Assessment. Conduct prototype demos of operational-level optimization and scheduling. Harden and demonstrate visualization and collaboration environment and scheduling/optimization tools as interoperable capability. Demonstrate metrics reporting.
- **FY 2005** - Conduct final demonstration and Military Utility Assessment. Deliver and sustain a residual capability, transition to programs of record, and continue interim capability support period.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Contamination Avoidance at Seaports of Debarkation (CASPOD)</b>	3.100	3.400	1.200

Demonstrate contamination avoidance at seaports of debarkation.

- **FY 2003** - Delivered Theater Chemical Biological Response Packages (TCBRP) to CENTCOM for Operations Enduring Freedom and Iraqi Freedom. Performed technology testing and selection. Completed integrated assessment plan and initial transition plan. Conducted preliminary demonstrations at Charleston Naval Weapons Center. Incorporated initial results from FY02 base lining activities toward an upgraded CASPOD system.
- **FY 2004** - Revise concept of operations and tactics, techniques and procedures. Updated transition plan. Conduct final demonstrations and utility assessments. Enhance CASPOD capabilities from the baseline systems and based on findings from technical demonstrations. Complete the final demonstration.
- **FY 2005** - Transition technology and lessons learned. Conduct residual training and

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support.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Information Assurance Common Operational Picture (CIA COP)</b>	2.200	3.600	3.800

Integrate information assurance and visualization tools and techniques to coalition network management processes and procedure to address interoperability policy issues.

- **FY 2003** - C-IA COP ACTD operational oversight shifted to US Joint Forces Command. Held Coalition/Allies Stakeholder Requirements Workshop to identify principle Warfighting deficiencies with current capabilities, and elicit primary Warfighter needs. Participated in Joint Warfighter Interoperability Demonstration 03. Developed System Requirements. Created C4ISR Architecture Elements. Produced Conceptual Screen Prototype.
- **FY 2004** - Create Design Assessment prototype implementing Mission Definition, Coalition IT Performance Monitoring, and Incident Management. Demonstrate with Coalition Stakeholders. Complete CONOPS. Participate in Joint Warfighter Interoperability Demonstration 04. Implement preliminary Threat and Vulnerability portions of IT Risk Monitoring. Implement a multi-layered geographical display of units, connectivity, attacks, performance, and impacts. Implement initial coalition collaboration capabilities. Deploy early operational prototype to pilot site. Plan for Transition.
- **FY 2005** - Elicit and analyze operator/stakeholder pilot site feedback. Refine Coalition IT Performance Monitoring, IT Risk Monitoring, Geographical Display, Coalition Collaboration. Plan and support the Military Utility Assessment. Collect and analyze MUA findings. Implement change requests resulting from MUA findings. Execute Transition Plan to GCCS-J and the Joint Command and Control System (JC2). Complete the final demonstration.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Expendable Unmanned Aerial Vehicle (XUAV)</b>	3.900	0.700	0.500

Demonstrate covert delivery of off-board sensors, tactical surveillance, battle damage assessments and weapons of mass destruction monitoring without risking personnel.

- **FY 2003** - Upgraded avionics and data dissemination capabilities. Finalized vehicle/avionics design and produce residual units. Developed CONOPS and commenced military utility assessment. Provided special operations support during Operation Iraqi Freedom.
- **FY 2004** - Continue work on parasail, deliver residual systems and conduct final military utility assessment. Commence transition and interim capability support phase. Complete the final demonstration.
- **FY 2005** - Continue interim capability support phase. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Homeland Security Command and Control (HLS C2)</b>	6.700	6.300	3.700

Refine and transition technologies and operational concepts that support the Homeland Security missions assigned to the Department of Defense

- **FY 2003** - Continued demonstrations with focus on matching technical capability to development of concepts of operations and employment as determined by Northern Command in order to fulfill their assigned missions. Provided a fielded, initial capability and migrated capability to Joint Task Force Civil Support in its new assignment at Northern Command. The congressional defense committees added an additional \$3.0 million to enhance real-world demonstrations.

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- **FY 2004** - Continue to expand and field additional capabilities. Expand multi-agency coordination with Federal Departments including working through the responsible OSD office for Homeland Security and the Federal Department of Homeland Security. Complete the final demonstration. As a result of added Congressional interest, an additional \$1.5 million was added to enhance and accelerate development and test of software tools for Federal, state and local department and agency collaboration.
- **FY 2005** - Field final C2 capabilities which include information assurance, consequence management and attribution. Field concepts of operations and employment to guide military participation in homeland security missions and coordination procedures with appropriate Federal agencies and departments.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Hyperspectral Collection and Analysis (HYCAS)</b>	3.500	1.600	0.200

Ddemonstrates the ability of hyperspectral (HSI) to address USCENTCOM's critical needs via a calibrated HSI sensor.

- **FY 2003** - Supported development of Army-COMPASS Sensor. Began development of Predator CONOPS and integration study of COMPASS and Predator. Re-designed Army COMPASS to fit onto Predator (AF-COMPASS). Supported search for Columbia debris. Procured long lead items for AF-COMPASS. Supported AFRL Falcon collections (Army COMPASS at Ft AP Hill). Developed, integrated, and flight tested tactical hyperspectral sensor on board MQ-1 Predator. Modified processing and exploitation algorithms. Integrated processing, exploitation and dissemination system in Predator Ground Control Station. Developed concept of operations and employment for tactical hyperspectral sensor.
- **FY 2004** - Demonstrate the tactical hyperspectral sensor and a Global Hawk hyperspectral sensor. AF-COMPASS planned for integration onto Predator. Refine concept of operations.

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- **FY 2005** - Transition tactical hyperspectral sensor to Aeronautical Systems Center for possible future development. Complete the final demonstration.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Distance Support and Response (JDSR)</b>	2.900	3.700	2.800

Integrates, demonstrates and transitions the Military Services' unique tele-maintenance initiatives and develops joint concept of operations/tactics, techniques and procedure to establish a common and interoperation tele-maintenance environment.

- **FY 2003** - Completed the CONOPS/TTP planning sessions for the Warfare Analysis Laboratory Exercise (WALEX). Coordinated with Services maintenance community for the development of the CONOPS/TTP. Completed draft development of a CONOPS/TTP document. Completed draft for the Integrated Assessment Plan (IAP). Completed draft Development Training Plans and documentation. Completed draft development of the IAP document. Completed site surveys for first Operational Demonstration at US Air Force Europe, Germany. Completed development of the Demonstration Execution Document (DED) for Demonstration 1. Completed Training in accordance with the training strategy for first demonstration. Completed planning and set-up of technical test laboratory. Completed the JDSR system design and architecture for the USAFE demonstration. Conducted USAFE operational demonstration according to measures of effectiveness and critical operational issues. Completed Quick Look Report for first demonstration. Coordinated and planned second demonstration. Completed build-up of local maintenance network software and knowledge center software. Performed initial system integration and full system tests. Modified and updated the modeling and simulation for the second operational demonstration. Initiated software and hardware certification for use in the second operational demonstration. Initiated procurement, build and integration of the JDSR system for the second operational demonstration. Initiated coordination and

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refinement of JDSR transition strategy, deployed training requirements and CONOPS and TTPs.

- **FY 2004** - Complete development of second demonstration with situational awareness, auto data capture and advance search engine. Perform second Technical Demonstration. Perform second Operational Demonstration. Update JDSR with lessons learned from the second Operational Demonstration. Perform technical demonstration for JMUA. Conduct full system, final operational demonstration in support of JMUA. Integrate JDSR ACTD technology with Joint Explosive Ordnance Disposal ACTD technology. Develop recommendations for DOTMLPF issues based on JMUA results and report. Complete development and refinement of transition plan. Submit request for Transition Technology Initiative and POM funds request for FY05/06 transition start. Complete validation of business modeling and simulation for establishing joint common maintenance processes based on JMUA results. Complete development of local maintenance network software and knowledge center software, version 1.0. Continue development of CONOPs, TTPs and training package. Prepare for EUE and initiation of transition if JMUA is positive.
- **FY 2005** - Initiate transition strategy including conduct of Extended User Evaluation of residual package, and follow-on development, acquisition and fielding. Purchase spares for EUE support. Complete CONOPs, TTPs and training package. Upgrade [as needed] business modeling and simulation for establishing joint common maintenance processes based on preliminary EUE results. Initiate transition of JDSR products to Program Of Records.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Explosive Ordnance Disposal</b>	5.300	3.200	4.900

Demonstrate a new integrated capability for joint and coalition explosive ordnance disposal forces to meet the evolving, asymmetrical, and sophisticated chemical, biological, radiological, nuclear, and high yield explosive terrorist threats.

- **FY 2003** - Conducted baseline exercises. Developed and exercised reach back capability. Integrated robotics with digital x-ray capability. Completed Joint TTPs for explosive ordnance disposal (EOD) forces conducting AT operations. Demonstrated contextual view to individual warriors based on relevance. Populated JEOD domain facts and beliefs repository. Performed initial military utility assessment.
- **FY 2004** - Complete Mission Support Center Development. Continue development of Decision Support System, Complete Technical Evaluation, conduct operational demonstration and military utility assessment for transition of initial operational capability. Complete transition plans.
- **FY 2005** - Improve Decision Support System capabilities. Conduct final ACTD Operational Demonstration and Military Utility Assessment. Field operational capability.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Language and Speech Exploitation Resources (LASER)</b>	4.200	1.100	0

Demonstrate technologies, concepts, and architecture paths providing language translation capabilities with improved interoperability, accuracy, deployability and timeliness of translation for speech and document exploitation. Assessments include users within the sponsoring Pacific Command, as well as warfighters in other combatant commands with immediate and critical language translation needs in the Global War On Terrorism.

- **FY 2003** - Conducted laboratory testing and evaluation of text-to-text and speech-to-speech automated translation projects. Identified automated translation tool

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requirements for coalition operations and intelligence operations exploiting captured documents and interrogations. Defined architecture and integration approach. Planned initial participation in coalition exercises and conducted limited military utility assessments for text and speech translation tools. Provided interim translation tools to warfighters in Operation Enduring Freedom and Operation Iraqi Freedom for intelligence, force protection and civil operations. Interim phrase translators demonstrated in Afghanistan in security and medical support operations. Interim document exploitation tools used to triage captured Al Qaeda documents.

- **FY 2004** - Develop interim assessment of military utility for technologies and concept of operations assigned to each Integrated Process Team. Plan and conduct demonstrations (including the final demonstration) in USPACOM's area of responsibility and in other areas of operations. Provide interim language translation tools for assessment in current military operations in Iraq for speech and text communication with Iraqi civil and governmental personnel as well as interrogation of terrorist forces and exploitation of intercepted documents. Document exploitation tools have already proven useful for intelligence operations to capture enemy combatants and hidden arms caches. Develop transition plan for LASER products found to have utility for military and intelligence users and begin spiral implementation through machine language translation program office. Establish oversight of language translation initiatives throughout the Government.
- **FY 2005** - Conduct capstone demonstrations and military utility assessments. Assess opportunities for residuals in combatant command areas other than the sponsor's area of operations. Field interim product improvements for demonstration and extended user evaluations in coalition and intelligence operations. Finalize concepts of operations and tactics, techniques and procedures for user adoption. Begin implementation of transition plan and joint transition program.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Micro Air Vehicle (MAV)</b>	4.000	3.400	3.100

Provide small, ground combat units with situational awareness of enemy activity using a low-cost, disposable, fully autonomous 6-9 inch unmanned aerial vehicle as an organic asset at the platoon level.

- **FY 2003** - Conducted technical analysis and developed integration plan.
- **FY 2004** - Conduct Phase 1: System requirements analysis, design and building of the air vehicle with a COTS engine. Design and development of a small, heavy fuel engine. Development of system tactics, techniques and procedures.
- **FY 2005** - Conduct field evaluations of the Phase 1 development. Complete development and production of a small, heavy fuel engine. Integrate heavy fuel engine and feedback from Phase 1 field evaluations into the Phase 2 MAV system development and production.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Pathfinder</b>	3.300	1.000	0.800

Integrate capabilities of unattended ground vehicles, air vehicles and smart sensors in a mobile, self-forming network to improve urban reconnaissance.

- **FY 2003** - Continued technology search and component evaluation. Continued appropriate limited operational evaluations (LOEs) and conduct experiments with Ranger units. Began system integration activities and formulation of the Pathfinder system architecture. Began transition planning activities.
- **FY 2004** - Complete component evaluation and technology selection. Complete system integration activities. Continue appropriate LOEs and conduct experiments with Ranger units. Continue transition activities as appropriate.

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- **FY 2005** - Conduct culminating demonstration. Commence and provide support for the extended user evaluation (EUE). Continue transition activities.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Signals Intelligence (SIGINT) Processing</b>	0	0.600	0

Provide a SIGINT processing mode to more precisely identify signals of interest and determine its military utility.

- Classified content only

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Space-Based Moving Target Indicator (SBMTI)</b>	6.300	6.300	0.600

Demonstrate space-based moving target indicator capabilities using existing platform assets.

- **FY 2003** - Developed and verified algorithms. Tested signal processing and tasking software.
- **FY 2004** - Conduct hardware assessment and testing. Conduct field evaluation of software/hardware for determining effectiveness of technology.
- **FY 2005** - Conduct final military utility assessment based on final demonstration. Conclude interim capability support phase. Provide robust requirements definition to support SD&D phase. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>SPARTAN</b>	2.300	4.000	2.400

Demonstrate an unmanned surface watercraft as a low-cost force multiplier with integrated expeditionary sensor and weapon system for use against asymmetric threats.

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- **FY 2003** - Developed and delivered an intelligence, surveillance and reconnaissance (ISR) Spartan prototype to the Second Fleet (USS Enterprise Battlegroup) for deployment. Commenced development of the Undersea Warfare Module (USWM). Continued Command Detection System (CDS) and ISR Module development and integration/testing.
- **FY 2004** - Complete development of the ISRM. Complete Mine Warfare module and demonstration. Complete spiral 2 of ISR module.
- **FY 2005** - Complete development of the Precision Strike module, as well as integration and systems testing. Complete the final demonstration and military utility assessment. Begin interim capability support phase.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Thermobarics (TB)</b>	4.100	5.700	2.400

Demonstrate an energetic, thermobaric, penetrator payload to defeat enemy tunnel facilities and weapons with two-to-three times the lethality of conventional high explosive payloads.

- **FY 2003** - Conducted full-scale validation tests. Down selected explosive fill material. Selected warhead and integrated explosive. Developed weapon effectiveness models for planning tool.
- **FY 2004** - Complete operational demonstrations of weapon and planning tool capability. Determine effectiveness of thermobaric fill in field testing scenarios. Produce residual weapons for further testing in SD&D phase or for use in contingencies.
- **FY 2005** - Conduct final demonstration. Deliver 10-20 thermobaric-filled residual warheads. Conduct user training. Support transition to SD&D phase by providing data to lead service. Complete the ACTD.

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**• FY2003 ACTDs**

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Adaptive Joint C4ISR Node (AJCN)</b>	5.027	6.300	4.300

Develops, integrates, demonstrates and transition a multi-mission radio frequency system that provides seamless interoperable communications, simultaneously with signal intelligence, electronic warfare, and information operations capabilities.

- FY 2003** -Completed contractor evaluation and initiated ACTD payload development. Validated requirements definition with Warfare Analysis Laboratory Exercise (WALEX). Demonstrated multi-mission performance baseline in laboratory demonstration and conducted a flight test on a CECOM C-23 to evaluate in-flight co-site mitigation performance. This flight test was successful and significantly reduced the risk of the FY04 Interim Joint Military Utility Assessment (IJMUA) and the FY05 Joint Military Utility Assessment (JMUA). Began integration of a Joint Tactical Radio System (JTRS) compliant software version of the Single-Channel, Ground-to-Air Radio System (SINCGARS) waveform within AJCN architecture. This waveform will be used in the FY04 IJMUA and this effort has demonstrated feasibility of porting JTRS waveforms into the AJCN architecture. Complete C-23 antenna layout and isolation measurements in preparation for the FY04 IJMUA. Initiated development of CONOPS and TTPs and training package. Initiated development of the Integrated Assessment Plan. Completed and staffed the Implementation Directive and completed and started staffing of the Management Plan.
- FY 2004** -Integrate AJCN payload and antennas on C-23 aircraft. Conduct the IJMUA at the Electronic Proving Ground at Ft. Huachuca with flight demonstrations and prepare an IJMUA report. Initiate integration of the four JMUA payloads and complete the antenna layout for the Hunter and NKC-135 aircraft that will be used in the JMUA and Extended

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User Evaluation. Continue development of CONOPS and TTPs and initiate development of the training package.

- **FY 2005** - Integrate AJCN payloads and antennas on NKC-135 and Hunter aircraft (2 each). Conduct flight tests to verify operation of payload and AJCN network and explore CONOPS. Conduct the final demonstration, JMUA exercises and prepare final report. Conduct final WALEX exercise and refine CONOPS and TTPs based on JMUA and WALEX results. Initiate transition strategy and prepare for Extended User Evaluation.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Counter Bomb/ Counter Bomber (CB2)</b>	1.000	4.600	6.100

Provides technologies to detect either suicide bombers or command initiated terrorist conventional and non-conventional explosive devices. Objectives includes improving force protection of deployed and CONUS-based forces. The CB2 ACTD was a late FY-03 new start in reaction to lessons learned during Operation Iraqi Freedom (OIF).

- **FY 2003** - Top-level planning was completed and JROC approval was obtained. The Implementation Directive was developed.
- **FY 2004** - Commence technical demonstrations. An intelligence assessment operational demonstration is planned in cooperation with INSCOM. Military utility assessments for two operational demonstrations will be completed. Planning for the USEUCOM operational demonstration will be initiated.
- **FY 2005** - Conduct the USEUCOM operational demonstration at Ramstein AFB, GE. Planning will be initiated for operational demonstrations at forward operating locations in both USEUCOM and USSOUTHCOM.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Deployable Cargo Screening (DCS)</b>	0	1.100	0.400

Provide a deployable capability to detect explosive threats in pallet loads of cargo moving in the defense transportation system.

- **FY 2003** - Identified functional requirements and operational concepts for cargo screening system. Identified critical operational issues in process of screening cargo shipped by C-17s. Identified key sensor technology requirements for integration in cargo screening system. Prepared contract for construction of pilot system.
- **FY 2004** - Develop demonstration plan. Prepare and assess concept of operations. Test and deliver pilot system to demonstration operational sites. Perform military utility assessments of the pilot systems and spiral upgrades of sensor systems. Accelerate fielding of interim system for assessment and current operational imperatives. Complete the final demonstration.
- **FY 2005** - Continue with military exercises and Ad Hoc operational and technical testing. Complete military assessment. Transition lessons learned during extended user evaluation of demonstration systems to objective cargo screening system procurements and fielding. Concepts of Operations, tactics, techniques and procedures also transitioned to Air Mobility Command trans-shipment operations. Complete the ACTD.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Foliage Penetration Synthetic Aperture Radar (FOPEN)</b>	0	0	1.200

Planned to provide real-time detection and cueing of stationary targets obscured by foliage and under camouflage using tactical and national sensors.

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- **FY 2003/4** - Targeted technologies were returned to the technology base after initiation. Alternate technologies are under examination to meet operational requirements. As a result, the final demonstration and completion date is to be determined.
- **FY 2005** - After alternate technologies are identified, reinitiate the ACTD with submission of the Implementation Directive to DUSD (AS&C). Begin initial demonstrations.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Gridlock</b>	4.000	4.500	4.000

Provided Unified and Joint Task Force Commanders the capability to quickly and automatically tie the time-sensitive advantage of tactical sensors to geospatial coordinate in support of precision guided munitions.

- **FY2003** - Completed accuracy and timeliness testing in live end-to-end laboratory technology demonstration.
- **FY2004** - Achieve accuracy and timeliness goals in Predator UAV and Global Hawk testing during JEFX 2004 at Nellis AFB. Initiate transition to operations for Predator imagery and Global Hawk Synthetic Aperture Radar (SAR) imagery upon successful achievement of goals.
- **FY2005** - Achieve accuracy and timeliness goals in Global Hawk and U-2 field exercises. Complete transition to support Predator UAV and Global Hawk operations. Provide interim capability to Coalition Air Operations Center (CAOC) and Joint Operations Centers (JOC) at selected Combatant Commander sites. Complete the final demonstration and the ACTD.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>High Altitude Airship (HAA)</b>	2.000	4.600	4.900

Provide a prototype, solar powered airship that can fly untethered at 70,000 feet altitude with 4,000 pounds of communication and surveillance payload.

- **FY2003** - Airship preliminary design completed. Included materials and envelope fabrication plans, seaming, power (generation, management, and distribution), propulsion systems, and C2 subsystem development planning. Initiated payload requirements definition, protocol identification, selection, and interface design. Performed parallel risk reduction efforts.
- **FY2004** - Complete airship vehicle design and initial development. Integrate subsystems. Perform subsystem ground tests. Complete payload interface design.
- **FY2005** - Integrate flight vehicle and initiate ground testing. Initiate integrated airship flight-testing with demonstration payload. Complete risk assessments. Initiate Military Utility Assessment (MUA).

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Blue Force Situational Awareness (JBFSA)</b>	3.400	2.000	0.900

Develops, demonstrates, and transitions seamless integration of joint blue force situational awareness tracking systems within its architecture and CONOPS/TTPs.

- **FY 2003** - Initiated development and creation of the Testbed Mission Management Center (MMC). Conducted technical demo of Spiral I functionality in Joint Warrior Interoperability Demonstration (JWID) with live feeds from BFT devices. Integrated JBFSA ACTD spiral 1 capabilities into selected venue (Jagged Thrust '03). Developed and executed Spiral 1 exercise and CONOPs and conducted QuickLook Joint Military Utility Assessment (JMUA). Determined Spiral 2 Venue (Foal Eagle 04). Started Spiral 2 exercise CONOPs. Integrated JBFSA ACTD Spiral 2 capabilities into selected venue.

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Started development of CONOPs, TTPs and training package and included Spiral 1 lessons learned. Developed ACTD transition plan and strategy. Developed Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) recommendations for all Spiral 1 activities.

- **FY 2004** - Continue planning and integration of JBFSA ACTD Spiral 2 capabilities into selected venue (Foal Eagle 04) and initialize Spiral 2 exercise CONOPs. Upgrade Testbed MMC to execute Spiral 2 as needed. Execute Spiral 2 exercise and CONOPs and conduct QuickLook JMUA. Determine Spiral 3 venue and develop Spiral 3 exercise CONOPs. Upgrade Testbed MMC to execute Spiral 2, as needed. Execute Spiral 3 exercise and CONOPs and conduct JMUA. Continue development of CONOPs, TTPs and training package based on Spiral 2 and 3 results. Finalize transition plan and strategy. Create DOTMLPF recommendations for Spiral 2 and Spiral 3 activities. Complete the final demonstration.
- **FY 2005** - Conduct Extended User Evaluations of residual package. Initiate transition of JBFSA products to targeted PORs for follow-on development, acquisition and fielding, pending results of FY04 JMUA. Review DOTMLPF recommendations based on JMUA report and results. Continue development of CONOPs, TTPs and training package.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Midnight Stand (formerly Idaho Thunder)</b>	0.200	2.900	1.300

Provides an offensive information operations program which demonstrates the ability to perform specific offensive information operations measures in a real-world environment. ACTD delayed one year due to operational requirements. Further definition is classified.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Night Vision Cave and Urban Assault (NVCUA)</b>	1.000	6.500	6.400

Provides advanced lightweight imaging sensor technologies allowing long-range surveillance identification for dismounted assault in difficult and restricted terrain.

- **FY2003** - Formed program team and establish IPTs. Prepared and coordinated Management Plan. Initiated technology development effort for Approach Sensors and Cave Assault Kit. Performed component and project level testing. Prepared exercise and evaluation plans for Operational Demonstration I. Developed initial Concepts of Operations (CONOPs) and Tactics, Techniques and Procedures (TTPs). Initiated transition planning.
- **FY2004** - Conduct Operational Demonstration I with Approach Sensors and Cave Assault Kit. Perform initial military utility assessment. Refine CONOPS and TTPs based on lessons learned from Demo I. Prepare exercise and evaluation plans for Operational Demonstration II. Initiate technology development for the Enhanced Cave Assault Kit and the Urban Assault Kit. Continue transition planning activities.
- **FY2005** - Complete development of Enhanced Cave Assault Kit and Urban Assault Kit. Conduct Operational Demonstration II. Perform Military Utility Assessment and measures of performance/measures of effectiveness analysis. Refine CONOPs, TTPs and training packages. Continue preparations for transition to acquisition.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Overwatch</b>	3.000	2.300	1.200

Provides the capability for ground forces to immediately direct precision fire support for infantry operations in land and urban warfare, peacekeeping and peace enforcement missions.



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- **FY 2003** - Collected data and extended database of small arms for theater specific weapons. Updated Overwatch system/subsystem requirements and develop hardware specs. Acquired system components (sensor, processor), integrated and tested. Updated system software for new hardware configurations including laser ranger/marker and imager. Developed initial CONOPS using Overwatch testbed.
- **FY 2004** - Install and integrate Overwatch system on HMMWV. Perform Full Scale Test 1 - a limited user test (LUT) to benchmark system performance. Develop/update classification software based on theater specific target set. Continue CONOPS development using Full Scale Test.
- **FY 2005** - Perform Major System Demonstration 1 with HMMWV based system. Develop and acquire hardware for UGV-based Overwatch system. Update system software for unattended ground vehicle (UGV) operation. Perform Full Scale Test 2 - a LUT with a UGV-based system.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Tactical Interferometric Synthetic Aperture Radar (IFSAR) Mapping (TIM)</b>	4.500	6.900	1.200

Provide theater-wide three-dimensional, fine resolution terrain data and synthetic aperture radar imagery for mission planning and rehearsal data acquisition in joint operations.

- **FY2003** - Commenced design of tactical IFSAR sensor system. Baselined IFSAR data using surrogate collection capability.
- **FY2004** - Fabricate sensor 001/002. Conduct laboratory testing and validation experimentation.
- **FY2005** - Test and integrate UAV system. Demonstrate initial collection capability. Conduct interim Military Utility Assessment (MUA).

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Theater Support Vessel (TSV)</b>	5.000	5.700	9.200

Provide a theater commander a high-speed, intra -theater sealift capability to support all theater engagement requirement within his area of responsibility including operational movement, repositioning and sustainment of combat forces.

- **FY 2003** - Contract awarded for TSV-1X, Spearhead, military modifications applied, outfitted with C4ISR tactical communications system, and deployed to CENTCOM AOR to support Operation Enduring Freedom/Operation Iraqi Freedom (OEF/OIF). Demonstrated invaluable capabilities during military operations. Contract awarded for design and production of Cargo Handling System (CHS I).
- **FY 2004** - Integrate Enroute Mission planning capability into both the HSV-X1 and TSV-1X and increase other C4 capabilities of both vessels. Install CHS I on TSV-1X. TSV-1X to return to CENTCOM AOR after CHS I modifications completed. HSV-X1 proceeding to USARPAC. Proceed with technical and operational demonstrations. Analyze various logistics support concepts. Conduct interim assessment. Research CHS II, a potential cargo handling/lift system modification for HSV-X1; if deemed feasible, award contract for production and installation.
- **FY 2005** - Integrate self-protection systems and upgrade C4I systems on both vessels. Install CHS II. Continue with military exercises and operational and technical testing. Complete the final demonstration and military utility assessment. Lessons learned transitioned to objective vessel. Concepts of Operations, tactics, techniques and procedures also transitioned.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Tunnel Target Defeat (TTD)</b>	3.000	0	0

Provides the means to defeat underground facilities and the threatening assets they protect.

- **FY2003** - Developed initial software for the Underground Target Analysis System (UTAS). Reached initial capability with the Underground Analysis and Planning System (UGAPS) database that integrates target characterization, aim point selection and high-fidelity weapons effects analysis. Updated the Munitions Effects Assessment tool to include the capability to predict ground shock and tunnel response and display the probability of damage contours on the 3D target model. Expanded the capability of the Integrated Target Planning Tool Set (ITPTS) to provide interoperability among the tools and data sources used for nuclear planning.
- **FY2004** - Conduct verification and validation program to numerically verify tunnel response and ground shock high-fidelity codes against known solutions and to validate the codes against laboratory and field tested data; finish laboratory tunnel experiments to provide test cases for high-fidelity codes to model tunnel response in jointed limestone media; perform semi-precision, in-situ field test to provide scaled tunnel response test data on an actual jointed limestone site; design nuclear ground shock simulator for full-scale ACTD target facility event to demonstrate tunnel defeat capability.
- **FY2005** - Deliver validated analysis and planning tools for use in pre-shot prediction of the main field demonstration; construct and conduct full-scale ACTD event, a high-explosive simulation test on full-size tunnels in representative geology at the Nevada Test Site; finish assessment of the end-to-end use of nuclear planning tools to characterize and weaponize the full-scale ACTD event; provide residual capabilities to

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USSTRATCOM. Complete the final demonstration.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Urban Recon (UR)</b>	1.475	1.700	1.500

Provide advanced airborne and terrestrial 3-D reconnaissance capability using rapid processing software for sensor data and decision air software.

- **FY 2003** - Designed prototype laser sensor hardware and software configurations for vehicle-mounted, soldier-borne, and UAV-mounted configurations. Developed demonstration plan to determine utility of surrogate Urban Recon data within JRX03 and acquire user feedback. Began development of 3-D data fusion software supporting automatic mosaic of 3-D image data from flash laser collections. Developed initial demonstration and assessment plans, CONOPS, TTPs and training package. Began planning for integration of laser, Global Positioning System/Inertial Measurement Unit (GPS/IMU), and gimbals on user identified UAV (15 lb payload).
- **FY 2004** - Refine prototype designs and complete development of baseline laser sensor hardware and software configurations for vehicle-mounted, soldier-borne, and UAV-mounted configurations. Integrate GPS/IMU (position/orientation system) into sensor system configuration. Integrate laser into gimbals for UAV-mounting. Develop UAV control interface to support steer/stare/step of laser over collection areas. Develop remote sensor operation software for UAV. Complete auto-mosaic data fusion software. Develop data cataloging and indexing software for mission analysis software. Conduct operational demonstration (JRX04) of vehicle-mounted, soldier-borne, and UAV-mounted laser sensors using baseline CONOPS and TTPs. Conduct Military Utility Assessment (MUA) of each integrated sensor configuration (soldier-borne, vehicle-mounted, and UAV-mounted). Continue development of CONOPS, TTPs and training package for warfighter evaluation. Initiate transition strategy based upon initial MUA results.

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- **FY 2005** - Upgrade laser to maximum performance based upon commercially available technology. Complete objective laser systems development supporting vehicle-deployed, soldier-deployed, and UAV-deployed configurations. Complete CONOPS for each objective system configuration. Conduct operational demonstration (JRX05) of vehicle-mounted, soldier-borne, and UAV-mounted laser sensors using established CONOPS and TTPs. Conduct MUA of each integrated sensor configuration. Complete development of CONOPS, TTPs and training package. Conclude transition strategy supporting follow-on development, acquisition and fielding based on successful MUA.

• <b>FY2004 ACTDs</b>
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	<b>FY 2004</b>	<b>FY 2005</b>
<b>Advanced Tactical Targeting Technology (AT3)</b>	5.00	6.100

Develops, integrates, demonstrates and transitions the ability to rapidly identify and geolocate short on-time threat emitters by fighter aircraft equipped with digital upgrades to Radar Warning Receivers (RWR) onboard. Will provide accurate target coordinates for immediate targeting by Suppression of Enemy Air Defense (SEAD) combat aircraft.

- **FY 2004** - Conduct initial Software Integration Lab (SIL) testing. Deliver initial ALR-69 with digital upgrades with AT3 insertion. Conduct F-16/RWR interface testing for RF compatibility.
- **FY 2005** - Begin initial tower testing with RWR sets to demonstrate Time Difference OF Arrival (TDOA) computation rapidly and netted. Conduct first two initial flight demonstrations and interim MUA.
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	<b>FY 2004</b>	<b>FY 2005</b>
<b>Agile Rapid Global Combat Support (ARGCS)</b>	3.000	4.900

Demonstrates Integrated Combat Support System technology that will establish a common, interoperable, scalable and morphable capability for electronics weapon systems support.

- **FY 2004** - Complete ARGCS contractor evaluation and system design. Initiate knowledge database information collection for Joint military utility assessment (JMUA).
- **FY 2005** - Complete fabrication of systems hardware/software. Conduct pre-deployment testing in a controlled environment and at beta sites.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Reception Staging &amp; Onward Movement (CORSOM)</b>	0.600	0.300

Demonstrates a set of technologies providing modeling and simulation support and establish procedures to provide Combatant Commanders with a better Reception, Staging and Onward Movement (RSOM )Planning and Execution Monitoring system for coalition deployment operations.

- **FY 2004** - Requirements capture and initial implementation of prototypes for RSOM data exchange and software extensions to NATO and national systems. Conduct laboratory testing and validation experiment.
- **FY 2005** - Finalization of prototypes and Coalition RSOM TTPs. Provide In-transit Visibility (ITV) concept and technology assessment. Provide final operational demonstration to users in a major coalition exercise.

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	<b>FY 2004</b>	<b>FY 2005</b>
<b>Coalition Shared Intelligence Network Environment (COSINE)</b>	0.200	0.300

Implement a flexible secure coalition command, control and intelligence system for sharing and collaboration information to support counter terrorist and combined/joint task force operations. COSINE is sponsored by North Atlantic Treaty Organization Allied Command Operations and Supreme Headquarters Allied Powers, Europe.

- **FY 2004** - Develop plan for addressing multi-level security and releasability policy issues. Develop interface with accredited secure network architecture for heterogeneous coalition systems. Develop interface with existing initiative to establish dynamic content based security system adaptable to changing user security attributes. Conduct preliminary demonstration of Coalition Shared Intelligence Network Environment capabilities using metadata-based publication, dissemination and retrieval rules.
- **FY 2005** - Conduct laboratory trials of interim capability and operational concepts. Test and assess concept of operations and the tactics, techniques and procedures in a broad multinational user environment. Prepare interim military utility assessment of spiral fielded capabilities. Prepare transition plan.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Future Tactical Truck System (FTTS)</b>	4.500	7.300

Demonstrates the operational potential, technical feasibility and maturity of advanced vehicle technologies through integrated demonstrations of subsystems, systems, and system of systems.

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- **FY 2004** - Test and evaluate high payoff tactical vehicle technologies coupled with future force sustainment concepts in an operation environment. Execute contract award for the demonstrator design and fabrication.
- **FY 2005** - Complete demonstrator fabrication and deliver hardware for evaluation.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Precision Airdrop System (JPADS)</b>	0.500	2.900

Develops, demonstrates a fast, flexible, direct projection-based distribution system to sustain rapidly-deployed forces at any global destination - strategically, operationally, and tactically.

- **FY 2004** - Refine tactics, techniques and procedures (TTP)/Concept of Operations (CONOPS). Perform prototype design and fabrication. Initiate system integration (Air Force Precision Airdrop System (PADS) with Army Precision, Extended Glide Airdrop System (PEGASYS)).
- **FY 2005** - Complete system integration and conduct technical testing; conduct User Training; and demonstrate a high altitude (25,000 ft. Mean Sea Level), autonomous offset airdrop capability (goal 10-20 miles offset) with the option to delivery separate and distinct payloads (up to 10,000 lbs total, full rigged weight) to multiple locations.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Joint Unmanned Systems Common Control</b>	3.500	4.300

Provides a reconfigurable and scaleable Command & control (C2) architecture that allows each service to tailor unmanned systems management to its specific mission needs



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- **FY 2004** - Develop joint requirements and preliminary CONOPS, an integrated assessment plan, and a plan for integration of legacy technologies.
- **FY 2005** - Conduct technical and operational demonstrations of the common control architecture. Conduct user training.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Man-Portable Threat Warning System (MANPACK)</b>	4.500	6.100

Develops an individual, network-capable, situational threat warning ensemble using an open, plug-and-play architecture, which is user configurable. MANPACK will provide a small, mobile, lightweight intelligence warning package which requires minimal power.

- **FY 2004** - Conduct technology search of existing off-the-shelf capabilities and perform limited integration leading to a baseline MANPACK ensemble. Develop CONOPS and finalize MOEs/MOPs. Develop initial TTPs and take delivery of the Demo I systems. Begin user training.
- **FY 2005** - Complete first demonstration. Identify early transition opportunities. Take delivery of Demo II systems and continue user training.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Multi-Sensor Aerospace/Ground Joint ISR Interoperability Coalition (MAJIIC)</b>	2.500	2.100

Develop, test and transition a set of standards, extensible Markup Language (XML) formats, and information services to promote intelligence, surveillance and reconnaissance (ISR) interoperability between U.S. and Coalition ground stations and systems. Demonstrate near-real time interoperability of data from electro-optical, infrared, motion video, moving target imagery, synthetic aperture radar, and other sensors. Enhance collaborative

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targeting operations, improve situational awareness, and support U.S. Joint ISR operations. U.S. Joint Forces Command is the operational sponsor.

- **FY 2004** - Complete contractor selection and initiate ISR Information Service (ISRIS) design and development. Demonstrate initial ISRIS capability during the Horizontal Fusion Quantum Leap exercise. Develop initial MAJIIC Concept of Operations (CONOPS).
- **FY 2005** - Conduct ISRIS laboratory testing and CONOPS validation experimentation. Initiate the MAJIIC Project multinational working groups. Expand ISRIS support to additional platform and sensors.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>PI</b>	2.500	2.400

Classified content only.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Protected Landing and Takeoff (PLATO)</b>	1.000	1.200

Assist in the development of an affordable Man-Portable Air Defense (MANPAD) countermeasures system that evaluates the use of a ground-based sensor grid in the vicinity of airports. The Protection for Landing and Take-Off (PLATO) ACTD has been delayed pending interagency agreement between the Department of Defense and the Department of Homeland Security on a coordinated strategy of investment for countermeasures to the Man-Portable Air Defense System (MANPADS) terrorist threat.

- **FY 2004** - Measure infrared (IR) signatures of civil aircraft at a U.S. airport. Begin development of digital missile engagement models. Assess sensors to support the grid. Conduct reactive pyrophorics effectiveness modeling. Sensor fusion system development.

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- **FY 2005** - Hardware in the loop missile engagement model development. Conduct ground-based sensor development test and evaluation. Conduct reactive pyrophorics flight evaluation. Complete a sensor fusion system flight test.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Psychological Operations (PSYOP) Global Reach</b>	2.900	8.100

Provide extended range over which the PSYOP message can be delivered, develop capabilities to disseminate products multi-dimensionally across extended ranges into denied areas, including over-the-air and new internet based methods. Advance the capabilities of automated planning processes through collaborative technologies, integrated into special operations forces (SOF) planning systems.

- **FY 2004** - Initiate development/integration of satellite radio, television, and broadcast systems; UAV based broadcast/relay payloads; and the PSYOP mission planning system.
- **FY 2005** - Begin development/integration of advanced broadcast/relay platforms and scatterable dissemination media. Perform demonstration of satellite TV systems. Begin transition of satellite TV capability to warfighter.

	<b>FY 2004</b>	<b>FY 2005</b>
<b>Theater Effects-Based Operations (TEBO)</b>	4.000	5.400

The TEBO ACTD will provide Combatant Commanders with enhanced capabilities to analyze, plan, execute, and assess Effects Based Operations (EBO) at the strategic and operational levels by integrating computer-aided decision support tools, Concept of Operations (CONOPS), and Tactics, Techniques and Procedures (TTPs) into Integrated Mission Architectures.

- **FY 2004** - Establish EBO baseline for US Forces Korea (USFK). Demonstrate prototype

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applications and tools for EBO and Operational Net Assessment (ONA) based on US Joint Forces Command (JFCOM) developments. Initiate CONOPS development. Establish integration and test facility. Participate in USFK and JFCOM exercises.

- **FY 2005** - Initiate development of EBO action planning tools and visualization tools. Conduct soldier-in-the-loop testing. Conduct initial military utility assessment. Continue CONOPS development. Participate in USFK and JFCOM exercises.

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** N/A. The majority of funding from this Program Element is forwarded directly to the Services/Defense Agencies who manage all contracting and support requirements.

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**F. Specific funding for each ACTD by fiscal year of new start** *(Dollars in Millions).*

<u>FY 1997 ACTDs</u>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Chemical Add-On to Biological Detection*	0	0	0
Consequence Management*	0	0	0
Counterproliferation II**	0	0	0
Extending the Littoral Battlespace & JTF Warnet*	13.800	0	0
Information Operations Planning Tool*	0	0	0
Integrated Collection Management*	0	0	0
Joint Advanced Health and Usage Monitoring System**	1.200	0.800	0
Military Operations in Urban Terrain*	0	0	0
Rapid Terrain Visualization*	0	0	0

\* Completed

\*\* Completed the demonstration phase of the ACTD.

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<b>FY 1998 ACTDs</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Adaptive Course of Action*	0	0	0
C4I for Coalition Warfare*	0	0	0
High Powered Microwave*	0	0	0
Information Assurance: AIDE*	0	0	0
Joint Bio Remote Early Warning System*	0	0	0
Joint Continuous Strike Environment*	0	0	0
Joint Modular Lighter System*	0	0	0
Line-of-Sight Anti-Tank	0	0	0
Link 16*	0	0	0
Migration Defense Intelligence Threat Data System*	0	0	0
Precision Targeting Identification*	0	0	0
Space Based Space Surveillance Operations*	0	0	0
Theater Precision Strike Operations*	0	0	0
Unattended Ground Sensors*	0	0	0

\*Completed

\*\* Completed the demonstration phase of the ACTD

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<b>FY 1999 ACTDs</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Battle Damage Assessment in the Joint Targeting Toolbox*	0	0	0
Coherent Analytical Computing Environment**	0.400	0	0
Common Spectral MASINT Exploitation Capability*	0	0	0
Compact Environment Anomaly Sensor II*	0.100	0	0
Force Medical Protection*	0	0	0
Human Intelligence and Counterintelligence Support Tools*	1.700	0	0
Joint Medical Operations Telemedicine*	0	0	0
Joint Theater Logistics**	0	0	0
Personnel Recovery Mission Software*	0	0	0
Small Unit Logistics*	0	0	0
Theater Air and Missile Defense Interoperability*	0.500	0	0

\*Completed

\*\* Completed the demonstration phase of the ACTD

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<b><u>FY 2000 ACTDs</u></b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
CINC 21**	6.000	1.500	0.400
Coalition Aerial Surveillance and Reconnaissance	2.400	3.000	0.600
Communication/Navigation Outage Forecasting System	2.000	0.500	0
Computerized Operational MASINT Weather	1.200	0	0
Content-Based Information Security	0	0	0
Global Monitoring of ISR Space Systems	0.300	0.200	0
Ground-To-Air Passive Surveillance	1.200	0	0
Joint Intelligence, Surveillance and Reconnaissance	0	0	0
Multiple Link Antenna System	3.900	0	0
Quick Bolt**	5.800	0	0
Restoration of Operations**	1.700	1.700	0
Tri-Band Antenna Signal Combiner*	0	0	0

\*Completed

\*\* Completed the demonstration phase of the ACTD

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<b>FY 2001 ACTDs</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Active Network Intrusion Defense	1.800	1.900	1.200
Adaptive Battlespace Awareness	3.400	1.800	1.200
Advanced Tactical Laser (Note 2)	5.800	5.800	3.500
Advanced Technology Ordnance Surveillance	0.700	0.700	0.800
Area Cruise Missile Defense**	1.800	0	0
Coalition Combat Identification	5.800	4.600	3.100
Coalition Theater Logistics	0.300	2.300	0
Coastal Area Protection System*	0	0	0
Hunter Standoff Killer Team	8.400	6.300	4.300
Joint Area Clearance	1.500	1.100	0
Loitering Electronic Warfare Killer***	0.200	0.200	0
Network-Centric Collaborative Targeting	5.800	5.700	1.200
Personnel Recovery Extraction Survivability Aided by Smart Sensors	5.800	5.200	0
Tactical Missile System Penetrator	10.900	0.600	0
Theater Integrated Planning Subsystem	0.700	0.700	0.300

\*Completed

\*\* Completed the demonstration phase of the ACTD

\*\*\* This ACTD was concluded in early FY04 and returned to the technical base due to technical maturity issues.

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<b><u>FY 2002 ACTDs</u></b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Active Denial System	1.700	7.700	3.700
Advanced Notices	3.500	0.600	0.600
Agent Defeat Warhead	2.400	3.400	4.300
Agile Transportation for the 21 <sup>st</sup> Century (AT21)	2.000	3.100	1.000
Coalition Information Assurance Common Operational Picture	2.200	3.600	3.800
Contamination Avoidance at Seaports of Debarkation	3.100	3.400	1.200
Expendable Unmanned Aerial Vehicle	3.900	0.700	0.500
Homeland Security Command and Control	6.700	6.300	3.700
Hyperspectral Collection and Analysis	3.500	1.600	0.200
Joint Distance Support and Response	2.900	3.700	2.800
Joint Explosive Ordnance Disposal	5.300	3.200	4.900
Language and Speech Exploitation Resources	4.200	1.100	0
Micro Air Vehicle	4.000	3.400	3.100
Pathfinder	3.300	1.000	0.8
Signals Intelligence Processing	0	0.600	0
Space-Based Moving Target Indicator	6.300	6.300	0.600
SPARTAN	2.300	4.000	2.400
Thermobarics	4.100	5.700	2.400

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<b>FY 2003 ACTDs</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Adaptive Joint C4ISR Node	5.027	6.300	4.300
Counter Bomb/ Counter Bomber	1.000	4.600	6.100
Deployable Cargo Screening	0	1.100	0.400
Foliage Penetration Synthetic Aperture Radar	0	0	1.200
Gridlock	4.000	4.500	4.000
High Altitude Airship	2.000	4.600	4.900
Joint Blue Force Situational Awareness	3.400	2.000	0.900
Midnight Stand (formerly Idaho Thunder)	0.200	2.900	1.300
Night Vision Cave and Urban Assault	1.000	6.500	6.400
Overwatch	3.000	2.300	1.200
Tactical IFSAR Mapping	4.500	6.900	1.200
Theater Support Vessel	5.000	5.700	9.200
Tunnel Target Defeat	3.000	0	0
Urban Recon	1.475	1.700	1.500

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<b><u>FY 2004 ACTDs</u></b>	<b>FY 2004</b>	<b>FY 2005</b>
Advanced Tactical Targeting Technology	5.000	6.100
Agile Rapid Global Combat Support	3.000	4.900
Coalition Reception Staging and Inward Movement	0.600	0.300
Coalition Shared Intelligence Network Environment	0.200	0.300
Future Tactical Truck System	4.500	7.300
Joint Precision Airdrop System	0.500	2.900
Joint Unmanned System Common Control	3.500	4.300
Man-Portable Threat Warning System	4.500	6.100
Multi-Sensor Aerospace/ Ground Joint ISR Interoperability Coalition	2.500	2.100
PI	2.500	2.400
Protected Landing and Takeoff	1.000	1.200
Psychological Operations Global Reach	2.900	8.100
Theater Effects-Based Operations	4.000	5.400

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Exhibit R-2 RDT&E Project Justification (Fiscal Year 2005 Budget Estimates)								February 2004	
APPROPRIATION0/BUDGET ACTIVITY						R-1 ITEM NOMENCLATURE			
RDT&E/Defense-Wide/BA 3						Joint Warfighting Program, PE 0603727D8Z			
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.850	10.284	9.936	10.268	10.514	10.958	11.204	Continue	Continue
Joint Warfighting/P727	8.850	10.284	9.936	10.268	10.514	10.958	11.204	Continue	Continue

**A. Mission Description and Budget Item Justification**

In May 1998 the Secretary of Defense appointed U.S. Joint Forces Command (formerly the U.S. Atlantic Command), as the Defense Department's Executive Agent for Joint Experimentation. Subsequently, the Department realigned resources to support the Joint Forces Command's new role. In FY 1999 funds from this JWP Program Element (PE: 0603727D8Z) were redirected to support the initial stand-up of Joint Forces Command's Joint Experimentation Directorate. Funding for joint experiments was transferred to Joint Forces Command through the Navy and PE 0603727N in FY 2000 and was established to provide Joint Forces Command with its own funding source. Funding to support the Joint Advanced Warfighting Program (JAWP) concept development, the Information Technology Backplane (ITB), and Technology Feeder Support (TFS) for joint experimentation was retained in the JWP PE. The DoD Adaptive Red Team (DART) was initiated as a pilot project in FY 2002. DART has proven to be very successful by providing an independent team of experts to challenge emerging operational concepts from their origin through the experimentation process. It has been continued as a key element of the Joint Warfighting Program starting in FY 2003.

The Joint Warfighting PE supports four related activities: the JAWP, the ITB, DART and TFS for Joint Experimentation. While these activities strongly support Joint Forces Command's joint experimentation efforts, a separate program element has been retained since the activities support

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<b>APPROPRIATION0/BUDGET ACTIVITY</b> RDT&E/Defense-Wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> Joint Warfighting Program, PE 0603727D8Z	

other organizations in addition to Joint Forces Command, and they require a degree of independence from Joint Forces Command to function as envisioned.

The JAWP was established by the Office of the Secretary of Defense (OSD), with the support of the Vice Chairman of the Joint Chiefs, to serve as a catalyst for innovation and change. This program's focus is on assisting in the formulation and assessment of advanced concepts and capabilities, plus identifying enabling technologies and integration options for the Department. These concepts drive changes in the doctrine, organization, training and education, materiel, leadership and facilities (DOTMLF) of the Services. The JAWP serves an essential independent role in identifying, exploring and evaluating breakthrough war fighting capabilities. It helps capture and builds on lessons learned from joint contingency operations and earlier joint and Service experimentation. From that foundation, it identifies and helps formulate breakthrough joint concepts, explores their effectiveness by designing and conducting joint experiments, and helps streamline implementation processes. Its work complements and supports the activities of Joint Forces Command, the Joint Staff, and the OSD by providing a uniquely informed independent source of advice. In identifying and elaborating innovative joint concepts and capabilities and associated enabling technologies, the JAWP helps integrate related Service efforts and those of Combatant Commanders and Defense agencies. Through its influence in a wide range of DoD transformation efforts, the JAWP promotes integration, bringing greater coherence to efforts that would otherwise be tangential or disconnected. The JAWP is composed of both civilian and military members. Its military component is the JAWP Analytical Project Office (JAWP-APO), a jointly manned activity established by the Deputy Secretary of Defense, consisting of equal numbers of military personnel from all four Services. The active duty military members provide a current operational perspective to concepts under investigation and serve as a vital link to ongoing relevant activities in the Services.

The ITB provides an advanced network infrastructure that extends commercial capabilities to meet JV2020 needs. Information Superiority is a key JV2020 building block and the ITB provides

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<b>APPROPRIATION0/BUDGET ACTIVITY</b> RDT&E/Defense-Wide/BA 3	<b>R-1 ITEM NOMENCLATURE</b> Joint Warfighting Program, PE 0603727D8Z	

the means to experiment with the digital transmission capabilities that are projected to be available five years (from each funding year). The ITB is not a new physical network. It is a virtual network that capitalizes on existing physical networks such as the Defense Information Systems Network (DISN), the DISN Asynchronous Transfer Mode Service Network (DATMS), the Defense Research and Engineering Network (DREN), and the experimental Advanced Technology Demonstration Network (ATDnet). The ITB has many users from sites served by existing networks but the funding included in this PE is the incremental funding needed to support joint experimentation. For example, this PE provides the circuit costs to extend the ITB from the experimentation site to the nearest point on the backplane (where no other network exists), and only the "extra" backplane costs generated by the Joint Warfighting Experiments. Since joint experiments are very dependent on advanced distributed simulation, or on limited, live, command post exercises that are being driven by simulations, a robust high-performance network is needed to interconnect the various sites. These simulations press the state of the art in networking capability, including that of requiring high-bandwidth, low-latency Type-I encryption for protected communications. The ITB also supports new bandwidth-intensive applications such as video teleconferencing, high definition television and large file transfers.

The third effort supported by this PE is TFS for joint experiments. There are many Technology Demonstrations (TDs), Advanced Technology Demonstrations (ATDs), and Advanced Concept Technology Demonstrations (ACTDs) that can provide advanced technologies to support joint experiments. For example, the Joint Staff has prepared 72 desired operational capabilities based on JV2020 concepts and 21st Century Challenges. For each Challenge, the Joint Staff has prepared roadmaps that provide opportunities to assess each Challenge. The roadmap for the battlefield awareness challenge shows 42 ACTDs that have the potential to demonstrate some aspect of a desired operational capability supporting battlefield awareness. This effort provides technology managers the resources to expand the scope of a test or demonstration to collect data for the joint staff or JFCOM, thereby leveraging the OSD and Service ACTD investment. The Technology Feeder Support effort was used to initiate a Red Team Pilot Project (DoD Adaptive Red Team - DART) for Joint Forces Command. The DART participated in Joint Forces Command Concept Development and

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Experimentation to provide an independent assessment that will ensure that product quality stays high and credible. This source of funding, which is separate from other Joint Forces Experimentation funding, will provide the necessary independence.

The DART has been established as a separate project starting with the FY2003 budget. The DART has assisted USJFCOM in the preparation for MILLENNIUM CHALLENGE 2002 and assisted United States Central Command (USCENTCOM) and United States South Command (USSOCOM) in preparation for real world operations in Operation Enduring Freedom. It will continue to provide an independent source of Red Teaming expertise to challenge operational concept development from their origin through experimentation and into execution.

**B. Program Change Summary**

<b>PE: 0603727D8Z</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Previous President's Budget	9.296	9.685	9.948
Current FY 2005 President's Budget	8.850	10.284	9.936
Total Adjustments:	-.446	.599	.012
Congressional Program Reductions			
Congressional rescissions			
Congressional increases		.750	
Reprogrammings			
SBIR/SSTR Transfer			
Other	-.446	.750	.012

**C. Other Program Funding Summary: N/A**



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Exhibit R-2a RDT&E Project Justification (Fiscal Year 2005 Budget Estimates)								February 2004	
APPROPRIATION0/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3						R-1 ITEM NOMENCLATURE Joint Warfighting , PE 0603727D8Z			
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.850	0.284	9.936	0.268	10.514	0.958	11.204	Continue	Continue
Joint Warfighting/P727	8.850	0.284	9.936	0.268	10.514	0.958	11.204	Continue	Continue

**A. Mission Description and Budget Item Justification**

In May 1998 the Secretary of Defense appointed U.S. Joint Forces Command (formerly the U.S. Atlantic Command), as the Defense Department's Executive Agent for Joint Experimentation. Subsequently, the Department realigned resources to support the Joint Forces Command's new role.

**B. Program Accomplishments and Plans:**

	FY 2003	FY 2004	FY 2005
Joint Advanced Warfighting Program (JAWP)	4.500	4.500	4.635

- FY 2003** - In February 2003, the JAWP's role in transformation was abruptly expanded. The Commander Joint Forces Command requested the JAWP's participation in the identification, collection, and analysis of operational-level joint lessons during Operation Iraqi Freedom (OIF). That role, initially intended to last only 90 days to help JFCOM during the war, was subsequently extended through FY04. Within 10 days of alert, the JAWP deployed 9 of its military members to joint headquarters throughout Southwest Asia and JAWP's senior military officer, BG Cone, led the JFCOM/JAWP joint lessons learned team, totaling over 50 people throughout the

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remainder of the FY, reporting jointly to Commander, US Central Command and Commander, US Joint Forces Command. Throughout the war, other members of the JAWP participated in the collection of lessons at joint deployment, sustainment, mobilization, targeting, intelligence, and information operations activities in CONUS and analyzing emerging lessons at JFCOM's Suffolk facilities. These efforts resulted in BG Cone briefing the President, Vice President, Secretary of Defense, Chairman of the Joint Chiefs of Staff, all Service Chiefs, and most Combatant Commanders on salient lessons. At the Secretary's direction, the effort continued after the war to identify, collect, and analyze lessons from post-major combat operations in Iraq. Five of the JAWP's members, including 3 civilians, deployed to Iraq for varying periods beginning in August 2003 while others continued supporting the effort at Suffolk and Alexandria. Although the lessons learned effort consumed most of the JAWP's resources for 10 months, the JAWP still managed to help JFCOM assume the Joint Urban Operations Executive Agent role, design and coordinate a major urban-centered human-in-the-loop experiment, develop a draft joint urban operations master plan, develop joint urban operations concepts used during OIF, provide advice on language for the Defense Planning Guidance and Transformation Planning Guidance, initiate work on streamlining implementation, and provide advice on issues for the next Unified Command Plan review.

- **FY 2004** -The JAWP will continue to support JFCOM's Joint Center for Lessons Learned by identifying and collecting lessons from the Global War on Terrorism. To do so, the JAWP will conduct the collection and analysis effort from OSD, the Joint Staff, the Intelligence community, and the departments of State and Justice. It will also coordinate and help integrate the overall global lessons learned effort from a JAWP-led cell at Headquarters SOCOM and a JAWP-led analysis cell at JFCOM. That effort will continue throughout the FY and will involve more than two thirds of the JAWP's resources. JAWP will also lead and help man JFCOM's Joint Urban Resolve Experiment. The experiment will explore joint command and control organization; integration of manned and unmanned capabilities for reconnaissance and combat applications; and innovative ways to overcome opponents' protective measures in an urban environment.

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Vulnerability assessments and "Red Teaming" will be conducted to improve the experiment's validity and robustness. A complementary effort for OSD AS&C will identify opportunities to leverage and integrate Service, allied and other agency programs. The latter effort will help integrate the independent joint command and control initiatives of United States Pacific Command (USPACOM), USCENTCOM, JFCOM, and Service command and control capabilities to help attain the Secretary's objective of establishing a more standardized and responsive joint command and control structure worldwide. A component of the task is to help identify and exploit opportunities facilitating the early transition of new concepts and technologies to operational capabilities. JAWP will conclude its support for JFCOM in its assumption of duties as DoD's Executive Agent for Joint Urban Operations in 2Q04 and concurrently wrap up its support to OSD and the Joint Staff on the next Unified Command Plan. Finally, JAWP will lead an effort supporting OSD and the Joint Staff on developing key concepts for capabilities based planning.

- **FY 2005** - Will continue support of the Department's transformation objectives through joint experimentation and joint concept development. Specifically, the JAWP will continue its Urban Resolve experiment and initiate a continuing experiment extending through FY06 to exploit insights gained from earlier experimentation. It will concurrently help identify an implementation path for a worldwide joint command and control structure emphasizing the creation of standing Joint Force Headquarters as the command and control foundation on which future joint operations will be based.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Information Technology Backplane (ITB)</b>	1.400	1.500	1.545

- **FY 2003** - The ITB support for wide-area network connectivity for joint warfighting experimentation will continue, as will the ongoing task of transitioning emerging technology from advanced research network test beds. Information assurance and other security technologies

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will continue to be developed, tested and deployed. Efforts to use multicast and net-flow monitoring and analysis to determine and map traffic-flow prioritization to WAN QoS will begin. Deployment of high-quality, low-latency video teleconferencing and collaboration will continue. Efforts in support of JFCOM, FBE and ad-hoc experimentation will continue including supporting JFCOM's goal of bringing supercomputer assets to bear on M&S problems and providing an ongoing set of events through their Continuous Experiment Environment (CEE). Assistance will be given to the planning and execution of Pinnacle Impact '03 and planning of Pinnacle Vision '04 (formerly Olympic Challenge '04) Connectivity to key sites will continue with selected circuits and equipment upgraded as required.

- **FY 2004** - The ITB support for wide-area network connectivity for joint warfighting experimentation will continue, as will the ongoing task of transitioning emerging technology from advanced research network test beds. Information assurance and other security technologies will continue to be developed, tested and deployed. Multicast and net-flow monitoring and analysis tools which determine and map traffic-flow prioritization to WAN QoS will be fielded. Efforts in support of JFCOM, FBE and ad-hoc experimentation will continue including JFCOM's Continuous Experiment Environment (CEE). Assistance will be given to the planning and execution of Pinnacle Vision '04 (formerly Olympic Challenge '04). Connectivity to key sites will continue with selected circuits and equipment upgraded as required.
- **FY 2005** - The ITB support for wide-area network connectivity for joint warfighting experimentation will continue, as will the ongoing task of transitioning emerging technology from advanced research network test beds. Information assurance and other security technologies will continue to be developed, tested and deployed. Efforts in support of JFCOM, FBE and ad-hoc experimentation will continue. Assistance will be given to the planning and execution of Pinnacle Challenge '05 (since this is a major DoD effort, this will require significant resources). Connectivity to key sites will continue with selected circuits and equipment upgraded as required.

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	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>Technology Feeder Support (TFS)</b>	0.950	1.034	1.065

- **FY 2003** - The primary effort of this project in FY 2003 was the enhancement of Joint Experimentation efforts in US Pacific Command. TFS funding was used to accelerate PACOM experimentation efforts in Information Flow Analysis & Control, Joint Enroute Mission Planning and Rehearsal System, Theater Effects Based Operations, PACOM Standing Joint Force HQ Development, Deployable Joint Command & Control Theater Validation and JTF WARNET experimentation. This was done by funding the major experimental series of events in PACOM which center around the periodic C2X experiments which focus on all of the above operational concepts and prototypes. With no independent funding for experimentation initiatives, PACOM would be unable to move forward on these important initiatives without OSD funding. With the assistance of this funding, PACOM was able to make important progress in each of the experimentation areas described above and maintain its momentum as a leader in defense transformation.
- **FY 2004** - The major effort planned for support by the TFS project will be to ensure that technology applications (ACTDs /ATDs) are injected into Pinnacle Vision 2004. It is anticipated that the major foci of the 2004 joint experiment will be on Standing Joint Force Headquarters and Theater Effects Based Operations so significant effort will be applied to ensure that appropriate technologies to support these operational concepts will be available to enhance this experiment. The support of combatant commander (other than JFCOM) experimentation will continue.
- **FY 2005** - The major effort planned for support by the TFS project will be to ensure that technology applications (ACTDs /ATDs) are injected into FY05 experiments conducted by JFCOM and

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other combatant commanders. It is anticipated that implementation of the Standing Joint Forces Headquarters and other Transformation efforts will continue to be the focus of experimentation efforts. Technology resources will be focused to support this effort. The support of combatant commander (other than JFCOM) experimentation will continue.

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
<b>DoD Adaptive Red Team (DART)</b>	2.000	2.500	2.691

- **FY 2003** - DART is established as a separate project because of its significant success as a pilot project. DART will assist JFCOM in concept development of the Standing Joint Force Headquarters in preparation for future joint experiments. DART will also assist in the red teaming of counter terrorism experimentation and JAWP's Future Joint Force II Experiment. DART will also assist other combatant commanders in the development, execution and red teaming of joint experimentation to be conducted by those commands. DART will also assist senior departmental leadership in red teaming any operational concepts for potential real world operations to be conducted in 2003. DART will also devise a Code of Best Practices for red teaming to assist the entire Department in improving the red teaming process.
- **FY 2004** - DART will continue to react to inputs from a Senior Advisory Group, DART has begun to shift its emphasis away from Joint Forces Command to supporting Combat Command (COCOM) requirements. Examples include extensive involvement with PACOM's Counter-Bio program, a biological defense initiative; Red Teaming SOUTHCOM's anti-FARC operations; and support for NORTHCOM's exercise program. Ongoing, albeit reduced levels of participation with JFCOM include Red Teaming the OIF After-action Report, and reviewing strategies for Capabilities Based Planning. DART continues to directly support AS&C with activities relating to Counter-

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Bomber 2 and Active Denial ACTD programs. Finally, DART published five Code of Best Practices documents with three more in the works.

- FY 2005** - DART will continue to support PACOM, SOUTHCOM, and NORTHCOM will expand to include EUCOM (defining requirements above the Corps level), US Forces Korea (an expansion of Counter-Bio to include employment Bio-defense considerations); and STRATCOM (assisting in establishing an internal RED TEAM). Urban Operations support to JFCOM is envisioned along with other activities as needed. ACTD support will continue. Valuable technical, as well as employment and deployment considerations are invaluable in refining the residual products for AS&C. Best practices and Senior Advisory Group activities will continue. Finally, interaction with DoD Intelligence, looking critically at how certain products are produced will institute another inter-agency relationship inside DoD.

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		<b>FY 2004</b>
<b>Congressional Plus Up (JFCOM Rapid Database Development)</b>		0.750

- FY 2004** - The Rapid Distributed Database Development (RD3) is a critical element in creating a Joint, National Training Capability, which allows Joint Force Commanders and their components to employ Live, Virtual and Constructive Simulations to support Regional Combatant Commanders' (RCC) operational and training requirements for mission relevant planning, training and mission rehearsal. This capability will also support US Joint Forces Command's requirement to perform Joint Training and Joint Experimentation. This project focuses on the definition, design, development, and integration of a systems approach to collecting, manipulating, storing, and retrieving mission relevant data in a usable form to support anticipated future Joint and service requirements for mission planning, training, mission rehearsal, and experimentation. The intent of RD3 is to reduce the development time for live, virtual and constructive simulation, C4 and other databases in support of Joint requirements for conducting mission planning, joint training, mission rehearsal, and joint experimentation events in accordance with the Joint National Training Capability concept. These requirements were validated by the RCCs and Services during the NOV 03 Joint Training Requirements Group, which stipulated the need for training systems flexible enough to support the rapid, reactive planning and rehearsal for real world operations.



Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E. Defense-Wide BA3				R-1 Item Nomenclature: <b>PE 0603716D8Z</b> Strategic Environmental Research and Development Program (SERDP)				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	50.938	49.883	56.936	60.358	61.189	63.048	64.528	
SERDP P470	50.938	49.883	56.936	60.358	61.189	63.048	64.528	
<b>A. Mission Description and Budget Item Justification:</b>								
<b>(U)      <u>Brief Description of Element:</u></b>								
<p>(U) Congress established the Strategic Environmental Research and Development Program (SERDP) in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns. It is conducted as a DoD program, jointly planned and executed by the DoD, DOE, and the Environmental Protection Agency (EPA), with strong participation by other Federal agencies, industry, and academia. SERDP's objective is to improve DoD mission readiness by providing new knowledge, cost-effective technologies, and demonstrations in the areas of environmental Cleanup, Unexploded Ordnance (UXO), Compliance, Conservation, and Pollution Prevention. SERDP does this by (1) addressing high priority, mission-relevant, defense environmental technology needs necessary to enhance military operations, improve military systems' effectiveness, enhance military training/readiness, sustain DoD's training and testing range infrastructure, and help ensure the safety and welfare of military personnel and their dependents; and (2) enhancing pollution prevention capabilities to reduce operational and life-cycle costs, as well as reducing the cost of necessary cleanup actions and compliance with laws and regulations. As a secondary benefit, SERDP helps solve significant national and international environmental problems. The keys to a growing list of SERDP technological successes are the ability to respond aggressively to these priority defense needs; the pursuit of universal, world-class technical excellence; emphasis on constant technology transfer to field use; and sound fiscal management. The apparent increase represents a return to historical levels in prior years' requests.</p>								
<b>B. Program Change Summary:</b> (Show total funding, schedule, and technical changes for the program element that have occurred since the previous President's Budget Submission)								

	FY 2003	FY 2004	FY 2005
Previous President's Budget	52.543	47.068	60.012
Current FY 2005 President's Budget	50.938	49.883	56.936
Total Adjustments	1.605	-2.815	3.076
Congressional program reductions	1.605		
Congressional rescissions			
Congressional increases		-3.550	
Reprogrammings		0.735	3.076
SBIR/STTR Transfer			
Other			

**C. Other Program Funding Summary: NA**

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E. Defense-wide BA 3				PE 0603716D8Z Strategic Environmental Research and Development Program (SERDP)				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
SERDP P470	50.938	49.883	56.936	60.358	61.189	63.048	64.528	
<b>A. Mission Description and Budget Item Justification:</b>								
(U) Congress established the Strategic Environmental Research and Development Program (SERDP) in 1990 (10 U.S.C. Section 2901-2904) to address Department of Defense (DoD) and Department of Energy (DOE) environmental concerns.								
<b>B. Accomplishments/Planned Program</b>								
Pollution Prevention	FY 2003		FY 2004		FY 2005			
Accomplishment/ Effort/Subtotal Cost	10.514		10.813		12.434			
<b>(U) FY 2003 Accomplishments:</b> Pollution Prevention: Efforts to eliminate or reduce the use and emissions of carcinogenic chromium were successful on several fronts; from a new corrosion resistant steel to novel polymers for corrosion protection to a chromate-free dry-coating technology. Efforts continued in tagging technologies to permit the remote localization and identification of UXO; environmentally acceptable oxidizers to replace perchlorate in pyrotechnic flares; the reduction of particulate emissions from gas turbine and diesel engines; the environmental fate, transport and effects of the new energetic material CL-20; environmentally benign polymer matrix composites; and environmentally benign packaging for military rations. Several new projects were successfully launched in FY 2003. They included: environmentally acceptable alternatives to chrome coating systems, and environmentally benign impact initiation devices and detonators for "green" medium caliber munitions.								
<b>(U) FY 2004 Plans:</b> Pollution Prevention: The development of "green" munitions and weapon systems that will not impact on the environment are core objectives of pollution prevention. Projects include elimination of hazardous materials from medium caliber munitions and pyrotechnics as well as novel,								

environmentally preferable synthesis methods for energetic compounds that are found in both explosives and propellants. SERDP will also continue to pursue technologies that will permit the "greening" of our industrial complex. The elimination or reduction of toxic and hazardous materials from our weapons systems and platforms and the processes that we use to repair and maintain them remains a primary objective. These projects include developing environmentally acceptable alternatives to ammonium perchlorate in missile fuels. These technology needs are addressed by both continuing and new start projects.

**(U) FY 2005 Plans:** Pollution Prevention:

New starts include the elimination of hazardous "redwater" from explosives (TNT) manufacturing; cadmium plating on high-strength steels; and solvents containing Class II ozone depleting substances. Additional new initiatives that will be funded in FY 2005 include alternatives to perchlorate in incendiary mixes and pyrotechnic formulations; Hazardous Air Pollutant (HAP)-free solvents, and environmentally benign "green" gun barrels for medium caliber weapons.

Compliance	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	8.902	8.111	9.817

**(U) FY 2003 Accomplishments:** Compliance:

An extensive ongoing program to determine the levels of explosives contamination on training and testing ranges and the determination of the fate and transport of these materials into the environment continued to yield a new understanding of the impact of military operations on the soil and groundwater at training ranges. This new knowledge combined with technologies to measure air emissions from the firing of munitions will contribute to the sustainable management of our ranges. New technologies to measure and characterize fine particulate matter in the air from military systems were successfully concluded and will permit the Department to comply with emerging EPA regulations. Projects to develop technologies for estimating the impact of DoD activities on marine estuaries and technologies to control aquatic non-indigenous species in Navy ships successfully concluded. New projects to develop technologies to measure and model the emissions from off-road training ranges vehicles were initiated.

**(U) FY 2004 Plans:** Compliance:

The focus of Compliance projects continues to be the development of technologies needed to support the sustainability of DoD's training and testing ranges. Specific attention is focused on the emissions from munitions and the fate and effect of explosive materials on the ranges. Related efforts include technologies for the measurement and control of air emissions from military vehicles. The other major driving issue is the need to understand the level of explosives residues on the ranges; how they are transported off the range and what effect they have in the environment. Specifically, the development of methods to measure and control air emissions from both tactical vehicles and munitions is key as are methods to assess the impact of noise. New starts in FY 2004 specifically address military noise prediction on ranges.

**(U) FY 2005 Plans:** Compliance:

New starts include dust emissions factors on ranges, and air toxic emissions factors for military aircraft engines. SERDP will be funding efforts to understand naturally occurring sources of perchlorate and methods for the treatment of perchlorate in drinking water. Ammonium perchlorate is a constituent of sold rocket fuel which is being found in drinking water sources with increasing frequency. In 1997 SERDP identified perchlorate as problem contaminant for DoD and the nation, and recently, EPA has begun the process to regulate this compound. Additional new initiatives that will be funded in FY05 to ensure the continued use and sustainability of our training ranges include characterizing the source term of energetic compounds in aquatic environments; exposure assessments of energetics; and innovative monitoring systems for impulse noise.

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Conservation	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	9.704	8.661	10.471	

**(U) FY 2003 Accomplishments:** Conservation:

The extensive efforts at Fort Benning, GA under the SERDP Ecosystem Management Project (SEMP) continued to develop land management techniques for installations and ranges. Work on an evaluation of the impact of military noise on marine mammals as well as protocols to control invasive plants on DoD installations that impair training activities continued to make progress. Methods to assess and predict the impact of urbanization and encroachment on our ranges are in their third year of effort. Continuing projects also focused on techniques to cost effectively detect and evaluate cultural resources on DoD ranges that fall under the Native America Graves Protection and Reparation Act; and the development of resilient wear-resistant plants for military training lands. New technologies to detect and control invasive aquatic species that are carried in Navy ships' ballast water are under development. Continuing projects are determining the impact of military operations on threatened and endangered species and develop methods and protocols for managing our natural resources in estuaries that are dominated by military activity.

**(U) FY 2004 Plans:** Conservation:

To ensure the sustained use of military ranges, SERDP in FY 2004 requested proposals for innovative technologies to conduct cost effective inventorying and monitoring of and quantification of impact of military operations on Threatened and Endangered Species, prediction of marine mammal distribution, and cost effective control of invasive species on ranges. Ecosystem management techniques for installations and ranges continues to dominate the Conservation thrust area as the SEMP project initiates the next round of projects on adaptive management. Work on technologies to detect and assess cultural resources also continues.

**(U) FY 2005 Plans:** Conservation:

New starts include understanding and managing invasive plant species that negatively affect training activities and the prediction of marine mammal population densities. Additional new initiatives that will be funded in FY 2005 to: characterize military activities that contribute to the transport of non-indigenous species; monitor migratory

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bird species on military lands; and develop remote sensing technologies to identify threatened/endangered species habitats to meet requirements of the Endangered Species Act and Migratory Bird Treaty Act.

Cleanup	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	10.112	9.191	11.125	

**(U) FY 2003 Accomplishments:** Cleanup:

SERDP-funded advances in bioremediation have been successful for two other major sources of pollution: the munitions constituents (explosives, propellants & pyrotechnics) found on ranges; and the chlorinated solvents (TCE, PCE) found at over half of DoD sites. Significant efforts continued in FY2003 to develop technologies to reduce the effort and cost associated with the long-term monitoring of sites that are undergoing cleanup. Projects continue to develop both biological and abiotic technologies to address the remediation of munitions constituents in soil and groundwater. The development of in-situ alternatives to decades-long "pump and treat" solutions to chlorinated solvent remediation continued, including aggressive chemical treatment of source zones, bioremediation and monitored natural attenuation. Other continuing projects included source zone delineation, new diagnostic procedures for evaluating performance and new technologies for the sequestration of toxic heavy metals in soils, such as lead on small arms ranges.

**(U) FY 2004 Plans:** Cleanup:

Projects were initiated in FY 2004 to develop advanced technologies for the remediation of munitions constituents on ranges; abiotic remediation of chlorinated solvents; cost-effective, in-place remediation of sediments; and the remediation of heavy metals. Contamination of drinking water with chlorinated solvents remains a significant issue for many military bases.

**(U) FY2005 Plans: Cleanup:**

New start projects will address the improved scientific understanding and innovative cost effective methods for the bioremediation of munitions constituents, specifically energetics and nitroaromatic compounds. Additional initiatives will be funded in FY05 to develop new technologies to: 1) better understand the scientific principles behind the thermal treatment of contaminants; 2) cost-effectively remediate new emerging contaminants in soil and groundwater and explosives and propellant-contaminated surface runoff; and 3) to improve risk assessments at DoD sites with ecological soil screening levels and wildlife toxicity reference values and to with screening level risk assessments of energetics contaminated soil and groundwater.

Unexploded Ordnance (UXO)	FY 2003	FY 2004	FY 2005
Accomplishment/ Effort/Subtotal Cost	11.706	10.292	13.089

**(U) FY 2003 Accomplishments: Unexploded Ordnance (UXO):**

In FY 2003 the investment in UXO increased to address a broad range of aspects of the UXO issue. These efforts ranged from next generation sensors to multiple sensor platforms to improved, precise geolocation systems to underwater detection and discrimination phenomena and system design to advanced signal processing. Two standardized test sites for the demonstration and evaluation UXO technologies became fully functional. New starts focused on innovative, high risk, high payoff sensor designs.

**(U) FY 2004 Plans: UXO:** SERDP continued its commitment to advance the state of the art in UXO detection and discrimination technologies. Projects were funded in FY 2004 to develop advanced approaches for detecting and discriminating UXO, identifying filler material in recovered UXO, and characterizing and remediating underwater UXO sites.

**(U) FY 2005 Plans: UXO:** New starts include a project to develop methods for UXO discrimination using time and frequency domain Electromagnetic Induction. Additional new initiatives in FY 2005 will develop site characterization and remediation technologies for underwater UXO-contaminated sites; advanced navigation systems for portable platforms; magnetometers or electromagnetic induction sensors and processing; and to perform systems integration studies.



**C. Other Program Funding Summary:** NA

**D. Acquisition Strategy.** Not required for Budget Activity 3.

**Major Performers:** None

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense-Wide, Budget Activity 3					R-1 Item Nomenclature: SPECIAL TECHNOLOGY SUPPORT PE 0603704D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	12.878	13.495						

**A. Mission Description and Budget Item Justification:**

Special Technology Support to Intelligence and Light Forces is a classified program. See the Congressional Justification Book for program details.

**FY 2003 Accomplishments:**

- Mission Support \$12.878 million

**FY 2004 Accomplishments:**

- Mission Support \$13.495 million

**FY 2005 Plans:**

(see R-2 for BA 6)

**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)

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	11.168	11.693	
Current BES	12.878	13.495	
Total Adjustments	1.710	1.802	
Congressional program reductions			
Congressional rescissions, inflation	-.083		
Congressional increases	2.100	2.000	
Reprogrammings	-.307	-.198	
SBIR/STTR Transfer			

**Change Summary Explanation:**

FY 2003: Congressional add +2.100; Non-pay purchase inflation adjustments -.083; Reprogramming adjustments -.307

FY 2004: Congressional add +2.000; Reprogramming adjustments -.198

FY 2005: Transferred to BA 6

**C. Other Program Funding Summary:** Not Applicable.

**D. Acquisition Strategy.** Not Applicable.

UNCLASSIFIED

<b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>					Date: February 2004	
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 3			R-1 ITEM NOMENCLATURE J-UCAS Advanced Technology                      PE 0603400D8Z Development and Risk Reduction			
COST (\$ in millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
PE 0603400D8Z	-	284.617	77.785	-	-	-

**A. Mission Description and Budget Item Justification:**

The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint DARPA, Air Force, and Navy effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture. The J-UCAS program combines 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. Although these efforts were targeted towards service-specific needs, 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, will reduce the risk of the system being developed for the joint early operational assessment. The J-UCAS concept incorporates the next generation Boeing X-45C family and Northrop Grumman X-47B family of air vehicles, together with a common architecture and subsystems (e.g. sensors, communications, and command & control software). These common system elements will maximize system flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint early operational assessment planned for the FY07-09 timeframe. The J-UCAS Office integrates DARPA, Air Force, and Navy personnel, operating in close coordination with Service users and other components. The program is focused on achieving a joint early operational assessment that supports both Services and enables an operational system development decision by the end of the decade. PE 0603400D8Z is for Advanced Technology Development and Risk Reduction, which funds the completion of demonstrations of the X-45A technology demonstrator and continued development of the Boeing X-45C and Northrop Grumman X-47B demonstrator systems, originally initiated under the UCAV and UCAV-N programs.

**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	-	-	-
Current FY 2005 President's Budget	-	-	284.617
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			

**C. Other Program Funding Summary:**

	UNCLASSIFIED						
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY2009</u>
PE 0604400D8Z, OSD	-	-	422.873	667.307	380.105	1,043.498	986.156
PE 0603114N, Navy	-	117.865	-				
PE 0604731F, Air Force	-	174.449	-				
PE 0207256F, Air Force	-	2.305	-				
PE 0603285E, DARPA	-	38.385	-				

**D. Acquisition Strategy:**

The J-UCAS Advanced Technology Development and Risk Reduction acquisition strategy is to prove the basic technological feasibility of the J-UCAS concept with the X-45A technology demonstrator and to prove the military utility through the next generation demonstrators – the X-45C and the X-47B demonstrators. This effort is tightly coupled with PE 0604400D8Z (J-UCAS Advanced Component and Prototype Development), which complements the work under this program element to deliver systems for the joint early operational assessment, using a common architecture and subsystems.

Exhibit R-2a, RDT&E Budget Item Justification						Date: February 2004		
APPROPRIATION/BUDGET ACTIVITY DEFENSE WIDE RDT&E BA 3				R-1 ITEM NOMENCLATURE J-UCAS Advanced Technology Development and Risk Reduction PE 0603400D8Z				
COST (\$ in millions)			FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
J-UCAS			0.000	284.617	77.785	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 DARPA, Air Force, and Navy effort to develop and demonstrate unmanned combat capabilities for high-threat Suppression of Enemy of Air Defense (SEAD), Surveillance/Reconnaissance, and related strike missions within the emerging global command and control architecture. The J-UCAS program combines 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. Although these efforts were targeted towards service-specific needs, 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, will reduce the risk of the system being developed for the joint early operational assessment. The J-UCAS concept incorporates the next generation Boeing X-45C family and Northrop Grumman X-47B family of air vehicles, together with a common architecture and subsystems (e.g. sensors, communications, and command & control software). These common system elements will maximize system flexibility and operational versatility, while reducing overall costs and maintaining schedule toward a joint early operational assessment planned for the FY07-09 timeframe. The J-UCAS Office integrates DARPA, Air Force, and Navy personnel, operating in close coordination with Service users and other components. The program is focused on achieving a joint early operational assessment that supports both Services and enables an operational system development decision by the end of the decade. PE 0603400D8Z is for Advanced Technology Development and Risk Reduction, which funds the completion of demonstrations of the X-45A technology demonstrator and continued development of the Boeing X-45C and Northrop Grumman X-47B demonstrator systems, originally initiated under the UCAV and UCAV-N programs.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	0.000	0.000	284.617

Planned Program:

- Continue development of J-UCAS systems, specifically the Boeing X-45C and Northrop Grumman X-47B air vehicles as well as the common operating system and sensors.
- Prepare for joint early Operational Assessment (OA).

**C. Other Program Funding Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
PE 0604400D8Z, OSD	-	-	422.873
PE 0603114N, Navy	-	117.865	-

UNCLASSIFIED

PE 0604731F, Air Force	-	174.449	-
PE 0207256F, Air Force	-	2.305	-
PE 0603285E, DARPA	-	38.385	-

**D. Acquisition Strategy:**

The J-UCAS Advanced Technology Development and Risk Reduction acquisition strategy is to prove the basic technological feasibility of the J-UCAS concept with the X-45A technology demonstrator and to prove the military utility through the next generation demonstrators – the X-45C and the X-47B demonstrators. This effort is tightly coupled with PE 0604400D8Z (J-UCAS Advanced Component and Prototype Development), which complements the work under this program element to deliver systems for the joint early operational assessment, using a common architecture and subsystems.

**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

UNCLASSIFIED

Fiscal Year (FY) Budget Estimates RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2004	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3					R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D8Z			
COST (In Millions)	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	FY 2008	FY 2009	
Total Program Element (PE) Cost	4.403	0	0	0	0	0	0	

**A. Mission Description and Budget Item Justification**

(U) Automatic Target Recognition (ATR) systems improve the capabilities of our armed forces by enabling them to make better use of the information provided by such military sensor systems as radar, laser, infrared (IR), hyperspectral, identification friend or foe (IFF), and electronic signal measurement (ESM). ATR enhances the combat capabilities of our forces by increasing the lethality and survivability of our weapon systems and decreasing the time required to acquire and identify potential targets. ATR technology reduces our risk of fratricide by augmenting combat identification systems to improve our ability to distinguish between friend, foe, or neutral forces under high stress conditions. ATR technology provides significant workload reduction for the intelligence forces by aiding the image analyst to exploit imagery rapidly and accurately. In an era of decreasing military manpower, improved ATR will enable our forces to handle an ever increasing load of sensory information in the complex situations to be encountered in the military missions of the future. ATR capabilities are becoming essential to the Warfighter, as the Services pursue `network-centric` concepts for exploiting sensor imagery and information acquired through large arrays of sensors at all echelons. Probability of target detection, recognition, and identification can be significantly increased while significantly reducing false alarm rates by exploiting multi-sensor fusion concepts for ATR algorithms.

(U) Increasing ATR operational effectiveness requires research and development to enhance sensors and algorithmic image processing. Additionally, improved, more efficient procedures must be developed for measuring and demonstrating ATR effectiveness. This is very important as the utility of ATR is highly dependent on the quality of the information provided by the sensor system(s) and the ability to process that information effectively to provide reliable decisions with operationally acceptable false alarm rates. Service and Agency ATR efforts have concentrated on



<b>Fiscal Year (FY) 2005 Budget Estimates</b>		February 2004
<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition <b>PE 0603232D8Z</b>	

algorithm development for conducting post-processing comparison and decision making which exploit improved digital computational capability. This program will focus on determining effectiveness of ATR, establishing benchmark metrics, and conducting and collecting single and multi-sensor data for potential reuse in Service and Agency algorithm development and objective evaluation. Consistent with the 1997 report of the Defense Science Board Task Force on ATR, this program will establish standard tests and procedures to provide an `honest broker` assessment of current leading candidate ATR's, as well as emerging ATR technology for the next generation of ATR systems.

(U) The ATR program funds the integration and demonstration of advanced technology for field experimentation and assessment. The result of the ATR program efforts is the integration of the demonstrated technological capabilities and the capability to assess algorithms and various technologies. This leads to greatly improved understanding of the Joint Warfighting utility when assessed in realistic operational contexts. The Military Services provide air, land, and naval technological superiority, respectively, and ACTDs rapidly prototype and transition technological solutions to specific threat scenarios. This program provides timely resources and flexibility to horizontally integrate technology solutions across Services and Agencies and identify new and emerging ATR systems with confidence so that this critical technology can be fielded more quickly.

(U) The Automatic Target Recognition (ATR) program is in its final year and focuses on three different areas. The first area is the closeout of prior efforts. Prior year efforts provided DoD-wide collaborative environment for ATR algorithm development and evaluation, focused on providing DoD-wide standard problem sets/realistic scenarios. Closeout efforts include Hyperspectral Assessment, creation of DoD-wide standards, procedures, metrics and common evaluation tools for realistic ATR evaluations, and the distribution of standardized Data Sets using realistic scenarios (targets in clutter) for algorithm development, testing and training. The second focus area provides a coordinate multi-service/agency data collection to further ATR technology development and assessment and allow for evaluation of multispectral sensor fusion ATR technology.

The three focus area develops a transition plan of the ATR program to the Services/Agencies for FY04 and establishes the process for continued OSD oversight.

<b>Fiscal Year (FY) 2005 Budget Estimates</b>		February 2004
<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition <b>PE 0603232D8Z</b>	

<b>B. Program Change Summary:</b>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	5.367	0.000	0.000
Current FY 2005 President's Budget	4.403	0.000	0.000
Total Adjustments	-.964		
Congressional program reductions	-.964		
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			

<b>Fiscal Year (FY) 2005 Budget Estimates</b> <b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition <b>PE 0603232D8Z</b>	

<b>Fiscal Year (FY) 2005 Budget Estimates</b> <b>Exhibit R-2a, RDT&amp;E Project Justification</b>							Date: February 2004
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Appropriation/Budget Activity RDT&E, D BA3	<b>Project Name and Number</b> <b>Automatic Target Recognition</b> <b>PE 0603232D8Z</b>						
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Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
ATR/P232	4.403	0	0	0	0	0	0

**A. Mission Description and Budget Item Justification:**

(U)Automatic Target Recognition (ATR) systems improve the capabilities of our armed forces by enabling them to make better use of the information provided by such military sensor systems as radar, laser, infrared (IR), hyperspectral, identification friend or foe (IFF), and electronic signal measurement (ESM). ATR enhances the combat capabilities of our forces by increasing the lethality and survivability of our weapon systems and decreasing the time required to acquire and identify potential targets

(U) Increasing ATR operational effectiveness requires research and development to enhance sensors and algorithmic image processing. Additionally, improved, more efficient procedures must be developed for measuring and demonstrating ATR effectiveness.

(U) The ATR program funds the integration and demonstration of advanced technology for field experimentation and assessment. The result of the ATR program efforts is the integration of the demonstrated technological capabilities and the capability to assess algorithms and various technologies

**B. Accomplishments/Planned Program:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
<b>Automatic Target Recognition</b>	4.403	0	0

<b>Fiscal Year (FY) 2005 Budget Estimates</b> <b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>		February 2004
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition <b>PE 0603232D8Z</b>	

**(U)FY 2003 Accomplishments:**

(U) The Automatic Target Recognition (ATR) program is in its final year and focuses on three different areas. The first area is the closeout of prior efforts. Prior year efforts provided DoD-wide collaborative environment for ATR algorithm development and evaluation, focused on providing DoD-wide standard problem sets/realistic scenarios. Closeout efforts include Hyperspectral Assessment, creation of DoD-wide standards, procedures, metrics and common evaluation tools for realistic ATR evaluations, and the distribution of standardized Data Sets using realistic scenarios (targets in clutter) for algorithm development, testing and training. The second focus area provides a coordinate multi-service/agency data collection to further ATR technology development and assessment and allow for evaluation of multispectral sensor fusion ATR technology. The three focus area develops a transition plan of the ATR program to the Services/Agencies for FY 2004 and establishes the process for continued OSD oversight.

**C. Other Program Funding Summary: None**

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3			R-1 Item Nomenclature: Joint DoD/DOE Munitions PE 0603225D8Z					
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	18.124	24.648	23.319	25.256	25.552	26.015	26.012	
DoD/DOE Munitions/P225	18.124	24.648	23.319	25.256	25.552	26.015	26.012	
<b>(U) A. Mission Description and Budget Item Justification:</b>								
<p>(U) The Joint DoD/DOE Munitions Technology Program has the mission of exploration and development of technologies intended to bring about major improvements in non-nuclear munitions technology. A memorandum of understanding between DoD and DOE provides the necessary basis for long-term commitment of resources of the DOE and a similar long-term commitment of the enabling DoD support for this effort. The continuous fusion of DOE technology with Service needs has provided major advances in warfighting capabilities and plays a crucial role in the exploration, development, and transition of new technologies of interest to the Services. The program provides a unique opportunity for the collaboration of DoD and DOE scientists to explore technologies of programmatic interest to both departments, within a structured program of established Departmental reviews and milestones. The interdepartmental collaboration allows exchange of information and the focusing on achievement of goals of interest to the Department, utilizing the substantial investment in the scientific resources of the DOE. The budgeted program funds represented here are supplemented by additional matching DOE funds.</p> <p>(U) Over the last three years, there has been an increased programmatic emphasis on developing technologies of particular value to counter-terrorism capabilities and asymmetric warfare. Initial successes have already emerged from this focus with products currently in the field. The increase in Budget for FY 2004 and beyond was designed specifically to focus additional program efforts on exploring and developing technologies to transform the operational capabilities of the warfighter. Two specific efforts were targeted for this increase: The first is the support of a new and rapidly emerging technology employing inert-loaded explosives which will enable precision lethality munitions; The second is the support of accelerated development of advanced initiation systems which will provide increased reliability, capability, and fieldability of Service munitions. The inclusion of precision lethality munitions within the Joint Program is significant from a number of points of view. The program goal is the development of the</p>								

understanding as well as the demonstration of the capability for a precision lethality munition, which combines substantially increased lethality within a prescribed region, with a low collateral damage beyond that region. Other anticipated characteristics of the precision lethality munitions are a reduced size over current munitions and satisfaction of insensitive munition requirements. The attainment of this goal requires simultaneous developments in the multiple program areas of energetic materials, computations and modeling, composites, penetration and warhead technology. This integrated effort within the Joint Program is a new approach which we believe will speed the transition of new technology through the development process. This effort has the strong support of all the Services and Special Operations Command. The advanced initiation systems effort is intended to develop a capability for the rapid fabrication and evaluation of multi-point initiation systems, which are critical to miniature, adaptable output munitions. The capability will greatly reduce the time and cost to design, develop, and implement the required advanced initiation systems. All Services have needs for the miniature, highly reliable, and adaptable initiation systems targeted by this development effort.

(U) The program effort is divided into five technology areas of interest to Department munitions, each of which is described below. The names of some of the technology areas have been modified to better reflect the content of the projects contained within. In addition, some projects have been re-allocated among the technology areas between FY2003 and FY2004, to better describe the functional area within the munition that will benefit from the project output.

(U) Sensors and fuzing are a critical components in every Department munition system. A fuze must ensure personnel safety by preventing unintended weapon detonation, know when to allow arming of a firing mechanism, detect the target through the use of sensors, and initiate detonation when required. With a growing emphasis on hard target defeat, advanced fuze systems must be able to survive and function in increasingly higher-velocity, higher-g penetration environments. One method of surviving high-g environments is through the miniaturization, integration, and/or robust packaging of conventional fuze components such as detonators, switches, transformers, capacitors, and sensors. In support of this technology area this program continues to demonstrate advances in miniaturizing high-voltage Electronic Safe and Arm Devices (ESAD) through research and development of low-energy detonator / booster combinations and miniature capacitive discharge units (CDUs). This focus builds on recent advances in micro-detonic/energetic materials research, and MEMS Safe and Arm Devices (MEMS-SAD). Efforts in this portion of the program generally advance fuze technology development and ultimately provide the DoD

and DOE with viable fuzing components for all weapons, particularly hard-target-defeat munitions (penetrators) and small, intelligent low-cost applications (artillery). Over the next five years this portion of the program will work toward demonstrating emerging technologies that support robust, intelligent fuzing that can survive and function in environments exceeding 30,000 G's. Advanced initiation technology is an enabler for the next generation of warheads that will be aimable, target adaptable, and survivable. This area is targeted for increased funding as described above.

(U) There is a growing need in the United States to develop energetic materials (EMs) that, when integrated into munitions, offer advantages of enhanced lethality against a variety of targets. Lighter and/or less bulky munitions significantly impact the logistics burden on military actions. Similarly, a decrease in hazard classification brought about by the use of insensitive energetic materials and better design will greatly decrease transportation and storage logistics costs. Smarter munitions, capable of selectable, differential output, are another boon to military agility. Hence, there is also need for advanced EMs that can be used in small-scale devices such as distributed fuzing systems. In addition, as the intended environments have become more severe, EM's must survive setback forces in guns and severe impact forces in hard-target penetration applications. Work in energetic materials was aligned with the recommendations from the DoD 2000 Weapons Technology Area Review and Assessment (TARA) and is coordinated with the recently established national initiative in advanced energetic materials. This aspect of the program is aimed at developing the next-generation of EMs that have increased energy density over those in our current inventory while remaining insensitive to extreme environments. An additional requirement is that the energy be released in an appropriate time domain to allow optimized coupling to the target. For enhanced lethal effects the energy must be released either in the detonation reaction zone, or early enough in the expansion so that it couples to impulse loading or sustains high temperatures. Material ingredients that contribute to energy release later than that offer no enhancement in lethality. A fundamentally new approach to increasing lethality while simultaneously reducing collateral damage is being investigated. Holding much potential for modern warfighting scenarios, this new material formulation provides increased performance while meeting insensitive munition standards. For microdevices suitable for distributed fuzing systems the requirement on energy release is very exacting in order to sustain reaction propagation in environments with extensive shock and heating losses. Like advanced initiation, advanced energetic materials are enabling technology for the next generation of weapon systems that will be safer, smaller and more lethal.

(U) The ability to accurately predict the behavior of weapons in their operating

environment of extreme pressure, temperature, and velocity is essential to the development of lethal, accurate, and cost effective systems. To meet the needs of the DoD and DOE communities, there is a requirement for validated capabilities using high-performance computing hardware and software that are sufficient to carry out a broad class of continuum mechanics simulations where shock waves, nonlinear dynamics, and multi-material gas dynamics are important. In particular, this aspect of the program focuses on numerical and algorithmic improvements to enhance our problem solving capabilities for munitions development, advanced energetics, and target lethality predictions with significantly improved material models that accurately represent the material in dynamic states. Three general classes of codes offer solutions to the varied requirements posed by the defense community in the shock analysis regime. Eulerian shock physics tools are effective for a large number of conventional weapons and advanced energetics related simulations. Anywhere there is very large material deformation and turbulent mixing, Eulerian formulations are the most efficient. A second class of codes addresses the large, nonlinear dynamics that can be important for weapons design and development. Such Lagrangian calculations provide design information that complements information provided by the Eulerian shock physics codes. For example, many penetration problems involve detailed structural mechanics that are not appropriate for Eulerian codes. A third class of tools combines capabilities by using arbitrary Lagrangian-Eulerian (ALE) algorithms to solve the conservation equations appropriate for shock analysis. This class of codes performs a range of simulations such as penetration mechanics, thermal cook-off, and fragment impact where multi-physics phenomena descriptions are required across a wide range of time scales, which cannot be addressed adequately with either Eulerian or Lagrangian codes. These codes and associated validated material models represent the future in modeling complex dynamics encountered in a broad spectrum of applications across the defense community. To date, the Department utilization of these capabilities is primarily in the S&T community. It is desirable to extend developing modeling and simulation tools into the engineering design community and this program will continue to provide supporting computational tools.

(U) There is a worldwide trend to harden more military facilities. Increasingly, these are being buried in layered earth and concrete "cut and cover" constructions, tunneled into mountainsides, or mined into rock far beneath the earth's surface. Buried structures accounted for a significant number of targets attacked by our forces during the Gulf, Afghanistan, and Iraq wars, and much of our military planning is being devoted to defeating them. A major thrust of this program continues to be hard target defeat. As hard target weapons evolve, several technical issues need to be addressed.



Specifically, penetrators striking targets with obliquity or with high angles of attack experience violent dynamic responses that can fail their cases or interfere with the functionality of fuzes. Similarly, oblique, low velocity target impacts can result in ricochet, undesirable shallow trajectories, or bouncing out of the target. In general, new delivery vehicles tend to be smaller and faster, requiring smaller penetrators that carry less payload and must survive more stressing impacts. Developing improved penetrating weapons depends on a solid understanding of the physics of penetration as well as affordable materials and processes to execute new designs that require more strength and durability from the penetrator. Although we can predict penetration depth with acceptable confidence, there are some targets for which we have insufficient data and experience; consequently, predicting the path a penetrator will take and whether it will survive is much less certain. This program provides a fundamental penetration technology base that addresses many of these issues and enables our future strike weapons. Additionally, warhead concepts which greatly extend the current range of capabilities in speed and tailored target effects are being explored. With increasing emphasis and interest in defeating targets of military interest in civilian areas, and of defeating and neutralizing WMD facilities, the application of energy to target must be thoroughly controlled and understood. This requirement places new demands on warhead output, which are being pursued under this program.

(U) DoD and DOE efforts toward munitions lifecycle technologies including stockpile aging, surveillance, demilitarization and disposal are coordinated under the auspices of this program. The Department has a large and growing inventory of conventional munitions in its demilitarization stockpile. Currently, the stockpile includes more than 400,000 tons and it is expanding by about 70,000-100,000 tons per year. As the long term focus for demilitarization and disposal in DoD turns from open-burn and open-detonation to resource recycle and recovery, alternative technologies are required to turn waste materials into useful products. The technologies developed in this portion of the program enhance DoD capabilities to field safe, cost-effective processes for disposal, resource recovery, and reutilization of munitions and munitions components. For an aged weapons stockpile that has not reached end of useful life, reliability and surety will change with time because of the age-related degradation of constituent materials. Existing stockpile assessment methods typically focus on addressing materials aging and reliability problems after they occur, rather than on anticipating and avoiding future problems or failure mechanisms. The predictive materials aging and reliability portion of this program is focused on improving our ability to understand, measure, predict, and mitigate safety and reliability problems caused by materials aging degradation in weapons systems. Together with complementary demilitarization technologies, this focus provides

a base of scientific knowledge and understanding that enhances the Department's ability to efficiently support the late phases of weapon lifecycle. Efficient management of existing stockpile assets is an economically necessary precursor to weapon system modernization.

**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	18.623	25.011	25.351
Current FY 2005 President's Budget	18.124	24.648	23.319
Total Adjustments	-.499	-.363	-2.032
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other		0.363	2.032

**C. Other Program Funding Summary: N/A**

**Acquisition Strategy. N/A**

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, Defense Wide/BA 3				Project Name and Number Joint DoD/DOE Munitions PE 0603225D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
DoD/DOE Munitions/P225	18.124	24.648	23.319	25.256	25.552	26.015	26.012	
<p><b>(U) A. Mission Description and Budget Item Justification:</b></p> <p>(U) This R&amp;D program is a cooperative, jointly funded effort between DoD and DOE to pursue new and innovative warhead, explosive, and fuze technologies in order to bring about major improvements in non-nuclear munitions. This program supports the development and exploration of new munitions concepts and technology preceding system engineering development. Through our funding arrangement with DOE, DoD resources are matched. More importantly, this relatively small DoD contribution effectively taps the annual billion-dollar DOE RDT&amp;E investment by accessing the specialized skills, scientific equipment, facilities and computational tools not available in DoD.</p> <p>(U) The effort exploits the extensive and highly developed technology base resident in the National Laboratories relevant to achieving the goal of developing capable, cost-effective conventional munitions, and leverages DoD investments with matching DOE investments. The current program supports 44 projects in warhead technology, energetic materials, advanced initiation and fuze development, munitions lifecycle technology, and munitions modeling and simulation. A specific Service laboratory sponsors each of these projects. The program is administered and reviewed by a Joint Technical Advisory Committee composed of members from the Army, Navy, Air Force, Special Operations Command, OSD, and DOE. Projects are peer-reviewed semi-annually by DoD Service Laboratory/Technical Center personnel in order to monitor technical excellence and ensure that the technologies under development address priority DoD needs. The program is integrated with Service efforts through the Project Reliance Weapons Panel and participation in the Defense Technology Area Plan for Conventional Weapons. The program is reviewed under the Technology Area Review and Assessment process. After reviewing the program, the most recent Weapons TARA panel assessed the program as follows: broad range of products transitioned to DoD as a result of program efforts; effectively leverages DOE expertise and funding; critical computational tools provided to DoD; well integrated into</p>								

Service efforts; Technology Coordination Groups provide an effective forum for technical collaboration.

**B. Accomplishments/Planned Program**

<b>Accomplishment/Effort/Su btotal Cost</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	
Initiation, Fuzing, and Sensors	3.111	5.70	4.690	

(U) **FY 2003 Accomplishments:**

(U) In FY 2003, improvement of electronic safing, arming and firing systems continued with a focus on miniaturization, cost reduction and shock survivability for hard target penetrators. This year, miniaturization of the next generation microCDU continues with modeling of the discrete electronic components. The current design has a package volume of 0.030 in<sup>3</sup>. The components were assembled and mounted onto a CDU flex cable configuration designed to wrap around the ceramic capacitor, operated at 1000 V, and successfully demonstrated to hold off 1500V. In late FY2002 detonation of HNS or CL-20 explosive with this microCDU design will be demonstrated. In support of a viable fuze industrial base, work is ongoing with Raymond Engineering and other suppliers on improving the manufacturing process for chip detonators and characterizing their performance. Nanostructured Multi Layer (NML) technology has the potential of reducing the size of a fireset capacitor by a factor of 10 to 100. Towards this goal, a total of 68 NML one, two, three, and four capacitors, of four different configurations were fabricated and are currently awaiting testing. This is the first important step towards the fabrication of an NML capacitor of greatly reduced volume. As low voltage fuze architectures are developed, it is anticipated that the ability to physically move or

block fire train elements (e.g. micro energetic materials) will be a primary feature of out-of-line systems. In support of these architectures, the ability to integrate micro energetic materials with MEMS devices will become a crucial technology. Accordingly, an effort is in place to learn how to preferentially load or coat simple MEMS structures with film energetic materials. Specifically, methods for patterning explosive materials using both reactive ion etch and lift-off techniques were successfully studied. As a result of this initial inquiries, a dedicated energetic material deposition system is being has been installed at Sandia which will enable the production of microenergetic devices by sequential CHNO deposition. Towards the program goal of demonstrating a prototype ESAD in a high-velocity penetrator in FY2003, characterization of detonators, capacitors, and switches in shock environments for application to hard target munitions was completed. A principal issue in multipoint initiation systems remains determination of the physical reasons for power-sharing inefficiencies and/or current oscillations in multipoint slapper arrays. In order to address this issue, current distribution was measured for incorporation into a validated electrical model that can be used to optimize multipoint array design. Support and development of the knowledge base tool for preservation of advanced initiation technology continued with an expanded scope that included other fireset components beyond detonators.

(U) In the sensors are, there is uniquely important work on precision guidance based on synthetic aperture radar (SAR) technology. While currently employed in UAVs, there is a need for a much reduced weight, reduced cost SAR, termed miniSAR. In 2003, the designs for the key components were completed and fabrication begun.

**(U) FY 2004 Plans:**

(U) A new project is starting with a focus on millimeter scale initiation and detonation. This work will attempt to understand the behavior and response of thin layers and small quantities of explosives, as are required for all MEMS based fuzing and microfiresets. This is a key enabling technology for miniature munitions and remains a largely unstudied field. Specific work plans for 2004 include measurement of run to detonation and failure diameter studies on HNS-IV, CL-20 and high surface area PETN. Development and demonstration of improved components and architectures for robust, low-cost, miniature safing, arming and firing systems will continue. Individual control of multiple initiation sites within a warhead using silicon fireset circuits will be demonstrated. Initial testing of extrudable explosive formulations will be completed

and evaluation will continue and commercial sources for a robust manufacturing technology base will be explored. An integrated capacitor and switch in a single package will be demonstrated for use as a next generation microfuze component. Current state of the art micro-fuze technology will be applied and focused on Special Operations Forces (SOF) requirements in order to enhance and expand SOF capabilities in various mission scenarios. The latest miniaturization technology will be transitioned to production-type facilities and to the Services in order to begin exploitation. The study to understand and predict instabilities in multiple-slapper, highly miniaturized systems will be completed towards the design of highly reliable and uniquely flexible ordnance systems. Experiments will be performed that will enable development of the theory and models of explosive behavior in very small geometries (microdetonics). Materials resulting from new formulations and the sol-gel process will be characterized and performance tested. MEMS devices will be characterized and tested in stressing high-g environments. Complete most subsystems of the miniSAR and form an industrial partnership to develop components, where appropriate.

**(U) FY 2005 Plans:**

(U) Conduct tests to demonstrate and evaluate the utility of rapidly prototyped multipoint initiation systems to enhance the performance of munitions. Evaluate reduction in development cycle time and cost achieved by rapid prototyping, as well as improvement in multi-point bridge performance gained from careful control of individual bridge geometry. Continue component miniaturization and cost reduction efforts. Demonstrate a packaged microtransformer for use in miniaturized munitions. Complete streak photography and VISAR diagnostic measurements for improved slapper detonator efficiency. Perform Detonation Shock Dynamics (DSD) analysis of initiation system transfer into a main charge. Implement viable multipoint diagnostics, such as magnetic probes or PVDF gauges, onto an array for use in warhead evaluation tests. Continue Development of MEMS CDU components. Demonstrate a packaged MEMS-SAD. Complete set of environmental tests on second generation Silicon Fireset assemblies. Implement a 6 kV single n-MCT switch sufficient for initiating a multipoint array. Design a minimum energy slapper and extrudable explosive system for use in adaptable warheads. Towards a miniature, optically charged fireset, complete development of very small 10 layer capacitors and begin integration of nanostructure multilayer capacitor and switch. Continue detonator designs requiring reduced micro joules of stored energy to fire. Complete prototype impact triggered MEMS fuze. Transition rapid prototyping technology. Complete and fly the initial phase 1 version of miniSAR.

Accomplishment/Effort/ Subtotal Cost	FY 2003	FY 2004	FY 2005	
Energetic Materials	5.573	6.214	6.750	

(U) FY 2003 Accomplishments:

(U) Concern from the DoD 2000 Weapons TARA regarding the need to maintain weapon lethality as weapon and platform size decrease were addressed in efforts to synthesize, characterize and scale-up new energetic materials with increased or tailored performance and decreased sensitivity. The development and characterization of new insensitive and new high-energy, high power materials continues with synthesis based on theoretical molecular design and insight. A host of new molecules are synthesized and evaluated each year. Those with promise are shipped in small quantities to DoD labs for further test and evaluation. Potentially significant output from this work is high nitrogen molecules as burn-rate modifiers for gun propellants, with the added attribute of reduced barrel erosion. An example is LLM-105, an attractive new booster material, which is being characterized in booster-size samples to evaluate its initiation threshold, cold temperature performance, and density and flyer size effects. Efforts are underway in this program to exploit opportunities in nano-energetics by developing nano-structured and engineered energetic materials, including sol-gel derived materials, and evaluating their effectiveness and utility for warhead applications. Energetic nanocomposites are of great interest as reactive materials, and accordingly have particular processing requirements. These were demonstrated as possible during 2003. Sol-gel chemistry was also applied to a method for producing high surface area nanometric  $WO_3$ . A new effort in 2003 was the study of the formulation of dense inert metal explosives (DIME), which have significant near-field damage capability. The materials combine explosives with metal powders in a uniform mixture. A cast-sure system of TATB and tungsten was developed and tested. Safety tests of the material were conducted successfully.

(U) Cheetah is a thermochemical code which predicts the performance of new explosives and is invaluable in explosive formulation efforts and is widely used throughout the Department for explosives and propellant analyses. In FY 2003, Cheetah underwent a major re-organization into a component architecture, which will simplify the development and maintenance of the code in future years. Also, significant improvements were made to the scientific capabilities of the code with the implementation of new chemical kinetics, allowing for real gas equations of state to be used. Efforts to develop and validate computational tools for predicting munition system response to operational threat and

computational capability. The first generation of simulation tools for munitions response to accident environments has been exercised against test data to validate the codes and expand their ability to predict weapon system performance and response in accident situations. Experiments were run in 2003 using strand burners and scaled thermal explosion experiments to benchmark ALE3D. Also, the same code was used to evaluate laser lethality of munitions, subject to attack with high power lasers. Results indicate different mechanisms are important for laser heating, leading to unique results. Experiments to determine mechanical properties of both fielded high explosives and their constituents continued for development and validation of high explosive mechanical response models. Specifically, PBXN-110 and Al-Teflon materials were characterized in support of ongoing Navy applications. The creation of new HEDMs continued, along with the development and implementation of accurate techniques for determining crystal structure and energy content of the newly synthesized materials. While progress is slow in this difficult field, progress was made in characterizing and determining energy content in new laboratory-created extended solid materials.

**(U) FY 2004 Plans:**

(U) Efforts to synthesize, characterize and scale-up new energetic materials with increased or tailored performance and decreased sensitivity will be continued. Coordination with the national advanced energetics initiative will also continue towards re-invigorating the energetic materials skill base within the Department. A summary report documenting the synthesis and scale up of LLM-105 as a booster explosive will be distributed to the energetics and fuzing communities in completion of the effort. FY 2003 advances in sol-gel metal oxide chemistry will be applied and focused on applications development and testing in support of specific Service requests for readily processed reactive materials and high performance thermitics. Energy and performance measurements of CO-derived and nitrogen HEDM's macro-samples will be completed and the synthesis of additional extended solid HEDMs will be explored. In FY 2004, Cheetah 4 will be released to the DoD community for performance predictions of an extended set of energetic materials. Development of ignition phenomenology models and design of ignition location experiments will be completed in support of the effort to validate and expand codes for predicting weapon system performance and response in accident situations. The effort to preserve and transition energetic materials technology generated by the community will continue with the distribution of an extended APEX database that will include over 500 energetic materials of different molecular structure. Support of enabling energetic materials technologies for low collateral damage munitions will expand



with the development of near-field and far-field product equations of state for the baseline explosive fill selected in FY 2003. Energetic materials requirements for SOF focused microfuze technology activities will be supported through testing of different nano-fuel/oxidizer formulations and incorporation of multi-layer energetic materials into propagation micro-channels.

(U) **FY 2005 Plans:**

(U) Continue development of nanoscale, microscale and mesoscale energetic materials with enhanced performance that are less sensitive and cost effective enablers for defense transformation. Demonstrate and characterize sensitivity and burning of hydrogen and nitrogen mixtures with nano-metals. Continue processing, scale-up, and performance characterization of low collateral damage energetic materials. In the area of high nitrogen energetic materials, continue measurements of burn rates and pressure-time histories for burning HN mixtures with nano Al, metals, and MIC; complete performance and sensitivity testing of azo-formamidines. Continue updating APEX explosives database on an 18 month cycle. Complete synthesis of ANTZ based target molecules as a new insensitive energetic material ingredient and synthesis precursor. Complete sol-gel metal oxides weaponization. Complete analysis of Navy fast cookoff experiments. Deliver high explosive grain scale continuum model for use in predicting the performance of plastic bonded explosives.

<b>Accomplishment/Effort/ Subtotal Cost</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	
Computational Mechanics and Material Modeling	2.560	6.095	5.487	

(U) **FY 2003 Accomplishments:**

(U) Predicting the behavior of weapons in their operating environment is essential to the development of lethal, accurate, and cost effective systems. Lagrangian and Eulerian hydrocodes, coupled code systems, arbitrary Lagrangian-Eulerian (ALE) codes, and supporting materials models and constitutive relations developed at the nuclear weapons

laboratories have been improved and adapted to DoD problems and transitioned to the DoD user community for use in warhead design and evaluation. This program provides prompt and direct access to the substantial investments in computational mechanics and materials modeling by the DOE and acts as the conduit for direct transition. Specific activities supporting the technology transition include distribution of computational tools to the DoD community, support of DOE codes on centralized DoD computing systems, training of the user community, and consulting as needed. Additionally, a new effort in FY02 commenced to study fragmentation and dynamic fracture of materials. Highly diagnosed experiments were conducted to generate a data base to benchmark computational models. Also, in 2003 a new emphasis was initiated on multiphase flow simulation. This area is of importance to the modeling of explosive mixtures heavily loaded with particulates, as well as in the prediction of the dispersal of agents introduced into an airstream. Blast loading of structures, applicable to structural integrity of dams subject to attack was another area of new emphasis. Sample problems were run in both of these new areas.

**(U) FY 2004 Plans:**

(U) Note that the large increase in funding for this technology area stems from the re-allocation of projects which previously were located in the Energetic Materials area. The increase in funding level does not indicate significant increase in activity. The new projects in this area relate to the modeling of the mechanical properties of explosive, polymers, and the generation of test data to validate the computational models. The development of Eulerian, Lagrangian, coupled and ALE codes relevant to the design and evaluation of munitions will continue. Efforts will continue in the development, implementation and validation of material constitutive and failure models supporting the simulation of warhead formation and warhead/target interactions. The program also provides a conduit to the improved materials models emerging from the DOE Advanced Strategic Computing Initiative providing high resolution, accurate predictions of materials behavior and failure relevant to the analyses of weapon systems. The transition and support of these tools and models along with user training will be provided as needed. A particular growing effort in this year is the development of a mixed phase flow calculational capability to describe inert particle loaded explosives. This capability is essential to the understanding of low collateral damage phenomena.

**(U) FY 2005 Plans:**

(U) Continue to develop, extend and apply the hydrocodes and associated materials models for warhead design and evaluation. Ongoing code and material model development

will continue to focus on greater accuracy, improved physics, and extension to mixed phase flow problems. Continue to support the transition of these tools, the training, and consulting for the DoD user community. Complete tensile plasticity and damage model extension for use within warhead design codes. Towards a robust, mesh free warhead design tool, begin extension of Dual Particle Dynamic (DPD) methodology to three dimensions. Complete integration of CTH and NEVADA design tools. Complete fragment explosive initiation modeling in support of DoD initiatives. Continue advanced material model implementation for warhead design and evaluation. Validate predictive capability for low collateral damage munition performance and effect..

<b>Accomplishment/Effort/ Subtotal Cost</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	
Warhead Technology & Integration	4.650	4.034	3.664	

(U) **FY 2003 Accomplishments:**

(U) In FY 2003, a suite of oblique penetration tests was begun. Through the use of a newly-developed 3-axis accelerometer, initial impact off-normal conditions will be utilized to benchmark computational models. Case materials research has been underway for a number of years and a report will be published in 2003 documenting findings on various materials and processing investigated. A new penetrator steel, ES-1, has been developed as a low-cost alternative to high-alloy steels such as HP-9-4-20m AF1410, and AerMet 100. ES-1 is scheduled for use in the next generation of BLU-113. Many well-controlled benchmarking experiments are being conducted for comparison with code predictions to evaluate modeling capability for oblique impact, varied geologic materials, and the effect of target diameter. A jointed penetrator concept was investigated as a future concept offering lower cost and much reduced production time. The cluster charge concept, which originated several years ago, was extended to include performance measurements against various in-situ geological targets, including tuff, limestone, and granite. Effects of target strength and porosity were documented. A project initiated in 2002 to provide a low collateral, discriminate lethality capability is continuing. This project includes and integrates the component technologies of DIME and fiber composite case structures to provide the discriminate lethality capability. Contributions from across the program are required for the development of this new capability and the integration of the efforts is carried out as part of Warhead Technology and Integration Technical area. Integration is seen as a vital element of all

future munitions, with its own set of unique issues not seen in discrete component development. In recognition of this fact, the title of this technology area was modified.

**(U) FY 2004 Plans:**

(U) Integration of all the components necessary for a low collateral damage munitions concept will occur. Energetic formulation, composite, case, and performance predictions based on modeling to date, will be combined in this effort. Near term applications of this technology are believed possible based on these tests. Efforts to provide enabling technologies for defeat of hardened military targets will continue in FY 2003. Dynamic compression studies of ES-1 and high-alloy steels will be completed and documented. Three axis oblique penetration experiments into concrete targets will generate a data base for the DoD and DOE communities for code and model benchmarking. The focus will be on obtaining data that reveals the dynamic rotations of the penetrator during entry and the resulting trajectory. The data will be provided to the DoD community for use in validating and benchmarking hard target design tools. Several new tasks will be initiated to look at penetration in multi-layer targets, angle of attack effects on penetration and payload survivability, and a boosted penetrator concept as a means to increase penetration depth. The development and integration of the computational, explosive, penetration, and composite material technologies required for an enhanced alternative to the use of inert munitions against soft targets in urban areas will be accelerated. Low collateral versions of existing bomb, such as Mk 82, are being fabricated and prepared for comparative test evaluation. The processing contribution of metal liner materials to enhanced performance will continue with the emphasis on studying special grain boundaries. Previous work in the commercial arena has demonstrated significant mechanical and corrosion resistance properties are achievable through control of grain boundaries. Temperature measurements of shocked materials will be applied to a variety of metals shocked to various stress states. Focus will continue on the science-based technology projects relating warhead performance to material properties under dynamic conditions as a prelude to improved computational modeling and the transition of improved warhead designs to developmental and fielded weapon systems. The simulations of the Ta liner test-bed experiments will be continued in order to assess the utility of the new materials models in the warhead design process.

**(U) FY 2005 Plans:**

(U) Continue low collateral damage verification and validation testing in comparison with

current best baseline munition. Use test data to evaluate simulation capability in predicting target damage. Continue the study of advanced hard target penetrator concepts and adapt designs to state-of-the-art materials and manufacturing methods. Complete instrumented oblique penetration tests using the 3 axis data recorder. Complete target size penetration tests aimed at reducing the cost of penetration tests for the community by obtaining evidence of a size scale effect. Continue target diameter benchmarking efforts in support of size-scale effect testing. Continue improvements in modeling of target entry dynamics and trajectory predictions via field testing and analysis. Complete characterization of low cost, high hardness candidate penetrator materials. In the area of design improvements for hard target penetrators, complete survivability design concepts. Continue improvements to the hard target response predictive capability established in the Peridynamic design tool. Complete push control studies using alternative reactive warhead materials. Continue efforts towards an FY 2006 demonstration of energy coupling enhancement through initiation.

<b>Accomplishment/Effort/ Subtotal Cost</b>	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>	
Munitions Lifecycle Technologies	2.230	2.605	2.728	

(U) **FY 2003 Accomplishments:**

(U) Femtosecond laser cutting of energetic materials has been successfully demonstrated in the 10 kg explosive tank. This is significant because it gives us the capability to cut systems containing larger amounts of explosives and thus, makes it possible to test mock-ups of weapons systems as well as complete systems. In addition, the process has been successfully extended to cutting propellants; this is a significant milestone that opens the possibility of using the femtosecond laser to demilitarize rocket weapon systems. Determination of a portion of the optimum cutting parameters, safety limits, and geometry limits for munitions related materials and high explosives was also completed. As a result the project is considered mature for this program, with technology available for transition to DoD demil programs. Work on the robotic workcell focused on adapting the system to the disassembly of Adam mine rounds and completing the vision and control algorithms, as well as the associated hardware, necessary to demonstrate completely automated disassembly of a cluster munition with safing of the individual submunitions. This goal was attained in FY 2003. In the area of ageing and

predictive means for material lifetimes and failure. The development of materials and system aging models continued with a focus on predicting the reliability of solder interconnects, plastic encapsulated microcircuits, propellants, and adhesive joints. A project initiated to characterize the particle emissions generated from open burn/open detonation (OB/OD) events characterized background signatures for a variety of aerosols including common atmospheric aerosols, biological background and a large number of powders. The result of the work will be an instrument which can satisfy present and future anticipated regulatory requirements on particle emissions from OB/OD events, with a minimum of false positives. Having completed the signature development phase, emissions from small scale munitions were recorded. A new start project was the development of a stand-off sensor for monitoring the position of the receding surface of propellant during rocket motor wash-out. The benefit of the tool is faster and safer washout of large rocket motors.

**(U) FY 2004 Plans:**

(U) Mid-scale testing of sensors that can detect particle emissions in explosive events will commence. The small and mid-scale sensor test results will be used to generate a data base and analysis tools for standoff identification and specification of particles generated in detonation events. Dissassembly and handling of ADAM mine projectiles will be demonstrated. Adapt the robotics technology to the M77 grenade and demonstrate removal of MLRS M77 grenades from a warhead section. The technology for standoff monitoring of OB/OD events at DoD demilitarization sites will be transitioned to a commercial partner. In the predictive materials aging and reliability area, measurements of the electrical response of dormant storage munition electronic components will commence. Under the aging of propellants task, continue to participate in the service life predictive technology (SLPT) program. This will consist of improved characterization of critical chemical and physical aging processes in composite propellants, and formatting that information into constitutive models for into predictive 3-D reactive-diffusion codes. The particulate emissions identification project will move to actual large-scale open-air detonation events, where soil samples near the event will have been characterized to provide a baseline signature.

**(U) FY 2005 Plans:**

(U) Complete real time particle size and composition analysis open air testing. Complete isothermal fatigue experiments for solder interconnect reliability studies. Transfer electronic corrosion predictive model to Service demilitarization efforts.

Continue identification of critical DoD electronic components susceptible to corrosion failure. Complete studies aimed at determining propellant thermal decomposition kinetics. Continue analysis of DoD aged samples and participation in Predictive Service Life Technology program reviews as requested. Complete MEMS reliability monitor verification tests. Complete testing of stand-off sensor for rocket motor demilitarization. Complete explosive combustion studies for predicting toxic emissions in OB/OD events. Prototype, design, and fabricate M77 grenade handling and safing hardware. Continue identification and analysis of non-plastic encapsulated critical DoD weapon components. Measure age dependent weapon adhesive joint toughness at various temperature levels and high humidity. Apply interfacial fracture mechanics methodology to existing DoD/DOE weapon systems. Continue HX-874 propellant binder aging studies.

**C. Other Program Funding Summary:** N/A

**D. Acquisition Strategy:** N/A

**E. Major Performers:** The work is performed in-house at the three DOE National Laboratories responsible for nuclear weapons RDT&E: Lawrence Livermore, Los Alamos, and Sandia National Laboratories.

## UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification						February 2004	
Appropriation/Budget Activity RDT&E.DW/BA3			R-1 Item Nomenclature: Combating Terrorism Technology Support PE 0603122D8Z				
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Total PE Cost	114.374	97.291	46.719	44.575	45.213	45.763	46.686
Combating Terrorism Technology Support/P484	114.374	97.291	46.719	44.575	45.213	45.763	46.686

**A. Mission Description and Budget Item Justification:****BRIEF DESCRIPTION OF ELEMENT**

Combating Terrorism Technology Support (CTTS). This program develops technology and prototype equipment that address needs and requirements with direct operational application in the national effort to combat terrorism. Projects support antiterrorism, counter terrorism, intelligence and terrorism consequence management activities to: conduct tactical operations; protect military forces, civilian personnel, installations, infrastructure elements and the general populace from terrorist attack; detect, neutralize, and mitigate the effects of conventional and unconventional devices; conduct surveillance and tracking of terrorists; conduct threat and incident assessments; and process and disseminate information. The program integrates Defense advanced development efforts with government-wide and international efforts to combat terrorism. The Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict oversees and is responsible for execution of the CTTS program, which addresses defense, interagency and international combating terrorism technology requirements.

**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)

	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>
Previous President's Budget	111.377	60.526	46.778
Current President's Budget	114.374	97.291	46.719
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases	6.000	38.200	
Reprogrammings	(.772)		
SBIR/STTR Transfer			
Other program adjustments	(2.231)	(1.435)	(0.059)

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Exhibit R-2a, RDT&E Project Justification						February 2004	
Appropriation/Budget Activity RDT&E.DW/BA3			Project Name and Number Combating Terrorism Technology Support 0603122D8Z				
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Combating Terrorism Technology Support	114.374	97.291	46.719	44.575	45.213	45.763	46.686

**A. Mission Description and Budget Item Justification:**

BRIEF DESCRIPTION OF ELEMENT

P484, Combating Terrorism Technology Support (CTTS). This program develops technology and prototype equipment that address needs and requirements with direct operational application in the national effort to combat terrorism. All projects are distributed among ten mission categories: Chemical, Biological, Radiological, and Nuclear Countermeasures; Explosives Detection; Improvised Device Defeat; Infrastructure Protection; Investigative Support and Forensics; Personnel Protection; Physical Security; Training Technology Development: Surveillance, Collection, and Operations Support; and Tactical Operations Support. This program is a non-system, advanced technology development effort that demonstrates the utility or cost reduction potential of technology when applied to combating terrorism requirements. It includes technology development and proof-of-principle demonstrations in field applications and coordination to transition from development to operational use.

**B. Accomplishments/Planned Program**

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	23.777	16.740	2.015

FY 2003 Accomplishments:

Completed laboratory and initial field tests of the Electrostatic Decontamination System. Completed laboratory testing of the high-volume aerogel-based sampler system. Demonstrated in the laboratory the distributed chemical sensor capability. Developed a real-time biological agent detector for four biological agents and demonstrated detector at a NIOSH/CDC facility. Developed standard testing protocols and evaluation criteria for building protection CB filters. Designed a portable water treatment system for overseas facilities. Developed building disinfection byproducts database for ozone. Assessed potential for using X-rays to treat luggage to reduce the potential for chance or deliberate introduction of biological warfare (BW) agents. Evaluated the ability of biopreservative material to increase storage life of BW samples across a range of conditions. Developed standard laboratory protocols for seven BW agents in food and for the ability to identify suspected terrorist who have worn protective equipment and terrorists who have worked with plutonium or enriched uranium. Completed testing of the small-room protection chemical, biological and radiological (CBR) filtration system; verification and validation of urban dispersion model to be used as a CB Planning Tool; tool for food safety managers on the viability and stability of BW agents in food. Qualified additional design for CB escape hoods and conducted development, testing, and evaluation of escape mask designs. Delivered advanced low-cost self-indicating casualty radiation dosimeter; software to assess the cost-effectiveness of building renovations to improve CB protection; and mass decontamination protocols.

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FY 2004 Plans:

Conduct toxicity testing on the Electrostatic Decontamination System and field testing on the high-volume aerogel-based sampler collection system for aerosolized BW agents. Develop field methods to quantify an individual's exposure to ionizing radiation and advanced protective clothing for incident response. Develop a tactical self-contained breathing apparatus (SCBA) for use by specialized response teams requiring enhanced respiratory protection. Develop high-volume air and water sampling systems for BW and CW agents. Conduct laboratory tests of a distributed chemical sensing system, a real-time maritime toxic industrial chemical (TIC) detector, and tools to improve the detection of foodborne attacks and advanced BW detection devices. Complete design and testing of a heat stress calculator for use by safety officers to manage worker heat-related health conditions. Test the portable water treatment system for overseas facilities and a cold plasma decontamination of high-value items. Complete the building disinfection byproducts database. Complete design review of the personal hydration CBR filtration system. Validate standard laboratory protocols for analyzing chemical protective filters for buildings. Continue testing of new designs for CB escape hoods. Develop a system to collect and detect biological agents in aqueous environments. Field-test biological agent preservation system and a real-time biological agent detector for aerosolized BW agents.

FY 2005 Plans:

Field-test the distributed chemical sensing system, the real-time maritime TIC detector, the tactical SCBA for specialized response units, and advanced protective clothing for incident response personnel. Validate methods for quantifying personal exposure to ionizing radiation. Validate tools to improve the detection of foodborne attacks and advanced BW detection devices and the statistical tool for sampling of contaminated facilities. Conduct live-agent testing of the personal hydration CBR filtration system. Test an advanced high-volume air and water sampling system for BW and CW agents. Conduct laboratory and field testing on the system to collect and detect biological agents in aqueous environments.

EXPLOSIVES DETECTION

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	12.546	7.439	3.522

FY 2003 Accomplishments:

Validated the capability of nuclear quadrupole resonance (NQR) portal to detect sheet explosives. Demonstrated capability to produce marking agents at lower cost. Characterized NQR enhancements for false alarm reduction in computed tomographic (CT) explosive detection systems.

FY 2004 Plans:

Integrate multiple explosives and weapons detection technologies into one portal. Demonstrate NQR computed tomographic (CT) explosive detection system with enhanced false alarm reduction capability. Evaluate NQR technology for detection of large vehicle bombs. Research and evaluate technologies for detection of explosives in cargo. Research and evaluate new technologies for screening bottles for explosives and hazardous materials. Develop methods to improve canine handler selection and training. Characterize canine ability to generalize from domestic to foreign explosives.

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FY 2005 Plans:

Develop prototype explosives and weapons detection portal. Validate NQR computed tomographic (CT) explosive detection system with enhanced false alarm reduction capability. Demonstrate system for explosive detection in aircraft cargo containers. Demonstrate system for screening bottles for explosives and hazardous materials.

IMPROVISED DEVICE DEFEAT

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	8.994	7.531	5.954

FY 2003 Accomplishments:

Developed and fielded an urban explosive magazine for storage of rapid response explosively driven render safe tools; a low cost .357 caliber micro disrupter; and an EOD expeditionary backpack for technicians to safely carry explosives, detonators, disruptors, cartridges and support tools necessary for EOD missions. Developed target recognition algorithms for detection and identification of potential IED components. Demonstrated and tested an automated information system to access and extract threat assessment, render safe data and disposal procedures. Conducted an Interagency Suicide Bomber Working Group meeting to develop best practice guidelines, address critical national coordination requirements and identify capability gaps related to the threat of person- or vehicle-borne suicide bombings in the U.S. The working group resulted in the development of a comprehensive suicide bomber information database and recommended SOPs.

FY 2004 Plans:

Complete testing for downsized high-energy access and disablement device. Complete characterization of several precision disruption tools. Complete development of a recoilless variable velocity disruption system for remote controlled vehicles; Develop an easy to use web-based interface allowing secure, password-protected access to a comprehensive database of IED reports, operational reports, publications and open source threat information; a Standoff Connectivity Control Unit (SCCU) to provide backward compatibility of existing sensor technology with analog robotic systems; and an integrated portable diagnostics system and electronic fusing disruption system. Field the Next Generation EOD Remote Controlled Vehicle advanced concept demonstrator for evaluation. Conduct a full field technical and operational assessment of EOD remote controlled vehicles to identify and quantify user requirements, to ensure comprehensive consideration and acceptance of NGEODRCV. Develop a fragmentation free micro-detonator. Expand scope of enhanced novel explosives characterization to include thermobaric effects, structural response and personnel injury probabilities.

FY 2005 Plans:

Conduct characterization of several disruption and breaching tools. Evaluate and test existing ballistic vest, helmet and face shields against explosive device detonation. Complete the assessment of EOD remote controlled vehicles. Deliver analysis of data to military services to facilitate purchase of next generation of remote controlled vehicles. Develop a dynamic entry warning device for breaching teams. Expand scope of detection methods, applications and characterizations of IED electronic components. Field easy to use, web-based interface allowing secure, password-protected access to a comprehensive database of IED reports. Characterize advanced IED arming and firing systems.

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INFRASTRUCTURE PROTECTION

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	1.705	2.175	1.901

FY 2003 Accomplishments:

Completed a RFW vulnerability site assessment guide. The water flow modeling system was refined and distributed to various US cities, governments, and municipalities.

FY 2004 Plans:

Develop tools to monitor propagation of malicious computer software code, as well as to monitor and defend external networks against large-scale attacks. Complete encryption algorithm suite for supervisory control and data acquisition (SCADA) system protection and provide recommendations to industry. Develop a secure teleconferencing bridge to allow for the safe communications and passing of sensitive information. Continue vulnerability assessment of critical infrastructures to the effects of RFW.

FY 2005 Plans:

Continue research and development of methods to protect critical infrastructure systems against malicious attack. Continue to improve methods of protection, detection, mitigation, and recovery from attacks on networks. Continue to research and develop systems to provide vulnerability models and assessments for networks and infrastructure systems. Commence development of interdependency model between all critical infrastructures to include communication networks, electric power, water, natural gas, and petroleum.

INVESTIGATIVE SUPPORT AND FORENSICS

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	6.473	5.651	3.923

FY 2003 Accomplishments:

Evaluated peroxide-based explosives for post-blast forensics. Distributed controls from residue background analysis to explosive examiners. Characterized and catalogued improvised explosive device components for examiners. Collected data for pipe bomb investigative reference. Fielded hyper spectral document imager prototype and automated handwriting examination system. Determined statistical “ground truth” for print matching criteria. Published standardized latent print evaluation criteria, as well as procedures for ink dating, float glass exams, and handwriting comparison of different language character sets. Began performance testing of computer forensic tools. Continued to develop next generation audio, visual, facial recognition, and computer forensic tools. Designed passive RF tag.

FY 2004 Plans:

Populate data reference with stable isotope signatures of explosives, post-blast forensics of peroxide-based explosives, IED component imagery, and residue background controls. Field next generation audio and visual enhancement tools; continue to develop forensic computer-aided facial recognition and

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advanced data recovery tools. Demonstrate link analysis of computer data through read back signals and computer password decryption. Design validation tests for ensuring court admissibility of forensic document examinations. Develop prototype of eye movement based detection of prior knowledge. Field prototype automated multilingual speaker recognition software. Develop remote polygraphy and non-contact facial temperature detection of deception techniques. Publish enhanced DNA and bio-hazard recovery and analysis protocols and procedures for trace analysis of conventional/novel ammunition. Validate new gunshot residue methods.

FY 2005 Plans:

Develop forensic facial recognition technology, advanced data recovery tools, and forensic services preparedness for mass disasters guide. Expand and publish pipe bomb investigative reference database and field reference card. Field remote polygraphy and non-contact facial temperature detection of deception techniques, as well as password counter encryption tool. Fabricate pocket kit for human identification in the field. Collect stable isotopic ratio data on foreign explosives and ignitable liquids for quadrilateral data repository. Develop prototype systems for all source investigative link analysis, high resolution facial imaging for human identification, individual video camera identification, and photo based terrorism scene modeling. Devise method to detect steganography with image files created by other steganography applications.

PERSONNEL PROTECTION

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	4.593	2.718	3.304

FY 2003 Accomplishments:

Completed a significant upgrade to the portable shield and delivered systems to users for operational validation. Completed a study and analysis of female body armor for torso blunt injury protection, provided findings for consideration in the NIJ Body Armor Standards. Completed field test and demonstration of the vehicle blast model. The results will be considered for future testing. Completed initial improvements and conducted operational field-tests of upgraded cooling system used under body armor, bomb squad protective suits, and other protective garments. This system has been provided to support operations in Iraq for further evaluation. Completed initial transparent armor validation testing. Completed an initial demonstration and assessment of laser detection, threat evaluation system. Initiated a developmental initiative using millimeter wave imaging technology to provide stand-off detection and monitoring of personnel carrying concealed weapons. Continued development of multi-hit test protocol for testing body armor by updating testing procedures and upgrading test instrumentation, based on threat and technology enhancements. Initiated a comprehensive effort to define an armored vehicle standard (VIP), which includes ballistic, blast testing protocols, vehicle performance, and transparent armor requirements.

FY 2004 Plans:

Complete demonstration of full-scale reduced weight transparent armor applications in a selected vehicle. Promulgate preliminary armored passenger vehicle standards to begin integration into a National Standard. Complete validation testing of transparent armor design model. Continue development and integration of enabling technologies for Instantaneous Personnel Protection System. Demonstrate practical application of laser detection and warning and sniper detection and locating concepts. Continue introduction of advanced technologies to upgrade systems that provide monitoring and warning support to VIP installations. Demonstrate preliminary concepts for standoff monitoring of personnel for concealed weapons. Begin analyses and characterization of frangible ammunition. Evaluate methods to provide collective protection in standard vehicles against chemical agents. Begin evaluation of advanced concepts for transparent armor using fused spheres. Conduct ballistic testing of large pieces of spinel.

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FY 2005 Plans:

Integrate armored passenger vehicle standards into National Standard. Complete development of Instantaneous Personnel Protection System. Continue characterization of frangible ammunition and include effects on standard body and vehicle armor systems. Validate concepts for standoff monitoring of personnel for concealed weapons. Complete development of advanced sphere-based transparent armor for practical applications. Continue assessment and implementation of vehicle systems that will provide protection against chemical agents.

PHYSICAL SECURITY

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	28.273	16.740	8.189

FY 2003 Accomplishments:

Conducted a CONUS operational evaluation of an advanced entry-point vehicle/driver identification system. Commenced development of an automated, portable, walk-through metal detector tester. Conducted a CONUS deployment and operational evaluation of vessel identification and positioning system for port security and initiated system integration with water- and land-based radar sources. Began development of inspection/screening guides for rail car explosives detection and for personnel screening at entry points. Initiated operational testing of a perimeter early warning and intruder detection system using standard visual and thermal imaging as well as motion detection. Commenced development of an integrated aerial and ground video monitoring system for perimeter security. Continued development of a prototype wireless tactical video surveillance system for perimeter intrusion detection. Continued development of a self-sustaining, industry-funded system for testing commercial intrusion detection devices. Continued development of a prototype perimeter intrusion detection system utilizing airport ground surveillance radar. Continued development of a light-weight, portable boom and underwater intrusion detection system to protect ships from underwater swimmers and small boats loaded with explosives. Completed market survey of video detection and assessment systems for identifying potential vehicle bombs near buildings. Commenced development of a blast simulator to test the effect of blast pressures on walls and columns without the use of explosives. Performed blast tests on redesigned and/or retrofitted structural (e.g., walls, columns, and floors) and non-structural (e.g., windows) building components to evaluate blast effects using conventional high explosives.

FY 2004 Plans:

Conduct an OCONUS operational evaluation of an advanced entry-point vehicle/driver identification system. Conduct an OCONUS deployment and operational evaluation of vessel identification and positioning system for port security. Conduct an evaluation of a commercial, automated, under-vehicle inspection system. Continue development of and demonstrate an automated, portable, walk-through metal detector tester. Develop and demonstrate a vehicle image recognition module for entry point screening. Publish and disseminate inspection/screening guides for rail car explosives detection and for personnel screening at entry points. Develop a handheld scanner using ground penetrating radar technology to detect metallic and non-metallic weapons on an individual. Continue development of an industry-funded, self-sustaining testing program for commercial intrusion detection systems. Manufacture and field test a light-weight, portable boom and underwater intrusion detection system to protect ships. Continue development of a prototype perimeter intrusion detection system utilizing airport ground surveillance radar. Continue development of an integrated aerial and ground video monitoring system for perimeter security. Complete development of a prototype wireless tactical video surveillance system for perimeter intrusion detection. Conduct an operational evaluation of video detection and assessment systems for identifying potential vehicle bombs near buildings. Improve structural designs and validate modeling simulations by performing blast tests on interior walls, columns, and other structural and non-structural components using conventional high

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explosives and enhanced novel explosives. Calibrate blast simulator to mimic the effects of enhanced novel explosives and conventional explosives at varying standoff distances and blast strengths.

FY 2005 Plans:

Investigate technologies and techniques to perform stand-off screening of vehicles and personnel for contraband to better protect screening personnel. Develop an improved, automated under-vehicle inspection system. Continue development of a perimeter security ground and aerial video monitoring system. Complete and demonstrate a prototype perimeter intrusion detection system utilizing airport ground surveillance radar. Develop a rapidly deployable wire barrier system (to establish temporary perimeters) and a rapidly deployable intrusion detection system (to protect high value and sensitive assets) for U.S. expeditionary forces. Support development of an integrated wide-area security system for airports and seaports. Transition a self-sustaining system for testing intrusion detection devices to private industry. Test walls, columns, and other structural elements of buildings with a blast simulator to produce high-quality, reproducible data for use in computer model validation. Identify relevant COTS blast mitigation technologies, test their applicability against conventional high explosives and novel enhanced explosives, certify results, and convert the information into useful engineering guidance and code.

SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	12.051	15.133	7.206

FY 2003 Accomplishments:

Enhanced facial recognition technology for use in surveillance systems to better identify terrorists. Delivered intelligence analyst visualization tool for enhanced content analysis. Developed Multimedia Alert Processing System (MAPS) to monitor, collect and deconflict information from domestic and international broadcasts, especially where timeliness of the collected information is critical.

FY 2004 Plans:

Enhance monitoring of multimedia broadcast information. Continue to integrate facial recognition technology into surveillance systems. Continue to improve intelligence analyst automation tools for dealing with large volumes of data including video and audio and including speech technology aids. Improve the capabilities for clandestine collection and enhancement of video and audio surveillance. Continue development of tagging, tracking and locating and unattended ground sensors, including the development of the necessary communication links and power sources. Continue to improve name recognition technology and include facial recognition and speech technology as well as other biometrics to assist in identifying terrorists on a watchlist.

FY 2005 Plans:

Continue to integrate facial recognition technology into surveillance systems. Continue to improve intelligence analyst automation tools for dealing with large volumes of data including video and audio and including speech technology aids. Continue development of tagging, tracking and locating and unattended ground sensors, including the development of the necessary communication links and power sources.

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TACTICAL OPERATIONS SUPPORT

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	7.622	13.986	5.222

FY 2003 Accomplishments:

Delivered first sets of production image intensifier tubes for install into existing night vision systems (small arms weapons and operator worn systems). Completed initial ammunition testing for an initial prototype advanced close quarter battle carbine. Completed testing and delivery of a wireless, low probability of intercept/detect communications system for high-speed assault craft. Completed the design of a fiber optic antenna extension to support remote positioning of the transmitter/receiver from antennas and began transition to production. Completed and delivered a prototype rifle-mounted video and thermal image display system. Completed a comprehensive evaluation of a broad range of hand-held radiation detection instruments using the latest ANSI standards. Initiated design for eye protective measures against hostile laser systems for high-powered binoculars and similar augmentation systems. Continued development of several new and innovative advanced breaching techniques and systems designed to support rapid breaching with reduced collateral damage. Continued to evaluate and assess emerging technologies, methods, and prototype systems that will support high-fidelity imaging through various wall construction techniques to support tactical decision-making. Initiated the development of an observation system that will locate sniper position based on the weapon muzzle flash. Using Congressional funding completed the first full-scale multi-agency field exercise in California to demonstrate interagency operation and inserted several emerging technology enablers. This exercise sets the stage for future exercises with different scenarios. Completed comprehensive tactical survey of selected high visibility installations for Navy Region Southwest to support the coordination of applicable response teams in reaction to a terrorist event, using Congressional funding.

FY 2004 Plans:

Complete fiber optic antenna system and begin evaluation of the system. Deliver advanced sensor fusion weapon sights. Continue development of small personal navigation system that will work in GPS-denied environments. Continue assessment and develop prototype systems that will support imaging through various construction walls in support of tactical decision-making. Conduct field evaluations and deliver prototype system that measures cross wind effect on projectile trajectory and provides aim point correction. Deliver advance lightweight combat helmet for SOF applications. Deliver reduced size and improved tactical communications systems for SOF applications.

FY 2005 Plans:

Standardize advanced breaching concepts that improve access time with reduced collateral damage. Deliver system that will support imaging through various construction walls in support of tactical decision-making.

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TRAINING TECHNOLOGY DEVELOPMENT

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost		2.424	1.800

FY 2004 Plans:

Develop training technologies, aids, devices, and simulations in support of the Global War on Terrorism. Design intelligent, open communication architectures, environments, tools, and services to enable the production and dissemination of combating terrorism mission support information and training. Develop Advanced Distributed Learning (ADL) training to support Management of Agricultural Biological Terrorism Incidents; Food Protection and Security for Critical and Overseas Facilities; CBRNE Awareness for DoD Installations; Combating Terrorism Operations; and CBRNE Installation Response Personnel. Develop training aids and devices to support fielded and transitioning TSWG technologies. Provide cross platform training delivery capabilities to enhance joint training across the Services. Field ADL training in support of WMD Laboratory Technicians; Small Watercraft Inspection Operations; Personnel Search Operations; Railway Inspection Operations; Suicide Bomber Awareness; and Psychological Aspects of WMD Incidents and Terrorism. Demonstrate the feasibility of providing critical skill sets to response personnel through integrated Federal and University developed training delivered via ADL technologies.

FY 2005 Plans:

Continue to develop Advanced Distributed Learning (ADL) delivery architectures and associated services to increase the promulgation of combating terrorism mission performance support and training. Continue to develop training aids and devices to support fielded and transitioning TSWG technologies. Develop ADL training in the areas of CBRNE counterterrorism awareness; command, control, and communications; force protection; medical surveillance and recovery; and consequence management. Develop ADL technologies to integrate interactive simulations with training and mission performance support capabilities.

PROGRAM MANAGEMENT

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	8.340	6.754	3.683

FY 2003 Accomplishments:

Aligned existing and new program staff members to provide program management oversight and technical support for all CTTS R&D projects. Augmented the CTTS program office with contract, financial and security management personnel. Managed an additional \$38 million in funds from other agencies, and cooperative R&D programs with the United Kingdom, Canada and Israel. Established the interface to other government agencies for CTTS related initiatives and for continuing and new projects to reinforce interagency and international participation for the identification and prioritization of CTTS mission area requirements. Solicited via Broad Agency Announcement (BAA) for new projects and tasks based on prioritized requirements. Directed the program/project planning and execution for projects and associated contracts including the daily management and reporting for more than 280 separate contracts and tasks. Developed and implemented improvements for the automated approach to the BAA Information Delivery System (BIDS) solicitation process including the establishment of collaborative source evaluation and selection tools. Developed and implemented process improvement initiatives for procurement request tracking and a Business Information System database. Continued the planning, development and implementation of process efficiency

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and re-engineering initiatives, encompassing a complete review of CTTS mission area management and reporting responsibilities internal to the organization and in support of external reporting requirements.

FY 2004 Plans:

Provide program management oversight and technical support for all CTTS R&D projects including funds from other agencies and management of cooperative R&D programs with the United Kingdom, Canada and Israel. Establish new cooperative R&D agreements with Australia and Singapore. Act as the interface to other government agencies for CTTS related initiatives and continuing and new projects. Establish goals, objectives, and immediate revisions to plans that will reinforce interagency participation for the identification and prioritization of CTTS mission area requirements. Direct the program/project planning and execution of projects and associated contracts using direct and indirect budget allocations. Includes management and closeout of existing contracts and the solicitation for an increasing volume of new initiatives. Review and revise existing process and execution plans for CTTS mission area management and internal and external reporting responsibilities.

FY 2005 Plans:

Provide program management oversight and technical support for all CTTS R&D projects including funds from other agencies and management of cooperative R&D programs with the Australia, United Kingdom, Canada and Israel and Singapore. Act as the interface to other government agencies for CTTS related initiatives and continuing and new projects. Establish goals, objectives, and immediate revisions to plans that will reinforce interagency participation for the identification and prioritization of CTTS mission area requirements. Direct the program/project planning and execution for projects and associated contracts using direct and indirect budget allocations. Includes management and closeout of existing contracts and the solicitation for an increasing volume of new initiatives. Review and revise existing process and execution plans for CTTS mission area management and internal and external reporting responsibilities.

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Exhibit R-2, RDT&E Budget Item Justification						February 2004	
Appropriation/Budget Activity RDT&E.DW/BA3		R-1 Item Nomenclature: SO/LIC Advanced Development PE 0603121D8Z					
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Total PE Cost	18.495	33.605	32.682	33.752	34.276	34.142	35.776
Special Operations/Low-Intensity Conflict Analytical Support/P205	0.835						
Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC)/P206	6.670	10.940	9.411	9.388	9.518	9.554	9.745
Special Reconnaissance Capabilities (SRC)/P207	10.990	20.695	20.275	20.370	20.765	20.590	21.025
Information Dissemination Concepts/P208		1.970	2.996	3.994	3.993	3.998	5.006

**A. Mission Description and Budget Item Justification:**

**BRIEF DESCRIPTION OF ELEMENT**

P205, Special Operations/Low-Intensity Conflict (SO/LIC) Analytical Support. The SO/LIC Analytical Support project provides specialized research and analytical support for the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (ASD (SO/LIC)). Projects address a broad spectrum of technical, acquisition, and policy issues relating to special operations, combating terrorism, peacekeeping, psychological operations, counterinsurgency, unconventional warfare, and contingency operations. The project supports and is integrated into overall DoD efforts to develop options for dealing effectively with a wide range of military responsibilities in military operations other than war. This project provides a vehicle to initiate analysis required to support acquisition documentation and conceptual policy issues regarding roles and missions of Special Operations Forces in the changing world environment. Analysis may also be used to improve OASD(SO/LIC)'s congressionally mandated oversight function of special operations and low-intensity conflict. In FY 2004 this analytic support program will become a component of P206, Explosive Ordnance Disposal/Low Intensity Conflict, providing efficiency of management and execution.

P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC program provides advanced technology and equipment solutions for military EOD operators and SOF to meet the challenges of homeland defense, force protection and the war on terrorism. EOD/LIC efforts focus primarily on the detection, access, identification, and neutralization of all types of conventional explosive ordnance and improvised explosive devices including weapons of mass destruction. Requirements submitted by the Joint Service EOD and Service Special Operations communities are prioritized and approved by OASD(SO/LIC).

P207, The Special Reconnaissance Capabilities (SRC) R&D Program addresses reconnaissance and surveillance inadequacies in the Department of Defense's ability to collect timely, actionable intelligence on difficult-to-access, high-value targets and on tagging, tracking and locating (TTL) vehicles, aircraft, vessels, containers, and individuals. Supporting technologies include the application of unattended ground sensors, tagging, tracking and locating (TTL), communications, power management, command, control and networking of sensors, mobility and delivery of sensors and situational awareness interfaces. The program also provides the new capability, as well as the technical expertise necessary to train operational users to enhance DoD special reconnaissance mission applications.

P208, The Information Dissemination Concepts project will address technology capabilities necessary to enable sustained information dissemination in denied areas. This project will leverage ongoing research efforts of USSOCOM, the Services and Defense and other agencies to develop, modify and demonstrate dissemination mechanisms, platforms and payloads. These development efforts will include research into high altitude, lighter-than-air vehicles, modifications to chipsets for receivers capable of receiving space based radio broadcasts, and transmit/receive payloads. These payloads have the potential to be deployed from numerous platforms to include unmanned lighter-than-air vehicles and unmanned aircraft.

**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)

	<u>FY2003</u>	<u>FY2004</u>	<u>FY2005</u>
Previous President's Budget	18.608	31.300	32.723
Current President's Budget	18.495	33.605	32.682
Total Adjustments			
Congressional program reductions			
Congressional rescissions			
Congressional increases		2.800	
Reprogrammings			
SBIR/STTR Transfer			
Other Program Adjustments	.113	.495	.041

Exhibit R-2a, RDT&E Project Justification				February 2004			
Appropriation/Budget Activity RDT&E.DW/BA3			Project Name and Number SO/LIC Advanced Development 0603121D8Z				
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Special Operations/Low-Intensity Conflict Analytical Support/P205	0.835						

**A. Mission Description and Budget Item Justification:**

**BRIEF DESCRIPTION OF ELEMENT**

P205, Special Operations/ Low-Intensity Conflict (SO/LIC) Analytical Support. The SO/LIC Analytical Support project provides specialized research and analytical support for the Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict (ASD (SO/ LIC). Projects address a broad spectrum of technical, acquisition, and policy issues relating to special operations, counter-and anti- terrorism, peacekeeping, psychological operations, counterinsurgency, unconventional warfare, and contingency operations. The project supports and is integrated into overall DoD efforts to develop options for dealing effectively with a wide range of military responsibilities in military operations other than war. The project provides a vehicle to initiate analysis required to support acquisition documentation and conceptual policy issues regarding roles and missions of SOF in the changing world environment. Analysis may also be used to improve OASD(SO/LIC)'s congressionally mandated oversight function of special operations and low-intensity conflict. In FY 2004 this analytic support program became a component of P206, Explosive Ordnance Disposal/Low Intensity Conflict, providing efficiency of management and execution.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	.0835		

FY 2003 Accomplishments:

Completed effort: Counter Exploitation Analysis Capability for Technology Proliferation. Successfully demonstrated enhanced integrated, cross-functional, interagency analyses and support capability in cooperation with USSOCOM, Defense Technology Security Administration, and the intelligence community.

Completed effort: Psychological Operations Agent-Based Analyses Environment Assessment. Successfully demonstrated this agent based approach with US PSYOP forces, and assessed its capability to improve: analytical thoroughness; incorporation of operational feedback and institutional expertise; and analyst training. Work is being considered for transition into the PSYOP ACTD Global Reach.

Completed effort: Advanced Distributed Learning (ADL) Front End Analysis. Examined current ADL training programs within the SOF community to develop a baseline for future application of ADL initiatives.

Completed effort: Language Translation, Data Extraction Assessment. Successfully demonstrated the integration of two-way handheld translation and data extraction capability into a commercial Palm-based computer for the SOF community.

Completed effort: Munitions Assessment Study that provided munitions program experts a baseline to make informed decisions for providing new ordnance tools and equipment to EOD/SOF operators.

Exhibit R-2a, RDT&E Project Justification						February 2004		
Appropriation/Budget Activity			Project Name and Number					
RDT&E.DW/BA3			SO/LIC Advanced Development 0603121D8Z					
Cost (\$ in millions)		FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Explosive Ordnance Disposal/Low-Intensity Conflict/P206		6.670	10.940	9.411	9.388	9.518	9.554	9.745

**A. Mission Description and Budget Item Justification:**

**BRIEF DESCRIPTION OF ELEMENT**

P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC program provides advanced technology and equipment solutions for military EOD operators and SOF to meet the challenges of homeland defense, force protection and the war on terrorism. EOD/LIC efforts focus primarily on the detection, access, identification, and neutralization of all types of conventional explosive ordnance and improvised explosive devices including weapons of mass destruction. Requirements submitted by the Joint Service EOD and Service Special Operations communities are prioritized and approved by OASD(SO/LIC).

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	6.670	10.940	9.411

**FY 2003 Accomplishments:**

Completed development of Limpet Mine Detection System. Completed development of the Improved Underwater Demolition Charge. Completed development and evaluation of the Limpet Mine Neutralization Tool. Completed development of the EOD Laser Ordnance Neutralization System (H-LONS). Completed development of the Chemical Leak Seal. Completed development of the Obscurant System for the Special Operations Craft – Riverine (SOC-R). Completed development of the SOF Incendiary Device. Completed development of the EOD Large Package X-ray Apparatus (LAPAXA). Completed development of the EOD Information System (EODIS)/Advanced EOD Procedures System (AEODPS). Completed development of the Miniature Reconnaissance Vehicle (MRV) Sub-System Integration. Completed modification of the Automated EOD Publication System (AEODPS) Identification Guide software to operate with PDA’s. Completed development of sub-systems for the EOD Mission Support Center. Continued development of an Integrated Diver Display Mask. Continued development of the Remote EOD Mini-Reconnaissance Vehicle. Continued development and evaluation of the EOD Underwater Search Remotely Operated Vehicle (ROV). Continued development of the SOF Tactical Decision Aids (TDA). Continued development of the Single-Sided X-Ray system. Continued development of the X-Ray Interpreter Software. Continued development of the Miniature Diver Display System (MDDS) with the DIDSON sonar. Completed development of the Unmanned Reconnaissance and Observation Craft (UROC). Continued development of the Remote Automated Munitions Clearance System. Continued development of the EOD Dispersion Suppressive System. Continued development of the EOD Improved Incendiary Tool. Continued development of the Joint EOD Digital Reporting and Tracking System (JEOD-DIGS). Continued the integration of the Tele-present Remote Aiming Platform

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(TRAP) and the USAF All-purpose Remote Transport System (ARTS). Continued development of the Remote Activation Munitions System (RAMS) Shock Tube Initiator Module. Started development of the Hydraulic Manipulator for Robots in cooperation with international partner. Started development of Ballistic Protection for the Special Operations Craft – Riverine (SOC-R). Started development of a Real Time Radiography System for Large Improvised Explosive Devices. Started development of a Krait/TORC Recoilless Disrupter with international partner. Started development of a Hydraulic Manipulator with international partner.

**FY2004 Plans:**

Complete development of the Integrated Diver Display Mask (IDDM). Complete development of Ballistic Protection for the Special Operations Craft – Riverine (SOC-R). Complete development of the EOD Dispersion Suppressive System. Complete development of a Real Time Radiography system for Large Improvised Explosive Devices. Complete development of a Tele-present Remote Aiming Platform for the ARTS robot. Continue development of the Remote EOD Mini-Reconnaissance Vehicle. Continue development and evaluation of the EOD Underwater Search Remotely Operated Vehicle (ROV). Continue development of the SOF Tactical Decision Aids. Continue development of the Single-Sided X-Ray system. Continue development of the X-Ray Interpreter Software. Continue development of the Miniature Diver Display System (MDDS). Continue development of an Unmanned Reconnaissance and Observation Craft (UROC). Continue development of the Remote Automated Munitions Clearance System. Continue development of the EOD Improved Incendiary Tool. Continue development of the Joint EOD Digital Reporting and Tracking System (JEOD-DIGS). Continue development of the Remote Activation Munitions System (RAMS) Shock Tube Initiator Module. Continue development of the Krait/TORC Recoilless Disrupter. Continue development of a Hydraulic Manipulator. Start development of Improvised Explosive Device Detection System. Start test and evaluation of the MK 6 Benign Case Entry System. Start development of the Active Thermal Protection System. Start development of Personal Data Assistant Software. Start development of the Tactical Urban Breaching Toolkit. Start development of an Advanced Robotic Vehicle. Provide specialized research and analytical support to OASD SO/LIC.

**FY2005 Plans:**

Complete development of a Real Time Radiography System for Large Improvised Explosive Devices. Complete development of the Krait/TORC Recoilless Dearermer. Complete development of a Hydraulic Manipulator. Continue development of the Remote EOD Mini-Reconnaissance Vehicle. Continue development and evaluation of the EOD Underwater Search Remotely Operated Vehicle (ROV). Continue development of the SOF Tactical Decision Aids. Continue development of the Single-Sided X-Ray system. Continue development of the X-Ray Interpreter Software. Continue development of the Miniature Diver Display System (MDDS). Continue development of the Unmanned Reconnaissance and Observation Vehicle (UROC). Continue development of the Remote Automated Munitions Clearance System. Continue development of the EOD Improved Incendiary Tool. Continue development of the EOD Dispersion Suppressive System. Continue development of the Joint EOD Digital Reporting and Tracking System (JEOD-DIGS). Continue development of the Remote Activation Munitions System (RAMS) Shock Tube Initiator Module. Continue development of PDA software. Continue development of the Active Thermal Protection System. Continue evaluation of the MK 6 Benign Case Entry System. Continue development of the Tactical Urban Breaching Toolkit. Continue development of an Advanced Robotic Vehicle. Continue development of an Improvised Explosive Device (IED) Detection System. Continue to provide specialized research and analytical support to OASD SO/LIC.

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Exhibit R-2a, RDT&E Project Justification				February 2004			
Appropriation/Budget Activity RDT&E.DW/BA3		Project Name and Number SO/LIC Advanced Development 0603121D8Z					
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Special Reconnaissance Capabilities (SRC) /P207	10.990	20.695	20.275	20.370	20.765	20.590	21.025

**A. Mission Description and Budget Item Justification:**

**BRIEF DESCRIPTION OF ELEMENT**

P207, The SRC program exploits, leverages, and integrates DOD’s service and agency efforts to improve reconnaissance and surveillance (R&S) tools (unattended sensors, tagging devices, data infiltration/exfiltration, remote delivery, and mobility/delivery of sensors), while providing operational focus for DoD and other agency technology and development programs. The SRC Program identifies, integrates, and operationalizes the technical tools for the collection of actionable information against a variety of targets and mission requirements and maintains DoD’s on-line catalog of tools in order to minimize special reconnaissance and surveillance crisis response time.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost	10.990	20.695	20.275

**FY 2003 Accomplishments:**

- Developed standoff identification capability through the use of inherent signatures.
- Enhanced and evaluated the capabilities of the current RF-backscatter tagging systems. The systems now provide for the detection and identification of vehicles or objects with subsequent data exfiltration.
- Developed, demonstrated, evaluated, miniaturized, and establish cache of small, readily concealed tracking devices and beacons to support rapid integration for response to anticipated operational support requirements.
- Improved optical tags and began operationalizing these capabilities.
- Evaluated existing platform sensing capabilities for tag operations. Integrated tagging capabilities into National Assets for demonstrations.
- Pursued remote tagging emplacement and removal capabilities in concert with user CONOPS. Various Tagging capabilities are being developed for evaluation and demonstration.
- Developed and demonstrated the capability to automatically detect a target moving past the camera, automatically capture an image of that target, and exfiltrate the image to a remote Mission Support Site.
- Improved Night Remote Optics. Developed and demonstrated the capability to detect a moving target in total darkness, capture an image of that target, and automatically compress the image data to smaller packets for rapid exfiltration.
- Improved power management/ endurance and reliability of remote sensor controller.
- Continued integration of maturing COTS/GOTS developmental sensors with the Remote Sensor and Camera Controller (RSC2) in response to DOD and OGA requirements. Transitioned RSC2 baseline capability to two government agencies.
- Continued to enhance functionality and expanded access of on-line information to supporting commands, DOD activities and OGAs.
- Assessed more than 24 reconnaissance capabilities and conducted twelve technology evaluations to assess operational capabilities.



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- Participated in user required operational prototype training where SOF successfully employed sensors and the RSC2 to detect time critical targets and rapidly relay images and sensor data to command and control centers.
- Improved Remote Sensor Controller mission life through the development of low power transceiver.
- Leveraged advanced sensing, tracking, communications and power technologies for insertion into SRC architecture.
- Initiated project to integrate RSC2 and sensors on robotic platform in support of Army SOF requirements.
- Continued to support cooperative projects with the Defense Intelligence Agency to accelerate the transition of advanced R&S technology to operational community.
- Modified and integrated existing sensors into a suite of single sensor modules with the capability to perform multiple sensing functions.
- Program Office provided training and capabilities in support of Operation Enduring Freedom and the Global War on terrorism specifically for the following prototypes: Long Range Remote Observation Post Systems; Sly Viper suites comprised of remote sensor camera controller and associated optical and unattended ground sensors; Cardinal remote sensor controllers; Sly Stone remote sensor controller with suite of sensors; Sly Boulder remote sensor controller with suite of special optical sensors; Sly Pirate remote sensor controller with day and night cameras; and various tagging devices.

**FY 2004 Plans:**

- Continue to refine the family of tags both for end-to-end operations, mission specific, and emplacement for installation and removal capabilities in concert with user CONOPS.
- Enhance and evaluate military utility of next generation optical tags (UV, and IR polarization), and exploit these devices by using National and Theater Sensor Platforms.
- Continue to develop TTL standoff capabilities through the use of inherent signatures and total systems architecture. Such devices could be applied to various missions, combat identification, dismounted tracking, vehicle tagging, and small sensor data exfiltration for worldwide applications.
- Provide for the improvement & integration of Day and Night Optics (I2/IR) into the Remote Sensor Camera Controllers (RSC2). Improvements include range & resolution, and integrate smart processing.
- Continue integration of various robust communication links with the RSC2.
- Provide for the continued integration of reliable unattended ground sensors.
- Continue to perform field evaluations of selected SR technologies and document results in on-line R&S knowledgebase.
- Continue to catalog and warehouse operationalized prototypes and residuals for potential operational use.
- Develop and demonstrate a brass board prototype radar tag system. Evaluate options for a command downlink with minimal impact on tag power consumption and mission life and provide a plan to reduce size of the tag by 25%.
- Develop and perform end-to-end assessment of next generation small beacon devices capable of communicating low-duty factor, short-burst, low-rate data messages over very long ranges using a very small/low power device.
- Integrate GPS for position and time accuracy, pager for remote wake up, reduce form factor and improve power management into the prototype RSC2.
- Integrate airdrop and maritime form factor changes into the RSC2 for evaluation.

**FY 2005 Plans:**

- Integrate new, miniature sensors into prototype remote sensor controller architectures.
- Continue to evaluate and operationalize sensor and tagging, tracking, and locating emerging and maturing technologies for their potential to enhance or enable the technical performance of R&S missions.
- Continue to engage the research and development community for technical solutions and candidate technologies to improve DOD' SR mission capabilities.
- Continue to insert operationally capable prototypes into operator training exercises to expose troops to help vet technologies and new develop tactics, techniques and procedures for employment.
- Continue to research, evaluate and integrate enhanced tagging and sensing capabilities to enable remote and standoff emplacement.

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- Continue to integrate improved SR data infiltration and exfiltration capabilities through the development and integration of advanced technology and new communications links.
- Continue to perform field evaluations of selected SR technologies and document results in on-line R&S knowledgebase.
- Continue to catalog and warehouse operationalized prototypes and residuals for potential operational use.
- Integration of Micro sensors and TTL devices
- Develop mini sensor controller for hand emplacement, and air and maritime employment.
- Integrate Dynamically Reconfigurable Vision camera technology into operational architecture.

Exhibit R-2a, RDT&E Project Justification					February 2004		
Appropriation/Budget Activity RDT&E.DW/BA3		Project Name and Number SO/LIC Advanced Development 0603121D8Z					
Cost (\$ in millions)	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009
Information Dissemination Concepts/P208		1.970	2.996	3.994	3.993	3.998	5.006

**A. Mission Description and Budget Item Justification:**

The Information Dissemination Concepts project will address technology capabilities necessary to enable sustained information dissemination in denied areas. This project will leverage ongoing research efforts of USSOCOM, the Services and Defense and other agencies to develop, modify and demonstrate dissemination mechanisms, platforms and payloads. These development efforts will include research into high altitude, lighter-than-air vehicles, modifications to chipsets for receivers capable of receiving space based radio broadcasts, and transmit/receive payloads. These payloads have the potential to be deployed from numerous platforms to include unmanned lighter-than-air vehicles and unmanned aircraft.

**B. Accomplishments/Planned Program**

	FY 2003	FY 2004	FY 2005
Accomplishment/Effort/Subtotal Cost		1.970	2.996

**FY 2004 Plans:**

New Start: Work with USSOCOM to identify and prioritize community requirements for PSYOP planning and analysis, remote sensing, broadcasting and range instrumentation. Write future work plan.

New start: Multimedia Alert Processing System (MAPS) is a DOD effort sponsored by the Technical Support Working Group. MAPS goal is to automate the encoding, processing, and storage of multi-lingual broadcast video in such a manner to allow content-based retrieval of processed video from a large media archive in near real time. MAPS ultimately will decrease time to disseminate information gathered from foreign language broadcast video.

Accelerate: Ongoing development efforts for long-duration, lighter-than-air vehicles to support information dissemination in denied territories. Specifically, PSYOP Global Reach ACTD. A USSOCOM initiative, this program plans to exploit technologies capable of disseminating information across a variety of media, and extend ranges into denied areas. Program will also improve PSYOP planning and analytical capability through technologies that are integrated into SOF planning systems.

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**FY 2005 Plans:**

Continued effort: Continue with USSOCOM projects as identified in FY 2004.

Continued effort: Development and demonstration of Multimedial Alert Processing System.

Continued effort: Potential for continued support to PSYOP Global Reach ACTD.

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<b>Fiscal Year (FY) 2005 Budget Estimates</b> <b>Exhibit R-2, RDT&amp;E Budget Item Justification</b>	Date: February 2004
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Appropriation/Budget Activity RDT&E Defense Wide BA 3	R-1 Item Nomenclature: <b>* Explosives Demilitarization Technology</b> <b>PE0603104D8Z</b>
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Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	17.494	0.000	0.000	0.000	0.000	0.000	0.000
JDTP/P486	17.494	0.000	0.000	0.000	0.000	0.000	0.000

**A. Mission Description and Budget Item Justification:**

**\* In FY 2004, Explosive Demilitarization Technology program management and execution responsibilities transferred to the Army PE-0603103A resulting in a more appropriate policy-level role for OSD.**

(U) The Explosive Demilitarization Technology Program is a cooperative interservice, interagency effort focused as the sole Department of Defense (DoD) program dedicated to the development of safe, efficient and environmentally acceptable processes for the resource recovery and recycling (R3) or disposition of strategic, tactical, and conventional munitions including explosives, and rocket motors. Efforts in this program emphasize environmentally compliant technologies to enhance existing methods for munitions R3 and new technology alternatives over that of open burning/open detonation (OB/OD). There are currently over 500,000 tons of these materials requiring disposition with a forecast of over 700,000 tons to flow through the stockpile by 2009. This is funded under Advanced Technology Development based upon its support to the development and exploration of new munitions concepts and technology preceding system-engineering development.

(U) The effort employs the highly developed technology base in the DoD Service Laboratories and Technical Centers, the Department of Energy (DOE) National Laboratories, industry, and academia. The program is integrated with munitions through the leadership of the Joint Ordnance Commanders Munition Demilitarization/Disposal Subgroup and seeks to leverage support from the Department's Environmental Security Technology Certification Program (ESTCP), the Strategic Environmental Research and Development Program (SERDP), the Joint DoD/DOE Munitions Technology Development Program, and complementary investments from the Services science and technology programs. Each project is required to include a federal laboratory sponsor and is provided peer review by the Joint Working Group. The Demilitarization Users Group is utilized to assess and review ongoing and emergent demilitarization requirements for use in planning future investments for this

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program. The program supports an annual Global Demilitarization Symposium and Exhibition, which focuses on sharing of technology transfer opportunities, program technical reviews and data evaluation from ongoing projects and advanced demonstrations. This program was established pursuant to Section 226 of the National Defense Authorization Act Fiscal Year 1996 (Public Law 104-106) and Section 227 of the National Defense Authorization Act for Fiscal Year 1997 (Public Law 104-201). The program provides an annual report to the Congress, which provides a detailed plan update on technology investments, accomplishments, and future planned investment areas. Recent annual reports; FY 2000-Department of Defense Joint Demilitarization Technology Program (February 2001) and the FY 2001-Department of Defense Joint Demilitarization Technology Program (February 2002).

**Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	18.205	0.000	0.000
Current FY 2005 President's Budget	17.494	0.000	0.000
Total Adjustments	-.711		
Congressional program reduction	-.711		
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other			

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Exhibit R-2, RDT&E Budget Item Justification Fiscal Year (FY) 2005 Budget Estimates						Date: February 2004	
Appropriation/Budget Activity RDT&E, D BA 3			R-1 Item Nomenclature: Medical Advanced Technology, PE 0603002D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0.000	5.941	2.063	2.539	2.590	2.644	2.700
Medical Adv. Technology/P506	0.000	5.941	2.063	2.539	2.590	2.644	2.700
Subtotal Cost							
<b>A. Mission Description and Budget Item Justification:</b>							
<p>(U) This program supports applied research for advanced development of biomedical strategies to prevent, treat and assess health consequences from exposure to ionizing radiation. It capitalizes on findings under PE 0602787D, Medical Technology, and from industry and academia to advance novel medical countermeasures into and through pre-clinical studies toward newly licensed products. Program objectives focus on mitigating the health consequences from exposures to ionizing radiation that represent the highest probable threat to US forces under current tactical, humanitarian and counter terrorism mission environments. Findings from basic and developmental research are integrated into highly focused advanced technology development studies to produce the following: (1) protective and therapeutic strategies; (2) novel biological markers and delivery platforms for rapid, field-based individual dose assessment; and (3) experimental data needed to build accurate models for predicting casualties from complex injuries involving radiation and other battlefield insults. The Armed Forces Radiobiology Research Institute (AFRRI), because of its multidisciplinary staff and exceptional laboratory and radiation facilities, is uniquely positioned to execute the program as prescribed by its mission. Because national laboratories operated by the Department of Energy no longer support advanced research relevant to military medical radiobiology, AFRRI is currently the only national resource carrying out this mission.</p>							

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**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)

	<u>2003</u>	<u>2004</u>	<u>2005</u>
Previous President's Budget	0	0	0
Current FY 2005 President's Budget	0	5.941	2.063
Total Adjustments		5.941	2.063
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other			

**C. Other Program Funding Summary:** Not applicable

**D. Execution:** Armed Forces Radiobiology Research Institute, Bethesda, MD

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Exhibit R-2a, RDT&E Project Justification Fiscal Year (FY) 2005 Budget Submission						Date: February 2004	
Appropriation/Budget Activity RDT&E, D BA 3				Project Name and Number Medical Advanced Technology, P506 PE-0603002D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project/Thrust Cost	0.000	5.941	2.063	2.539	2.590	2.644	2.700
<b>A. (U) Mission Description and Budget Item Justification:</b>							
<p>(U) This program supports applied research for advanced development of biomedical strategies to prevent, treat and assess health consequences from exposure to ionizing radiation. It capitalizes on findings under PE 0602787D8Z, Medical Technology, and from industry and academia to advance novel medical countermeasures into and through pre-clinical studies toward newly licensed products.</p>							
<b>B. (U) Accomplishments/Planned Program:</b>							
Cost (in \$ Millions)	FY 2003		FY 2004		FY 2005		
5-AED Preclinical Studies	0		1.559		.120		
<p><b>FY 2003:</b> In compliance with FDA requirements, safety and toxicity studies for 5-androstenediol were initiated in a large animal model through contract with a GLP certified laboratory.</p> <p><b>FY 2004:</b> Obtain results from toxicology studies. Contract out GLP efficacy studies on primates.</p> <p><b>FY 2005:</b> Transition to advanced development for Phase I clinical trials. Submit IND application to FDA/CDER.</p>							
Cost (in \$ Millions)	FY 2003		FY 2004		FY 2005		
Ex-Rad Radioprotectant (Congressional add)	0		1.000		0		
<p><b>FY 2003:</b> Initiated a collaboration with Onconova Therapeutics to evaluate the cellular and molecular mechanism by which Ex-Rad ON01210 exerts its radioprotective effects.</p>							

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<b>FY 2004:</b> Evaluate the efficacy, toxicity, and pharmacology of the radioprotectant.			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Radiation Dose Assessment: Development and Protocol Evaluation	0	.545	.194
<b>FY 2003:</b> Improved lymphocyte isolation procedures for better mitotic yield. Conducted radiation dose assessment in radiation accidents from 12 samples.			
<b>FY 2004:</b> Define high throughput approaches for dose assessment of mass casualties, to include lymphocyte isolation system, metaphase spread preparation, and automation equipment for metaphase spread preparation.			
<b>FY 2005:</b> Complete a simulated mass exposure dose assessment experiment. Perform intra- and inter-laboratory studies to validate the procedures.			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Biodosimetry PCC Assay Validation	0	.505	.255
<b>FY 2003:</b> Completed in vivo validation of the premature chromosome condensation (PCC) assay using samples from the accident in Thailand. Acquired blood samples from radiotherapy patients for assessment.			
<b>FY 2004:</b> Complete time-course study to determine the effect of sampling delay on the PCC assay. Continue validation of assay using samples from accident victims and radiotherapy patients. Complete analysis from 8 radiotherapy patients. Optimize an immuno-enzymatic bright field method for detecting chromosome aberrations involving specific chromosomes in mouse for persistency study.			
<b>FY 2005:</b> Establish multicolor chromosome aberration analysis. Continue validation of assay using samples from accident victims and radiotherapy patients.			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Early-Response Gene Expression Markers	0	.783	.583

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<p><b>FY 2003:</b> Demonstrated that gene expression changes can be measured in less than 3 hours after sample processing using devices capable of nucleic acid analysis through gene amplification on a platform deployable to a field laboratory.</p> <p><b>FY 2004:</b> Evaluate dose-dependent changes in multiple gene targets from single donors (samples irradiated ex vivo) for intra-individual comparisons. Complete study of inter-individual comparisons using ex-vivo irradiation of samples. Initiate validation of assay using gene expression in rodent models exposed to radiation in vivo.</p> <p><b>FY 2005:</b> In animal model test the influence of radioprotectants on gene expression markers to determine if the use of these pharmacological agents will influence the biodosimetric assay endpoints. Develop proof-of-principle fieldable protocols for major component of the nucleic acid analysis assay.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Biodosimetry Assessment Tool (BAT) and Blood Markers	0	.438	.138
<p><b>FY 2003:</b> Initiated efforts to design a version of BAT for a PDA. Obtained an updated database of bioassay data on lymphocyte and monocyte counts from the REAC/TS accident registry to support the enhancement of the BAT dose prediction models.</p> <p><b>FY 2004:</b> Initiate evaluation of a new hematology analyzer and perform reliability, accuracy and dynamic range studies. Initiate design for blood counter data storage system. For BAT, update neutron criticality data for onset of vomiting. Complete development of integrated help screens. Update BAT software to version 1.0. Transition selected BAT utilities to Palm Pilot platform - beta version.</p> <p><b>FY 2005:</b> Complete hematology protocol development and exercise deployable hematology system. Evaluate time window requirements to determine dose using lymphocyte depletion kinetics. Incorporate neutron criticality lymphocyte depletion data set into BAT. Complete PDA version 1.0 of BAT software application.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Assessment of uranium exposure	0	.111	.023

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**FY 2003:** Initiated development of analytical techniques to increase the sensitivity of methodology for the rapid detection of uranium in urine. These approaches require the uranium in the urine to be concentrated. Began synthesis of imprinted polymer resin to be used for concentrating uranium in the urine. Identified potential compounds for uranium chelation chromatography.

**FY 2004:** Assess the utility of commercially available resins to concentrate urinary uranium. Continue synthesis of imprinted polymers capable of sequestering uranium.

**FY 2005:** Assess the utility of imprinted polymers to concentrate urinary uranium. Assess the utility of chelation chromatography methodologies for the concentration of uranium in urine.

Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Infection Therapies	0	1.000	.750

**FY 2003:** Determined the efficacy of several antibiotics including ceftriazone and gentamicin and three quinolones (trovafloxacin, gatifloxacin, and moxifloxacin) to protect against opportunistic infection with K. pneumoniae in sublethally irradiated mice.

**FY 2004:** Continue studies with most promising antibiotics to optimize dose regimens to protect against opportunistic infection with K. pneumoniae in sublethally irradiated mice.

**FY 2005:** Determine the optimal dose regimens for quinolones against a polymicrobial infection from endogenous pathogens with lethal doses of radiation.

C. Other Program Funding Summary: N/A.

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Exhibit R-2, RDT&E Budget Item Justification Fiscal Year (FY) 2005 Budget Estimates						Date: February 2004	
Appropriation/Budget Activity RDT&E, D BA2				R-1 Item Nomenclature: Medical Technology, PE 0602787D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	6.100	11.641	10.084	10.266	10.488	10.708	10.929
Medical Technology/P505, Subtotal Cost	6.100	11.641	10.084	10.266	10.488	10.708	10.929
<p>A. Mission Description and Budget Item Justification:</p> <p>(U) This program supports developmental research to investigate new approaches that will lead to advancements in biomedical strategies for preventing, treating, assessing and predicting the health effects of human exposure to ionizing radiation. Program objectives focus on mitigating the health consequences from exposures to ionizing radiation that represent the highest probable threat to US forces under current tactical, humanitarian and counter terrorism mission environments. New protective and therapeutic strategies will broaden the military commander's options for operating within nuclear or radiological environments by minimizing both short- and long-term risks of adverse health consequences. Advancements in field-based biological dose assessment systems to measure radiation exposures will enhance triage, treatment decisions and risk assessment. Accurate models to predict casualties will promote effective command decisions and force structure planning to ensure mission success.</p> <p>(U) The program has three primary goals: (1) rational development of prophylactic and therapeutic strategies based on fundamental knowledge of radiation-induced pathophysiology and on leveraging advances in medicine and biotechnology from industry and academia; (2) development of novel biological markers and delivery platforms for rapid, field-based individual dose assessment; and (3) understanding toxic consequences from chronic exposure to tissue-embedded depleted uranium (DU).</p>							

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B. Program Change Summary:

	<u>2003</u>	<u>2004</u>	<u>2005</u>
Previous President's Budget	0	0	0
Current FY 2005 President's Budget	6.100	11.641	10.084
Total Adjustments		11.641	10.084
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			
SBIR/STTR Transfer			
Other			

C. Other Program Funding Summary: Not applicable.

D. Execution:

Armed Forces Radiobiology Research Institute, Bethesda, MD

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Exhibit R-2a, RDT&E Project Justification Fiscal Year (FY) 2005 Budget Estimates						Date: February 2004	
Appropriation/Budget Activity RDT&E, D BA 2	PROGRAM ELEMENT Medical Technology PE 0602787D8Z			Project Name and Number Medical Technology P505			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project/Thrust Cost	6.100	11.641	10.084	10.266	10.488	10.708	10.929
<p>A. Mission Description and Budget Item Justification:</p> <p>(U) This program supports developmental research to investigate new approaches that will lead to advancements in biomedical strategies for preventing, treating, assessing and predicting the health effects of ionizing radiation.</p> <p>(U) The program has three primary goals: (1) rational development of prophylactic and therapeutic strategies based on fundamental knowledge of radiation-induced pathophysiology and on leveraging advances in medicine and biotechnology from industry and academia; (2) development of novel biological markers and delivery platforms for rapid, field-based individual dose assessment; (3) understanding toxic consequences from chronic exposure to tissue-embedded depleted uranium (DU).</p>							
Cost (in \$ Millions)	FY 2003		FY 2004		FY 2005		
Mechanisms of AED Radioprotection	1.030		1.353		1.300		
<p><b>FY 2003:</b> To address the FDA requirement for an understanding of the mechanisms responsible for AED's radioprotective actions, demonstrated that AED stimulates phagocytotic activity in circulating granulocytes and the oxidative burst in circulating monocytes in irradiated mice. Demonstrated that AED's protective effects are not due to contamination with endotoxin. Established techniques for measuring AED and other steroids to allow pharmacokinetic analysis of AED.</p> <p><b>FY 2004:</b> Initiate experiments on effects of AED on the function of peritoneal macrophages, a critical, non-circulating component of the immune system. Initiate studies on AED's ability in the spleen to induce cytokines, which mediate signals of the immune system.</p> <p><b>FY 2005:</b> Complete assays on actions of AED on oxidative burst and phagocytosis of peritoneal macrophages in irradiated and non-irradiated rodents. Provide preliminary measurements of several cytokines in the spleen. Establish correlation of plasma levels of</p>							

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AED and efficacy of drug actions in the rodent model.			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Radioprotective effects of isoflavones and vitamin derivatives	.698	1.110	1.480
<p><b>FY 2003:</b> Demonstrated that the soybean derived isoflavone genistein has radioprotective effects if administered subcutaneous 24 hour prior to radiation exposure in the mouse. Preliminary experiments show that the related compound daidzein also provides radiation protection. Demonstrated that alpha-tocopherol increased the erythrocyte levels in irradiated mice.</p> <p><b>FY 2004:</b> Determine the dose response curve for radioprotection by genistein in both male and female rodents. Determine the optimal time for administration of genistein for radioprotection. Complete screening of delta- and gamma-tocopherol in comparison to alpha-tocopherol for radioprotection in mice.</p> <p><b>FY 2005:</b> Determine the optimal time for administration of daidzein for radioprotection. Begin to evaluate combinations of genistein and daidzein to determine the optimal ratio. Determine the dose-reduction factor of the most effective isomer of tocopherol. Compare pharmacokinetics of this isomer given subcutaneously in irradiated and non-irradiated mice.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Dual-action Drug Delivery Strategy	.480	.873	.500
<p><b>FY 2003:</b> The initial design of a sustained-release, lipid-encapsulated (liposomal) delivery system for aminothiols in combination with Vitamin E was improved to provide approximately 35% drug loading.</p> <p><b>FY 2004:</b> Continue to perfect the liposomal delivery system. Assess the distribution of the drug achieved with this delivery system and assess the effects on cytokine gene expression as an indicator of drug action.</p> <p><b>FY 2005:</b> Establish optimum conditions for radioprotection with the liposomal preparation in rodents using survival following radiation exposure and blood profiles as endpoints.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Radioprotectants/Therapeutics Survey	1.001	1.247	1.376

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**FY 2003:** Continued systematic survey of potential radioprotectant and therapeutic compounds under a drug screen protocol. Included this year were several non-androgenic steroids related to 5-AED, captopril, a cell cycling modulator, and several analogs of Vitamin E. Continued to refine, test, and analyze preventive treatment strategies based on fundamental mechanisms of cellular and molecular injury and repair of blood-forming and gastrointestinal organ systems.

**FY 2004:** Among the drugs slated to be tested in FY2004 with drug screening protocol are promising products from various pharmaceutical companies. Most of the agents are proprietary; they include a DHEA derivative and statins. Drugs that show potential will be targeted for further development.

**FY 2005:** New drugs continue to come to the attention of the Institute for assessment. These agents will be evaluated for their ability to prevent and/or treat radiation injury. Approaches to screening new agents will be improved.

Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
PCC Cytogenetic Assay	.240	.240	.340

**FY 2003:** Patent application filed on the novel premature chromosome condensation (PCC) aberration assay that permits rapid analysis of radiation exposure across a broad dose range from interphase lymphocytes of peripheral blood. Demonstrated that PCC can be induced in a single cell.

**FY 2004:** Continue to improve sample preparation by promoting signal transduction mechanisms for inducing PCC in peripheral blood lymphocytes. Optimize the color pigment technique that will be used for fluorescent in situ hybridization (FISH) method for detecting chromosome aberrations in multiple chromosomes.

**FY 2005:** Optimize the multicolor FISH protocol that will allow detection and quantification of radiation-induced chromosome aberrations in multiple chromosomes. This approach will increase the sensitivity of the assay and permit detection and quantification of partial-body exposures.

Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
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Molecular Biomarkers- DNA mutations	.466	.466	.566
<p><b>FY 2003:</b> Developed real-time PCR for detection of DNA mutations (common mitochondria DNA deletion) in genomic DNA samples providing a significant advance in quantitative assessment of target sequences. Initiated studies to optimize the real-time and cytological DNA mutation bioassay to detect low-frequency DNA mutations.</p> <p><b>FY 2004:</b> Develop and evaluate modified deletion primers for quantitative fluid phase PCR bioassay in Human Peripheral Blood Lymphocytes (HPBL). Begin evaluation of low level multiplex detection.</p> <p><b>FY 2005:</b> Develop cytological assay using PCR to measure mtDNA deletions in HPBL. Evaluate the effect of inter-individual variation for this assay. Perform in vitro dose-response studies for fluid-phase PCR assay in HPBL.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Blood-Based Cell and Protein Markers	.297	.397	.510
<p><b>FY 2003:</b> Optimized the microassay to determine protein concentration in human blood samples. Developed biotinylated detection antibody cocktails that allow detection of proteins in serum. Determined the level of one important protein (GADD45) in irradiated human blood.</p> <p><b>FY 2004:</b> Continue studies to develop microsphere flow cytometry system for measurement of multiple radiation-responsive protein biomarkers. Optimize sample processing of protein biomarkers for field-based blood analysis. Provide GADD45 and human albumin or beta-actin bead sets for radiation-responsive blood protein biomarker determinations.</p> <p><b>FY 2005:</b> Complete initial phase of in vitro studies evaluating radiation-responsive blood protein biomarkers involving other protein targets measured by the microsphere flow cytometry-based system. Initiate protein biomarker studies to evaluate inter-individual and stress agent effects.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Toxicity of DU and Tungsten	.160	.433	.050

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<p><b>FY 2003:</b> Determined that DU and Tungsten Alloys induce mutations in a marker gene (HPRT) in vitro. Completed studies assessing the effects of the heavy metals on gene expression in liver carcinoma cells. Initiated studies on genomic instability and human-derived (HOS) cell neoplastic transformation.</p> <p><b>FY 2004:</b> Continue transformation, genotoxicity, and genomic instability studies on HOS cells. Initiate studies on macrophage cell lines that are important in the toxicity of inhaled DU and other heavy metals. (The related Defense Technology Objective completes in FY 2004.)</p> <p><b>FY 2005:</b> Evaluate effects of heavy metals on viability of pulmonary macrophages and initiate evaluation of cell function.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Late-Arising Radiation Injuries	.264	.205	.414
<p><b>FY 2003:</b> Evaluated in vitro the effects of the pharmacological agents AED, epigallocatechin (EGCG), and phenylacetate on expression of radiation-induced biomarkers that correlate with carcinogenicity. Developed a leukemogenesis mouse model that can be used to study the pre-leukemic phase, identify oncogenic changes, define factors that contribute to the development of leukemia, and test the efficacy of the drugs.</p> <p><b>FY 2004:</b> Assess the ability of phenyl acetate to inhibit human cell transformation in vitro (i.e, to block development of pre-cancerous cells). Initiate transformation studies with EGCG.</p> <p><b>FY 2005:</b> Complete transformation studies with EGCG. Initiate radiation leukemogenesis studies with phenylacetate and EGCG.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Radiation Injury and Bacterial Sepsis	.700	1.366	1.700
<p><b>FY 2003:</b> Established animal model to assess antibiotics and biological response modifiers for radiation-related infection and sepsis.</p> <p><b>FY 2004:</b> Determine the ability of the non-specific biological response modifier (insoluble beta-1,3-glucan) against infection with K. pneumoniae in sublethally irradiated mice.</p> <p><b>FY 2005:</b> Determine the efficacy of the non-specific biological response modifier against a polymicrobial infection from endogenous pathogens with lethal doses of radiation. Determine the effects of the quinolones against a polymicrobial infection from endogenous pathogens with lethal doses of radiation.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005

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Probiotics	.387	0.613	0.924
<p><b>FY 2003:</b> Developed the experimental mouse model to assess the effectiveness of Lactobacillus reuteri to protect against radiation-induced enteric infections. Established that L. reuteri is not indigenous to the mouse colony. Demonstrated feasibility of model system.</p> <p><b>FY 2004:</b> Evaluate the effectiveness of L. reuteri as a probiotic protective agent when mice are challenged with S. sonnei and radiation exposure</p> <p><b>FY 2005:</b> Compare the effectiveness of L. reuteri and VSL#3 (a commercially available combination of multiple bacteria) in response to lethal radiation at doses that cause gastrointestinal damage and diarrhea.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Noninvasive "biomodulation" system (Congressional add)	0	2.400	0
<p><b>FY 2004:</b> Assess the use of hair proteins in the hair follicle as a non-invasive biomarker for exposure to radiation. Develop the methodology for a biological dosimetry tool to allow triage of potential radiological victims using this approach.</p>			
Cost (in \$ Millions)	FY 2003	FY 2004	FY 2005
Host-Defense Mechanisms	.377	.938	0.924
<p><b>FY 2003:</b> In macrophage cell lines, identified patterns of host-defense modulation at the molecular level following sublethal irradiation and viral (influenza) infection. NFkB was found to be one of the primary chemicals regulating macrophage response to virus.</p> <p><b>FY 2004:</b> Determine the activation state of NFkB during virus infection and radiation exposure. Assess cell survival, apoptotic markers, and cytokine production as endpoints.</p> <p><b>FY 2005:</b> Evaluate the effect of antioxidants and radioprotectants including genistein on changes induced by virus infection and radiation exposure.</p>			

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<b>Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&amp;E Budget Item Justification</b>							Date: February 2004	
Appropriation/Budget Activity RDT&E., DW BA2				R-1 Item Nomenclature: Lincoln Laboratory 0602234D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	26.056	26.830	25.441	26.854	27.367	27.752	28.349	

**A. Mission Description and Budget Item Justification:**

(U) The Lincoln Laboratory (LL) Line program is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). LL is operated as an FFRDC administered by the DoD, and is unique among DoD FFRDC's: the laboratory is operated (under A-21) by MIT with no fee. Thus, the Research Line is the laboratory's only dedicated source of funding for innovative research and development efforts.

(U) The LL Line funds advanced research activities that directly lead to the development of new system concepts, new technologies, and new components and materials. These activities enable the DoD to address latent technology needs that affect a broad spectrum of missions, services, and transformational operational capabilities. The Lincoln Laboratory Research Line contributed foundation technologies to two systems which received the 2002 Packard Excellence in Acquisition Award: (1) the Bio-aerosol sensing and micro-laser technologies were transferred to industry and are in production for the Joint Biological Defense Sensor (JBPDS), and (2) the Free-space optical communications technologies were used in the GeoLite optical communications satellite demonstration system. The GeoLite demonstration provides the underpinnings of the Transformation Communications Architecture. Other recent successes include a compact 3D imaging laser radar that uses unique photon-counting avalanche photodiode arrays and has demonstrated, in the DARPA Jigsaw program, high quality imagery of targets obscured by dense foliage or camouflage, and a biosensor that uses genetically engineered immune cells and has demonstrated the ability to identify major biowarfare agents in under two minutes with high sensitivity and low false alarm rate.

(U) The LL Line program currently has impact in five core technology thrusts:

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(U) Surveillance Systems, with emphasis on revolutionary sensing techniques, algorithms for detecting and recognizing battlefield targets both in the clear and in difficult deployments, and high performance computing to enable rapid prosecution of suspected targets. The advanced sensing techniques include simultaneous multi-mode operation to improve the ability to monitor multiple ground surveillance sites. These improvements are complemented with innovations in algorithm techniques to efficiently extract information from multi-modalities operation. Develop signal processing computing architectures to respond in real-time on-board the sensor platform. The multi-modality sensing is fused with archived data to improve target ID and classification. These techniques will enable dramatic improvements in ground surveillance targeting, identification and classification.

(U) Communications and Decision Support, with emphasis on high bandwidth, low probability of intercept, jam resistant communication links and machine-to-machine applications that operate over a network of these links. Links include advanced antenna designs, RF technology, and high-rate fiber and free-space optical communications systems. Develop network protocols (including for mobile users with lightweight transceivers) for "socketing" sensors into the network and the interconnection of these very disparate modalities into a global defense network that can truly realize the vision of a "from sensor to decider to shooter" communications infrastructure. Develop unique intrusion detection/response techniques to protect computer networks and applications that fuse information for presentation to decision makers.

(U) Applied Optics, including advanced 3D laser radars (ladars), high-energy-laser (HEL) technology, and active and passive hyper spectral imaging (HSI). The ladar efforts develop and test advanced concepts in both 3D direct detection ladar and in coherent ladar. These ladar efforts are providing the enabling technology for a variety of new DoD systems, including target identification systems as part of the Army Future Combat Systems (FCS) and discrimination systems for advanced ballistic-missile-defense (BMD) seekers. The HEL technology efforts focus on improving beam control for stressing atmospheric conditions (e.g., tactical HELs in near-surface engagements) and on developing novel, more efficient lasers to reduce the size and weight of future HEL systems. The HEL efforts will potentially enable future HEL systems, such as Block upgrades to the Airborne Laser (ABL) and an Advanced Tactical Laser with a solid-state laser as the weapon laser. The HSI efforts have been principally focused on active sensing and the combining of HSI sensing with ladar sensing.

(U) Advanced Electronics Technology, with emphasis on development of materials, devices, and

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subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors. Specific focus areas include work on low power and high sample rate analog to digital (A/D) conversion for digital receivers for radar and electronic intercept, 3-D imaging and photon-counting focal-plane arrays for ISR and advanced missile seekers, mid-infrared semiconductor lasers to counter advanced heat-seeking missiles, new sensors for rapidly detecting and identifying low concentrations of bio-warfare agents, solid state low-light imagers for surveillance and targeting, and high-speed, radiation hard, ultra-low power analog and digital circuits tailored for DoD applications.

(U) Bio-Chem Defense, including technology, analysis and systems aimed at defeating enemy use of biological and chemical weapons, and includes efforts in agent detection, diagnosis and treatment, and informatic systems. Agent detection is aimed at rapid, accurate, and sensitive methods for collecting, analyzing and reporting the presence of a biological or chemical agent, and involves analysis of chemical and physical properties of the agents, such as DNA, RNA, antigens and various other proteins. Both stand-off (remote) detection and point sensors are included. Treatment methodologies include novel anti-viral techniques that open new immune-system pathways for biological-warfare agent-induced diseases that might otherwise be untreatable. Bioinformatics systems are specifically targeted at the analysis of micro array images, applying first to pattern recognition techniques for agent identification, but expanding into large integrated systems.

**Program Change Summary:**

	FY 2003	FY 2004	FY 2005
Previous President's Budget	26.769	27.231	26.514
Current FY 2005 President's Budget	26.056	26.830	25.441
Total Adjustments	-.713	-.401	-1.073
Congressional program reductions			-1.073
Congressional rescissions			
Congressional decrease	-.713		
Reprogrammings			
SBIR/STTR Transfer			
Other			

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Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, DW BA2				Project Name and Number Lincoln Laboratory 0602234D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Project Name or Future Naval Capability /No./Subtotal Cost	26.056	26.830	25.441	26.854	27.367	27.752	28.349	
<b>A. Mission Description and Budget Item Justification:</b>								
<p>(U) The Lincoln Laboratory (LL) Line program is an advanced technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT).</p> <p>(U) The LL Line funds advanced research activities that directly lead to the development of new system concepts, new technologies, and new components and materials</p> <p>(U) The LL Line program currently has impact in five core technology thrusts:</p> <p>(U) <u>Surveillance Systems</u>, with emphasis on revolutionary sensing techniques, algorithms for detecting and recognizing battlefield targets both in the clear and in difficult deployments, and high performance computing to enable rapid prosecution of suspected targets.</p> <p>(U) <u>Communications and Decision Support</u>, with emphasis on high bandwidth, low probability of intercept, jam resistant communication links and machine-to-machine applications that operate over a network of these links</p> <p>(U) <u>Applied Optics</u>, including advanced 3D laser radars (ladars), high-energy-laser (HEL) technology, and active and passive hyper spectral imaging (HSI).</p> <p>(U) <u>Advanced Electronics Technology</u>, with emphasis on development of materials, devices,</p>								

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and subsystems utilizing microelectronic, photonic, biological, and chemical technologies to enable new system approaches to DoD sensors.

(U) Bio-Chem Defense, including technology, analysis and systems aimed at defeating enemy use of biological and chemical weapons, and includes efforts in agent detection, diagnosis and treatment, and informatic systems.

**B. Accomplishments/Planned Program**

Surveillance Systems	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	4.938	5.023	4.891	

**FY 2003 Accomplishments:**

(U) Advanced High Performance Computing Technologies: Developed advanced Very Large Scale Integration (VLSI) technologies for implementation of a wideband, Electronic Counter Measures (ECM)-resistant receiver for Space-Based Radar and other multi-modality sensing applications. Demonstrated integrated small size, weight and power technologies to achieve high computation throughput with very low latencies. Implemented a heterogeneous architecture to permit real-time robustness against ECM.

(U) Surface Surveillance Phased Array System: Developed advanced phased-array architectures and signal processing concepts directed towards achieving full time-energy utilization in airborne and space-based Ground Surveillance radars through the use of mode interleaving and multiple simultaneous beams. Such designs could improve the performance of Ground Surveillance radar systems by an order of magnitude, but will require advanced digital signal processing and packaging technologies for implementation.

(U) Parallel and Distributed Processing: Develop innovative techniques to distribute processing load across multiple computing nodes based on an easy to use interpretive language. This technology provides several factors of improvement in rapid prototyping and development of advanced signal processing concepts.

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**FY 2004 Plans:**

(U) *Advanced High Performance Computing Technologies:* Integrate wideband Very Large Scale Integrated (VLSI) channelized receiver with electronically-scanned phased array antenna to demonstrate Space-Based Radar Electronic Counter-Countermeasures (ECCM) and signal processing functionality.

(U) *Surface Surveillance Phased Array System:* Build several channels of an advanced conformal phased-array architecture for airborne and space-based Ground Surveillance radars, and demonstrate improvements in time-energy utilization using mode interleaving and multiple simultaneous beam formation. Characterize and quantify sensor performance to detect targets in the presence of high levels of ground clutter and other signal interferers.

(U) *Array Element Level Digitization:* Develop innovative architectures to enable digitization at the element level. Integrate digital signal processor with radiating antenna manifold. These architectures will eliminate the existing complexity present with more conventional analog hardware architecture.

(U) *UAV Video Exploitation:* Plans include developing video processing algorithms to process large amounts of video data from Unmanned Air Vehicles (UAVs) presently overloading image analysts and precluding fast turn around responses. Rapid confirmation of suspected targets will be enabled by correlating multiple frames to quickly identify mobile threats within a 3-D scene under surveillance.

(U) *Parallel and Distributed Processing:* Continue development of techniques to implement signal processing algorithms across a number of heterogeneous computing platforms. Demonstrate unique approaches on small cluster of computing nodes.

**FY 2005 Plans:**

(U) *Surface Surveillance Phased Array System:* Demonstrate prototype system instrumented on-board of a sensor platform. Applied advanced signal processing algorithms to collected data to verify predicted performance.

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(U) *Array Element Level Digitization:* Develop hardware design and build concept hardware with key enabling technologies. Begin demonstration on a sub-scale prototype.

(U) *UAV Video Exploitation:* Demonstrate video processing algorithms based on representative scenario data. Quantify improvements compared to today's conventional approaches. Implement algorithms in real-time on-board an experimental Navy airborne sensor platform.

(U) *Parallel and Distributed Processing:* Exercise highly efficient distributed processing across a larger node cluster. Address challenges in fault tolerance and reallocation of computing resources for close to real-time performance.

Communications & Decision Support	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	4.548	4.627	4.505	

**FY 2003 Accomplishments:**

(U) *Global Networks:* Continue to focus on evolving architecture and technology for global high-rate military communications and networking, including optical communications in space and fiber, future Milsatcom, and tactical theater communications, particularly to forces on the move and to support time-critical strike. Continue laboratory demonstrations of technology for DoD-specific applications, refine networking architecture and protocols, and aid DoD in defining its development and procurement strategy for the future global defense network that will provide C3 and ISR with product transport within tactical timelines. Application is to the emerging integration of DoD command elements, information centers, and execution forces into a unified Global Information Grid. Specific technologies include free-space optical systems for multi-Gbps readout of Airborne Intelligence, Surveillance and Reconnaissance (AISR) platforms and connectivity to airborne C2 platforms through space communications as envisioned by the DoD Transformational Communications Architecture, multi-frequency RF systems and antenna designs for ground mobile "comm-on-the-move" satcom systems, and protocols for high-speed wireless networks.

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(U) *Defensive Information Warfare:* Developed robust collaborative applications for network-centric operations involving wireless airborne and ground operations, which are subject to both varying link problems and information attacks. Near term focused on robust, secure chat to support airborne C4ISR in the Multi-mission C2 Constellation environment

(U) *Airborne C2 Node:* Used the Air Force Command and Control Constellation Test bed (Task Force Paul Revere) to test new communication, command, and control concepts for ISR and weapon targeting. Developed an integrated multi-intelligence (multi-INT) surface target detection system by combining Signal Intelligence (SIGINT) cues with high-resolution SAR imagery. This work was the first step towards integrating synoptic and narrow field-of-view sensors of the reconnaissance/strike lattice.

**FY 2004 Plans:**

(U) *Global Networks:* Refine the architecture and technology for global high-rate military communications to permit seamless line-of-sight and over-the-horizon connectivity for peer-to-peer computer-based tactical applications to include distributed operations centers, distributed sensor ground processing, and integrated C2 of reconnaissance and strike assets. Technologies that will receive priority include moving to a "packet-based" network design, redesigning crypto and transec to retain Information Assurance in a packet topology, revising network control to provide both tactical on-demand connectivity and transient provisioning of large data pipes for sensor flows.

(U) *Defensive Information Warfare:* Research and development will focus on the problems of robustness and security of collaborative applications, including chat, against information attacks and varying link availability in an airborne C4ISR environment.

(U) *Airborne C2 Node:* Use the Air Force Paul Revere Test bed to test new communications, command, and control concepts for ISR and for interface to strike, including the electronic threat environment as influenced by Electronic Countermeasures (ECM) and jamming. Extend multi-INT system to include ID sensors, and use experimental system to form a substrate for the time-critical strike lattice. Develop cueing strategies and use of contextual information in behavior databases.

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**FY 2005 Plans:**

(U) *Global Networks:* Continue to develop, demonstrate, and transfer technologies for high speed optical and RF networked communications into funded DoD programs that put global connectivity into the hands of the war fighter.

(U) *Defensive Information Warfare:* Continue focus on tactical ISR used to support joint air-sea and air-land networks, working the wired and wireless robustness and security issues facing net-centric warfare, with attention to robustness for collaborative applications.

(U) *Airborne C2 Node:* Use the Air Force Paul Revere Test bed to exploit Global Airspace Traffic Management data to enhance the air picture; provide computer-to-computer network interfaces to the Navy Cooperative Engagement assets; and to provide firepower support to transformational army elements. Extend system to include multiple synoptic and narrow field-of-view sensors such that the system provides the mechanism of linking sensors in the reconnaissance/strike lattice. Transfer technology to BMC2 contractor for use in Command Air Operations Center (CAOC), Distributed Common Ground Station (DCGS) and Multi-mission Command and Control Aircraft (MC2A).

Applied Optics	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort	4.264	4.337	4.223	
Subtotal Cost				

**FY 2003 Accomplishments:**

(U) *Laser Radar:* Developed laser radar technologies for applications to advanced ballistic and tactical seekers and combat identification. Demonstrated fully-functional 32 x 32 arrays of InGaAs Geiger-mode avalanche photodiodes at the 1.0-micron wavelength. Focused on integrating these systems into lightweight, low power packages consistent with advanced seeker applications, which will provide single-photon-sensitivity and high-precision range resolution for generating detailed 3-D imagery of targets. Investigated high-efficiency alternative transmit lasers for 3-D imaging systems that enable further miniaturization. Continued the development of multi-function laser-radar systems, for

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applications to Ballistic Missile Defense (BMD) interceptors, combat identification and foliage penetration.

(U) *High Energy Laser Technology:* A laboratory test bed is being assembled to explore Multi-Conjugate Adaptive-Optics (MCAO) compensation for atmospheric distortions. MCAO should provide enhanced performance in certain stressing scenarios. The lab should be assembled and initial results obtained by the end of the year. A new multi-node cluster has been installed to run the wave-optics propagation code, and the code has been upgraded to model MCAO. A high-brightness beam-combined slab-coupled optical waveguide laser (SCOWL) is being developed; it will be the highest power diffraction-limited diode laser by more than an order of magnitude.

(U) *Hyper spectral Imaging:* A system concept for stand-off imaging of bio-aerosols has been developed. The efficacy of sensing bio-aerosols using multi-spectral sensing has been evaluated in a test chamber.

**FY 2004 Plans:**

(U) *Laser Radar:* Develop laser-radar technologies for applications of advanced ballistic and tactical seekers, surface surveillance, and combat identification. This includes the development of visible and near-infrared-sensitive, eye safe, Geiger-mode avalanche photodiode arrays with bonded timing circuitry for 3-D laser radars. Integrate these systems into small (~150 cm<sup>3</sup>) lightweight (~1 kg), low power, packages consistent with advanced seeker applications, which will provide single-photon-sensitivity and high-precision range resolution for generating detailed 3-D imagery of targets. Continue the development of multi-function laser-radar systems, which combine 3-D imaging and range-Doppler sensing for applications to BMD interceptors, combat identification, and foliage penetration. These systems will use the same laser transmitter and the same photon-counting avalanche photodiode array for both direct-detection laser radar for 3D imaging and coherent laser radar for range-Doppler imaging. Collect simultaneous Range-Doppler and 3-D images of various targets in order to demonstrate the target-recognition and discrimination capability of the combined measurement modalities using ground and airborne platforms.

(U) *High Energy Laser Technology:* Multi-conjugate adaptive-optics (MCAO) experiments will be conducted in the lab. These experiments will be extended to include non-linear

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phase conjugation. The wave-optics propagation code will be merged with lethality codes and laser codes to begin to create a "photon birth-to-death" model. The Slab-Coupled Optical Waveguide Laser (SCOWL) laser developed in FY03 will be used to pump a fiber laser in a building-block demonstration for scaling to high power. Exploration of real-time decision aids to help optimize the performance of HELs in varying atmospheric conditions will begin.

(U) *Hyper Spectral Imaging*: HSI measurements will be combined with 3D ladar measurements to explore the utility of 4D systems.

**FY 2005 Plans:**

(U) *Laser Radar*: Develop laser-radar systems for applications in advanced ballistic and tactical seekers, surface surveillance, and combat identification to demonstrate operational form, fit, and function. This includes efforts at electronics miniaturization using Application Specific Integrated Circuits (ASIC) components to generate systems that show a direct development path to fit on a seeker, hand carried sensor, or small UAV.

(U) *High Energy Laser Technology*: Test new compensation algorithms in the lab. Complete "photon birth-to-death" model. Demonstrate combined spectral and coherent beam combining for high-power fiber lasers. Implement a proof-of-principle real-time decision aid.

Advanced Electronics Technology	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort Subtotal Cost	7.374	7.501	7.303	
Bio-Chem Defense	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort Subtotal Cost	4.932	5.342	4.512	

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**FY 2003 Accomplishments:**

(U) *Agent Detection Systems:* Developed a prototype sensor that combines the rapid trigger feature of the Bio-Aerosol Warning System (BAWS) sensor and the rapid identification capability of the B-cell based CANARY. A multi-channel breadboard instrument has been fabricated that demonstrates real-time bio-detection/identification capability, with applications in military force and facility protection. The sensor system is ready to be fielded in FY04. Also, continued development of a non-PCR (polymerase chain reaction) based approach to detection of DNA. Thirdly, completed building of lab system for interrogating individual suspect biological aerosol particles.

(U) *Diagnosis and Treatment:* Initiated exploration of chemical signatures of bacteria not normally observed in the breath of healthy individuals, to establish high-confidence early markers of infection. Continued laboratory proof-of-concept development of anti-viral therapies with significant milestone in curing common cold *in vitro* without affecting normal host cells.

(U) *Bioinformatics:* Initiated efforts in applying automated target recognition techniques developed for military target discrimination to the problem of identifying biological agent DNA signatures from micro array data and images.

(U) *Facility defense:* Concluded measurements program addressing a subway, an arena, an airport terminal, and in the process of documenting findings on background and other conditions that affect a variety of potential biological or chemical agent targets.

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**FY 2004 Plans:**

(U) *Agent Detection Systems:* Plans include fielding the combined BAWS-CANARY in refereed trials against simulant agents to determine effectiveness of sensor relative to other fielded and prototype systems. Initiating new efforts in improving logistics of CANARY sensor, particularly addressing cell lifetime in storage and handling. Concluding effort in analyzing individual bio-aerosol particles. Also, initiating efforts aimed at taking advantage of bacterial cell signaling as sensor modality. Toxins and standoff sensing also to be addressed.

(U) *Diagnosis and Treatment:* Continue exploration of chemical signatures of bacteria in the breath, looking for new exudates. Continue work on anti-viral therapies.

(U) *Bioinformatics:* Continue efforts in applying automated target recognition techniques to micro array data and images, working toward building a pathogen signature data base.

(U) *Facility defense:* Initiate efforts aimed at neutralizing agents in ventilation systems, utilizing aerosol chamber and germicidal ultraviolet light.

**FY 2005 Plans:**

(U) *Agent Detection Systems:* Based on data from field trials, design and begin to prototype compact BAWS-CANARY sensor, combined as practicable with rapid DNA analysis. Continue efforts in improving toxin response and logistics of CANARY sensor, emphasizing dried-cell techniques. Continue efforts aimed at taking advantage of bacterial cell signaling as sensor modality. Advanced standoff sensing designs to be considered.

(U) *Diagnosis and Treatment:* Expect to build prototype breath analysis instrument and conduct limited field testing. New biometric approaches will be investigated, to include identification and tracking of individuals by their unique markers, including effluents, DNA, RNA and physical features. Continue work on anti-viral therapies.

(U) *Bioinformatics:* Expand bioinformatics effort into analyzing signatures from a network of chemical and biological sensor systems, to include fusion of data from disparate sources, environmental data, weather, people movement, and terrain.

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(U) *Facility defense:* Based on FY 2004 results, conduct field testing of ultraviolet light neutralization systems and other advanced techniques.  
ultraviolet light.

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Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2, RDT&E Budget Item Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E.DW BA # 2				R-1 Item Nomenclature: <b>Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) 0602228D8Z</b>				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
HBCU/MI	25.306	20.651	14.192	14.440	14.710	15.352	15.688	

**A. Mission Description and Budget Item Justification:**

The Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) program provides infrastructure support in fields of science and engineering that are important to national defense. The DoD Infrastructure Support Program is the only program that encourages participation of small minority schools as well as research institutions. This competitive program provides support through grants or contracts for research, collaborative research, education assistance, instrumentation purchases, and technical assistance. This project competitively supports programs at minority institutions nationwide in following areas:

- Research. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and empirical activities. Collaborative research allows university professors to work directly with military laboratories or other universities.
- Education. Education assistance funds are used by the selected institutions to strengthen their academic programs in science, mathematics, and engineering thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields. These grants provide equipment, scholarships, cooperative work/study opportunities, visiting faculty programs, summer programs, and a variety of other enhancements designed to support students and to encourage them to pursue careers in science, mathematics, and engineering.
- Infrastructure. This program allows the university to purchase from basic laboratory equipment for education program enhancements to highly sophisticated research instruments, such as lasers and spectrometers.
- Technical assistance. These funds are used to design programs to enhance the ability of minority institutions to successfully compete for future Defense funding. The objective is to assist the HBCU/MI community in areas such as proposal writing and

administration of grants and contracts.

**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 2003	FY 2004	FY 2005
Previous President's Budget	25.980	0	0
Current FY 2005 President's Budget	25.306	20.651	14.192
Total Adjustments	-6.74	20.651	14.192
Congressional program reductions			
Congressional rescissions			
Congressional direction		20.958	14.192
Reprogrammings			
SBIR/STTR Transfer			
Other adjustments rescission inflation	-6.74	.307	

**C. Other Program Funding Summary: (None)**

**D. Acquisition Strategy.**

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							February 2004	
Appropriation/Budget Activity RDT&E.DW / BA2			Project Name and Number <b>Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) 0602228D8Z</b>					
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
HBCU/MI	25.306	20.651	14.192	14.440	14.710	15.352	15.688	
<b>A. Mission Description and Budget Item Justification:</b>								
<b>(U) <u>BRIEF DESCRIPTION OF ELEMENT</u></b>								
<p>(U) The Historically Black Colleges and Universities and Minority Institutions (HBCU/MI) program provides infrastructure support in fields of science and engineering that are important to national defense. The DoD Infrastructure Support Program is the only program that encourages participation of small minority schools as well as research institutions. This project competitively supports programs at minority institutions nationwide in following areas:</p> <ul style="list-style-type: none"> <li>• <u>Research</u>. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and empirical activities.</li> <li>• <u>Education</u>. Education assistance funds are used by the selected institutions to strengthen their academic programs in science, mathematics, and engineering thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields.</li> <li>• <u>Infrastructure</u>. This program allows the university to purchase from basic laboratory equipment for education program enhancements to highly sophisticated research instruments, such as lasers and spectrometers.</li> <li>• <u>Technical assistance</u>. These funds are used to design programs to enhance the ability of minority institutions to successfully compete for future Defense funding.</li> </ul>								

**B. Accomplishments/Planned Program****(U) HISTORICALLY BLACK COLLEGES AND UNIVERSITIES AND MINORITY INSTITUTIONS PROGRAM**

	FY 2003	FY 2004	FY 2005	
Accomplishment/ Effort/Subtotal Cost	25.306	20.651	14.192	

**(U) FY 2003 Accomplishments:**

Continued evaluation of the awards made with prior year funds. Developed and released the second electronic broad agency announcement (BAA) for the HBCU/MI FY 2003 solicitation. Previous years had been hardcopies only, although hardcopies of the announcement were available upon request. The solicitation closed on January 24, 2003. Receipts totaled 43 proposals, 22 to establish long-term centers of excellence and 21 requesting instrumentation or equipment. The solicitation afforded the HBCU/MI community an opportunity to acquire 21 equipment grants to enhance science, mathematics, and engineering (SME) programs and to facilitate the education of students in research areas important to the DoD. Four new Centers for SME Research and Education were established. Two Centers for Research and two Centers for Education. The Centers will be supported for three to five years at approximately \$0.8 million per year. Equipment grants are for a twelve-month performance period and will range from \$58,000 to \$180,000. Twenty five grants were awarded. The Army Research Office and the Air Force Office of Scientific Research will execute the awards.

The FY 2003 program also contains five congressional adds which resulted in two separate BAAs. The FY 2003 DoD Appropriations Act added an additional \$3.0 million in the HBCU/MI Program for Tribal Colleges and Universities (TCUs). The Army Research Office was designated manager for the special solicitation and allocated \$2.7 million after taxes. The BAA closed on March 21, 2003. Eleven proposals were received. All eleven proposals were judged to be worthy of support and eleven equipment grants to TCUs were made ranging from \$76,000 to \$400,000 and will have a 12 month performance period. Also, in FY 2003 the DoD Appropriations Act added an additional \$5.0 million in the HBCU/MI Program for Hispanic Serving Institutions (HSIs). The Army Research Office issued a separate solicitation in March 2003 for HSIs to compete. The BAA closed on May 30, 2003. The Army Research Office received 23 proposals. A total of 17 awards for instrumentation

and/or equipment were made which will provide enhancements to SME programs at HSIs. The equipment grants range from \$108,000 to \$400,000 and will have a 12 month performance period.

The other three congressional adds in the FY 2003 program are: (1) Enhanced Skills and Training Program for Electronic Engineering Technology Program; (2) HSI Project Grant; and (3) Technical Assistance Program.

(U) FY 2004/2005 Plans:

Continue evaluation of the awards made with prior year funds. In FY 2004/2005, the HBCU/MI Infrastructure Program will continue to build infrastructure through instrumentation and equipment awards by issuing three separate solicitations; the first one for the Infrastructure Support Program; the second announcement for HSIs, and the third solicitation for TCUs. The objective is to increase the quality of education provided in SME and build HBCU/MIs that currently offer advanced degrees in SME.

**C. Other Program Funding Summary:** Not Applicable

**D. Acquisition Strategy:** Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification Fiscal Year (FY) 2005 Budget Submission				Date: February 2004			
APPROPRIATION/BUDGET ACTIVITY RDT&E, D BA2				R-1 ITEM NOMENCLATURE Medical Free Electron Laser PE 0602227D8Z			
COST (\$ in Millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	11.609	18.518	9.668	9.850	10.072	10.078	10.090
Medical Free Electron Laser/P483, Subtotal Cost	11.609	18.518	9.668	9.850	10.072	10.078	10.090
<p>A. Mission Description and Budget Item Justification</p> <p>(U) The Medical Free Electron Laser (MFEL) program seeks to develop advanced, laser-based applications for military medicine. Free electron lasers (FELs) provide unique pulse features and tunable wavelength characteristics that are unavailable in other laser devices. Thus, FELs broaden the experimental options for the development of new laser-based medical technologies.</p> <p>(U) This program is focused on developing advanced procedures and equipment for rapid diagnosis and treatment of battlefield-related medical problems. Specific applications under investigation include soft tissue repair, hard tissue surgery, therapies for thermal and chemical burns, warfighter vision correction, and new medical imaging modalities. Uniquely, laser applications will be clinically tested in medical centers, leading to Food and Drug Administration (FDA) approval. There is high potential dual use for civilian medicine. Thus far, more than 30 clinical procedures have been developed in several medical specialties, including ophthalmology, orthopedics, thermal and chemical burn treatment, and neurosurgery. Work in these areas will continue in FY 2004 under new center grants, with the primary focus of the work remaining on the development of militarily relevant laser medicine applications.</p> <p>(U) Overall management plans for FY 2004 include strengthening the interactions of the new grantee institutions with military medical research facilities in order to improve both the content of the grant programs and the implementation of new techniques in military medicine.</p>							

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Exhibit R-2, RDT&E Budget Item Justification Fiscal Year (FY) 2005 Budget Submission		Date: February 2004	
B. Program Change Summary:			
	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	0	9.494	9.694
Current FY 2005 President's Budget	11.609	18.518	9.668
Total Adjustments	-11.609	-9.024	-.026
Congressional program reductions	-0.103	-0.182	
Congressional rescissions			
Congressional increases	11.712	9.206	
Reprogrammings			
SBIR/STTR Transfer			
Other			-0.026
C. Other Program Funding Summary: Not Applicable			
D. Execution			
Laboratories/Centers			
Beckman Laser Institute, University of California-Irvine, Irvine, CA			
Duke University, Durham, NC			
Stanford University Picosecond FEL Center, Stanford, CA			
Vanderbilt University FEL Center for Research, Nashville, TN			
Wellman Laboratories, Massachusetts General Hospital, Boston, MA			



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Exhibit R-2a, RDT&E Project Justification Fiscal Year (FY) 2005 Budget Submission						Date: February 2004		
Appropriation/Budget Activity RDT&E, D BA 2		PROGRAM ELEMENT: Medical Free Electron Laser, PE 0602227D8Z			Project Name and Number Medical Free Electron Laser, P483			
Cost (\$ in millions)		FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Project/Thrust Cost		11.609	18.518	9.668	9.850	10.072	10.078	10.090
A. Mission Description and Budget Item Justification:								
<p>(U) The MFEL program seeks to develop advanced, laser-based applications for military medicine.</p> <p>(U) The majority of this program is focused on developing advanced procedures for rapid diagnosis and treatment of battlefield-related medical problems.</p> <p>(U) A small part of this program is focused on materials research.</p> <p>(U) Overall management plans for FY 2004 include strengthening the interactions of the new grantee institutions with military medical research facilities to improve both the content of the grant programs and the implementation of new techniques in military medicine.</p>								
(Cost in \$ Millions)		FY 2003		FY 2004		FY 2005		
Imaging Technology		2.314		4.438		1.864		
<p>Optical Coherence Tomography (OCT) applications have been developed to assess the clinical status of burns by combining polarization sensitivity for tissue structure and birefringence with Doppler detectors to simultaneously measure blood flow in the tissue. Resolution of the extent of the burn can be made to between 2 and 10 um. OCT applications also have been developed for diagnosis and monitoring of surgical repair of orthopedic injuries using a hand-held laparoscopic probe for imaging. A similar probe can also be used in conjunction with many standard diagnostic scopes in other areas of medical practice, such as injuries to the trachea and respiratory tract. Work on improving the resolution of OCT images is also being done, with resolutions down to 1 um shown to be possible with short pulse lasers. A tunable, monochromatic x-ray system has been developed using the electron beam of an RF accelerator to scatter beams from a terawatt laser, producing the x-rays through an inverse Compton effect. The monochromatic x-ray system provides significantly improved images when compared with standard x-ray sources. Other potential technologies include a Pulsed Photothermal Radiometry technique that can be used to determine changes in the optical properties of the skin and provide diagnostic information on wound management and absorption on the skin of possible chemical agents, and Photon Migration techniques to non-invasively monitor hemodynamic parameters such as oxy/deoxy-hemoglobin ratios. Optical diagnostic methods are being studied to characterize important biomolecules and processes tagged with microparticles or molecular biosensors. The potential of the use of near-field IR microscopy in cellular imaging is also being examined. Plans for 2004 include work on improving the contrast and depth of OCT imaging with emphasis on its use in burn injury, development of new</p>								

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ultras-small fiber optic endoscopy systems, continued development of monochromatic x-ray and Pulsed Photothermal Radiometry applications, new applications of Near Field Optical Microscopy, and other IR microscopy techniques.			
(Cost in \$ Millions)	FY 2003	FY 2004	FY 2005
Laser Surgery Methods	1.233	3.047	1.065
<p>FELs are being used in experimental surgery studies and human surgical cases. An FEL has been used in the surgical removal of a human brain surface tumor, and additional surgical applications are on-going. Experimental surgery studies are developing techniques for precision surgical requirements such as optic nerve fenestration and neurosurgical treatment of epileptic foci. Studies examining the most effective laser wave length and pulse duration variables for cutting hard tissue and optimizing post-ablation bone regeneration and healing are also in progress. Studies to determine optimal methods for using lasers for properly shaping collagen materials for use in reconstructive surgery are examining the molecular nature and behavior of the collagen during the reshaping process. Proper shape and shape memory of the material are of critical importance in success of reconstruction efforts. Work under this program has also led to the observation of laser effects on chondrocyte regeneration, critical for effective treatment of arthritic degeneration. An effective animal model for study of corneal healing after laser vision correction surgery has been developed, and subsequent work using this model has described important steps to minimize the scarring which can adversely affect vision correction efforts. Plans for 2004 include continuing studies in neurological and ophthalmic surgery applications of lasers, as well as continuing work on optimal laser parameters for dermal and hard tissue cutting and subsequent healing. New efforts will examine the application of laser-based imaging to orthopedic repair of cartilage.</p>			
(Cost in \$ Millions)	FY 2003	FY 2004	FY 2005
General Clinical Medicine Techniques	<b>2.501</b>	2.902	1.994
<p>The use of photosensitive materials that can bind to cells, become activated on illumination, and cause a subsequent change in cell activity has been shown to have a number of clinical applications. Photosensitive compounds can be used to tag specific bacteria and lead to virtually complete elimination of the organisms. Antibiotic resistant strains remain vulnerable to such photodynamic therapy. Wounds infected with ordinarily fatal strains of <i>Psuedomonas</i> and various <i>Staphylococcus</i> organisms were completely healed following treatment with photosensitive compounds. Studies on the effect of using this technique for the treatment of difficult infections such as tuberculosis are being initiated. Other photosensitive compounds attached to cells have been shown to be able to modulate cellular activity. For example, chondrocytes, activated by light sensitive molecules, have been able to initiate complex processes that prevent inflammatory destruction of collagen explants. Similarly, light absorbing nanoparticles have been shown to affect various properties of cells, including their permeability, which may provide the possibility of controlling cell processes, as well as improving drug uptake and effectiveness. Photochemical controlled tissue bonding studies have led to the development of materials that provide wound closure that is superior to current mechanical or adhesive methods. The photochemical bonding material was first demonstrated in the closure of the flaps generated during laser vision correction surgery. The material is now being tested for effectiveness in nerve and tendon repair, and repair of damage to the trachia. In 2004, studies will</p>			

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continue on photochemical bonding of tissue, developing new photosensitizers and methods for their delivery, mechanisms for controlling various cellular activities, and the use of photodynamic therapy in treating infections of selected microorganisms.			
(Cost in \$ Millions)	FY 2003	FY 2004	FY 2005
Laser/Tissue Interactions and Wound Healing Studies	1.287	2.620	1.110
<p>A wide range of studies has examined the interactions of laser energy with tissues, cells and biological macromolecules. Models for laser ablation have been developed and used to examine the course of the post-ablation healing process. Studies using the unique single micropulse capability of the Stanford FEL continue, and will provide valuable information on the role of wavelength, pulse structure and pulse sequence in the ablation process on the molecular level. Confocal microscopy with subcellular resolution is being used to follow the processes of fibronectin growth and wound closure. Vasodilation, which is an important factor in wound healing, has also been shown to be sensitive to the application of UVA and blue light <i>in vivo</i>. Studies examining the effect on wound healing of this phenomenon and its enhancement by norepinephrin, a known vasoconstrictor, are also underway. Studies on laser ablation and the subsequent healing processes will continue in 2004, with a continuing focus on determining tissue viability at the wound site, as this is critical for effective wound management. Work on wound closure using photochemical tissue bonding will also be a significant focus. Vasodilation studies for treating ischemic wounds will also be continued.</p>			
(Cost in \$ Millions)	FY 2003	FY 2004	FY 2005
Physical and Materials Science Research	0.610	0.767	0.515
<p><b>Research on the improvement of the performance and reliability of the FELs is a continual effort. Such work includes the development of new materials for waveguides through which the laser energy may be routed as well as refinements in the existing laser systems. In addition, basic efforts are carried out using laser-based spectroscopy methods, on the structure and nature of biologically important macromolecules, on the dynamics of various surface-based processes, and on the nature, formation and deposition processes of thin films. Continued work on spectroscopy methods, surface-based processes, and the nature and formation of thin films are planned for 2004.</b></p>			
(Cost in \$ Millions)	FY 2003	FY 2004	FY 2005
Laser Operations Support	3.664	4.744	3.120
<p>A major upgrade in the components of the Duke University FEL system was completed, greatly improving the efficiency and overall capability of the system for research. A total of more than 5,000 hours of beam time has been provided for the use of various scientists at the three FEL facilities combined. Plans for 2004 include continued efforts to improve FEL performance and reliability, and to supply increased beam time for use by investigators in all of the disciplines noted above.</p>			

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<b>Fiscal Year (FY) 2005 Budget Estimates</b>							<b>DATE</b>	
<b>RDT&amp;E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)</b>							February 2004	
<b>APPROPRIATION/BUDGET ACTIVITY</b>						<b>R-1 ITEM NOMENCLATURE</b>		
RDT&E, Defense Wide/BA 1						Defense Experimental Program to Stimulate Competition PE 0601114D8Z		
<i>COST (In Millions)</i>	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
Total PE Cost	15.197	9.578	9.590	9.738	9.933	9.977	10.193	

**(U)      A. Mission Description and Budget Item Justification**

(U) Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The DEPSCoR is a legislated program that helps build national infrastructure for research and education by funding research activities in science and engineering fields important to national defense. Participation in this program is limited to states that meet eligibility criteria as set forth in the authorizing language. The program is intended to improve the capabilities of institutions of higher education (IHE) to develop, plan and execute science and engineering research that is competitive under the peer-review system. IHEs in eligible states are invited, through their NSF State EPSCoR Committee, to compete for research/infrastructure awards in areas identified by the department in broad agency announcements regularly published by the Services.

(U) Through FY 2000 DEPSCoR was funded within the University Research Initiative Program (PE 0601103D8Z).

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**B. Program Change Summary:**

	<b>FY 2003</b>	<b>FY 2004</b>	<b>FY 2005</b>
Previous President's Budget	16.455	0.000	0.000
Current FY 2005 President's Budget	15.197	9.578	9.590
Total Adjustments	-1.258	9.578	9.590
Congressional Program reductions	1.258		
Congressional Rescissions			
Congressional Direction		-9.730	9.590
Reprogrammings			
SBIR/STTR Transfer			
Other			

**C. Other Program Funding Summary:**

**D. Acquisition Strategy: NA**

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Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification							Date: February 2004	
Appropriation/Budget Activity RDT&E, D BA1				Project Name and Number <b>* Defense Experimental Program to Stimulate Competitive Research (DEPSCOR) PE 0601114D8Z</b>				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
DEPSCOR/ P 114	15.197	9.578	9.590	9.738	9.933	9.977	10.193	
<b>A. Mission Description and Budget Item Justification:</b>								
<p>(U) Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The DEPSCoR is a legislated program that helps build national infrastructure for research and education by funding research activities in science and engineering fields important to national defense.</p> <p>(U) Through FY 2000 DEPSCoR was funded within the University Research Initiative Program (PE 0601103D8Z).</p>								
<b>B. Accomplishments/Planned Program:</b>								
	FY 2003	FY 2004	FY 2005					
<b>Research</b>	15.197	9.578	9.590					

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**FY 2003 Accomplishments:**

(U) Research. The Department of Defense (DoD) awarded 30 separate grants for research/infrastructure support to 18 academic institutions in 14 States to perform research in science and engineering fields important to national defense. Proposals were competitively selected by the Air Force Office of Scientific Research, the Army Research Office and the Office of Naval Research to receive an average of \$500,000 each over the three year grant period. The DEPSCoR is designed to expand research opportunities in States that have traditionally received the least funding in federal support for university research. (\$ 15.197 million)

**FY 2004 Plans:**

(U) Research. This is a congressionally mandated program that will continue to be conducted in a manner that is consistent with the goals established in the authorizing legislation and at a level of performance directly proportional to the funding that is annually adjusted by Congress. Research proposals from eligible states will be competitively selected for funding.(\$ 9.578 million)

**FY 2005 Plans:**

(U) Research. This is a congressionally mandated program that will continue to be conducted in a manner that is consistent with the goals established in the authorizing legislation and at a level of performance directly proportional to the funding that is annually adjusted by Congress. Research proposals from eligible states will be competitively selected for funding.(\$ 9.590 million)

**C. Other Program Funding Summary: None**

**D. Acquisition Strategy: NA**

Shopping List - Item No. 20-2 of 20-4

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Exhibit R-2, RDT&E Budget Item Justification						Date: February 2004	
Appropriation/Budget Activity RDT&E/Defense Wide BA7				R-1 Item Nomenclature: NATO Alliance Ground Surveillance (NATO AGS), PE 1001018D8Z			
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	0.000	24.363	30.399	29.547	85.743	131.342	180.234
<b>A. Mission Description and Budget Item Justification:</b>							
<p>(U) This project supports the U.S. share of the cost for NATO to acquire a ground surveillance capability similar to what their owned and operated Airborne Warning and Control System (AWACS) provides for air surveillance.</p> <p>(U) The North Atlantic Council (NAC) validated the requirement in 1995 for a NATO-owned and operated core air-to-ground surveillance capability supplemented by interoperable national assets. Since then, the Major NATO Commanders have consistently made Alliance Ground Surveillance (AGS) their number one equipment acquisition priority.</p> <ul style="list-style-type: none"> <li>• October 1997, NATO Conference of National Armaments Directors (CNAD) approved AGS NATO Staff Requirement (NSR)</li> <li>• April 1999, NATO Washington Summit <i>Defense Capabilities Initiatives</i> (DCI) included need for a NATO-owned and operated core system for ground surveillance</li> <li>• September 2001, Reinforced NAC (RNAC) re-affirmed need for a NATO-owned and operated AGS capability by 2010</li> <li>• November 2002, NATO Prague Summit approved <i>Prague Capabilities Commitment</i> (PCC) that includes an airborne ground surveillance capability</li> <li>• December 2003, AGS Steering Committee approved in principle the merger of NATO AGS and the TCAR sensor projects.</li> </ul> <p>(U) In September 2002, the NATO AGS Steering Committee approved a Master Schedule supporting a 2010 Initial Operating Capability (IOC) with Full Operational Capability (FOC) by 2013.</p>							

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**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	0.000	24.721	73.550
Current FY 2005 President's Budget	0.000	24.363	30.399
Total Adjustments		-0.358	-43.151
Congressional program reductions			
Congressional rescissions			
Congressional increases			
Reprogrammings			(-43.151)
SBIR/STTR Transfer		(-0.054)	
Other		(-0.304)	

**C. Other Program Funding Summary: N/A**

**D. Acquisition Strategy. N/A**

**B. Program Change Summary:**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
Previous President's Budget	8.903	0.000	0.000
Current FY 2005 President's Budget	8.240	-6.696	0.000
Total Adjustments	.663		
Congressional program reductions	.663		
Congressional rescissions			
Congressional increases		6.800	
Reprogrammings			
SBIR/STTR Transfer			
Other			

Fiscal Year (FY) 2005 Budget Estimates Exhibit R-2a, RDT&E Project Justification						Date: February 2004		
Appropriation/Budget Activity RDT&E/Defense Wide BA 1				Project Name and Number Government/Industry Co- sponsorship of University Research PE 0601111D8Z				
Cost (\$ in millions)	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	
GICUR/P111	8.240	6.696	0.000	0.000	0.000	0.000	0.000	
<b>A. Mission Description and Budget Item Justification:</b>								
<p>Program is a shared commitment between industry and Government to sponsor next generation semiconductor electronics research via the Government/Industry Co-sponsorship of University Research (GICUR) program. It capitalizes on university-based research, education and training in technologies of strategic importance to national defense and also to industry. It provides an emphasis on ground-breaking research with a long-term horizon, and education and training in selected research areas which are vital to advancement of technologies.</p> <p><b>Program ends in FY 2004.</b></p>								

**B. Accomplishments/Planned Program**

	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>
GICUR/P111	8.240	6.696	0.000

**(U) FY 2003 Accomplishments:**

(U) In cooperation with the Microelectronics Advanced Research Corporation (MARCO) the program funded four university research centers. The University of California at Berkeley lead a team of 14 other universities performing research into "Design and Test" technologies for the Giga-scale semiconductor integrated circuits. Georgia Tech lead a team of six universities for research into

"Interconnect" technologies to solve the impending materials, processes, and architecture challenges in connecting billions of devices. The "Structures and Devices" Center was led by MIT and involved 9 other major research universities and focused on sub- 10 -nanometer silicon-based FETS, silicon-based quantum effect devices, molecular and organic semiconductor electronics, nanotube electronics and modeling and simulation. The new "Circuits, Systems and Software" Centers was led by Carnegie Mellon University and involved 9 other major research universities. The Center's research focused on the analysis and synthesis of analog and analog/mixed signal circuits, explored novel system level technologies and sought software solutions and workarounds for the deep submicron CMOS process limitations. Under MARCO the electronics industry provided about two dollars for each dollar provided by DoD. GICUR program funding ends in FY 2004.

**(U) FY 2004/2005 Plans:**

(U) In addition to the current four focused research centers, the program is funding a new center on Functional Engineered Nano Architectonics at the University of California at Los Angeles. The function of the Center is to resolve the cross-cutting materials and device challenges relating to scaled CMOS and providing insights into what solutions might lay beyond. The research will create new nanoscale functional materials and architectures and will provide heterogeneous interfaces of new nanosystems enabling a combination of biological and molecular functions that lead to new paradigms of information processing and sensing.