RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1							R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research (ILIR) **PE 0601101D8Z**			
COST *(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		1.989	2.081	2.126	2.187	2.387	2.430	2.477	Continuing	Continuing
ILIR/P503		1.989	2.081	2.126	2.187	2.387	2.430	2.477	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This program element supports basic medical research at the Uniformed Services University of the Health Sciences (USUHS) and provides the only programmed research funds received by the University. In addition, it facilitates the recruitment and retention of faculty; supports unique research training for military medical students and resident fellows; and allows the University`s faculty researchers to collect pilot data in order to secure research funds from extramural sources (estimated $25-$30 million annually). Eighty to 100 intramural research projects are active each year, including 20-25 new starts. Projects are funded on a peer-reviewed, competitive basis. Results from these studies contribute to the fund of knowledge intended to enable technical approaches and investment strategies within Defense Science and Technology (S&T) programs.

(U) The ILIR program at USUHS is designed to answer fundamental questions of importance to the military medical mission of the Department of Defense in the areas of Combat Casualty Care (CCC), Infectious Diseases (ID), and Military Operational Medicine (MOM). The portfolio of research projects will vary annually because this research is investigator-initiated. Examples of typical research efforts are:

(U) Combat Casualty Care: Ischemia and reperfusion injury, traumatic brain and peripheral nerve injury, neural control of pain, endotoxic shock, cryotherapy, malignant hyperthermia, inflammation, and wound healing.

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(U) Infectious Diseases: Immunology and molecular biology of bacterial, viral and parasitic disease threats to military operations. These threats include E. coli and their shiga toxins, HIV, HTLV-1, strongyloides, gonorrhea, streptococcus, staphylococcus, hepatitis A, helicobacter pylori, typhoid, influenza A, Venezuelan equine encephalitis (VEE), malaria, and bartonellosis.

Military Operational Medicine: Sustainment of individual performance; mapping and managing deployment and operational stressors; cognitive enhancement; and military & medical training readiness.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** In-House Laboratory Independent Research (ILIR) **PE 0601101D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		1.989	2.081	2.126	2.187	2.387	2.430	2.477	Continuing	Continuing
ILIR/P503		1.989	2.081	2.126	2.187	2.387	2.430	2.477	Continuing	Continuing

(U) Project Number and Title: P503 ILIR

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Infectious Diseases: Representative projects included a family of epidemiological studies of both endemic and epidemic Bartonellosis in Peru that have recently combined information systems and molecular diagnostic technology to isolate a specific constellation of environmental factors associated with spread of the disease. Investigators attempting to develop new antibodies to E. coli and its Shiga toxins have completed their work; the project will now move into Phase I safety studies under the aegis of NIH. An ongoing investigation of the lifecycle and metabolism of *cryptosporidium parvum* (Cp) identified possible pathways for effective new drug treatments based on the location of 4 enzymes unique to Cp, which causes diarrheal illness. These projects supported essential military missions by advancing our understanding of the transmission and internal mechanisms of a spectrum of pernicious and/or common diseases that may be faced by military personnel at home or abroad. In turn, that understanding opens avenues to better control, diagnosis, and treatment of natural and man-made biological threats. ($ 0.639 million)

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(U) Military Operational Medicine: Studies of the protein melanopsin have shown a homology between the protein found in the skin of African frogs and that in the eyes of insects and mammals. A project investigating the circadian photoentrainment pathway in a murine model has developed the reagents needed to determine the chemical content of ganglion cells involved in the central circadian oscillator; the investigators have also completed two promising histochemical pilot studies. An exploration of electrochemical processes in the amygdala has partially characterized a mechanism that appears important in the formation and consolidation of emotional memory, and thence in the development of neuropsychological disorders resulting from battle experiences, such as depression and PTSD. A study of the effects of stress on suppression of the immune system identified a specific group of proteins that are both elevated during stress and critical to protecting lymph cells. Two epidemiological investigations, one of Gulf-War databases and one of direct responses from active-duty submarine personnel, have begun to identify life stressors commonly reported by deployed warfighters. These studies supported essential military missions by increasing our understanding of and ability to manipulate the physiological mechanisms of stress and immunity, human sleep and seasonal cycles, and neurological changes necessary to short- and long-term memory. In turn, their discoveries should enable warfighters to stay awake longer with fewer detriments to performance; lead to better strategies for enhancing and preserving memory and reasoning capabilities under battle conditions; help understand and ultimately prevent and treat neurospsychiatric illnesses such as depression and PTSD; and assist deployed troops and their families to better prepare for and contend with common, significant stressors. ($ 0.997 million)

(U) Combat Casualty Care: Representative studies include an ongoing investigation of signal transduction that has now identified two antibodies pinpointing the mu opioid receptor in the brain, an essential step to understanding the mechanism of opiate effects on pain relief and neural functioning. A controlled study of individuals susceptible to malignant hyperthermia (MH) has demonstrated that MH-susceptible individuals exhibit slower rates of lactate removal with strenuous exercise, which may explain the sudden, severe symptoms, similar to heat stroke, that such individuals can experience under physical stress. A project that explores the response of Schwann cells in neuroregeneration after removal of an axon identified two optimal sites of regeneration. These studies supported essential military missions by further exploring the mechanism of pain control for an established treatment; providing the groundwork for effective treatments to limit nerve damage and encourage regeneration; and identifying a possible cause of life-threatening complications of the combination of exertion and injury common under heavy battle conditions. ($ 0.353 million)

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(U) FY 2002 Plans:

(U) Infectious Diseases: Work continues toward development of vaccines for HIV, gonorrhea, and other STDs; understanding of the pathogenesis of VEE, HTLV-1, and influenza A; effective management of infections by *H. pylori* and bartonellosis; and analysis of Hendra virus envelope glycoproteins. New projects include a study of initial host-parasite interactions in *Salmonella typhi* infections, the regulation of virulent products of infection (such as toxins), and investigation of a possible marker for typing staph infections. These studies continue to support essential military missions by extending scientific understanding, control, and treatment of eminently possible biological threats, both natural and man-made, faced by Americans at home and abroad. ($ 0.780 million)

(U) Military Operational Medicine: Representative new studies address the relationship between axonal growth and synaptic hyperconnectivity in the brain; the direct effects of exogenous neural growth factor on the cerebral cortex in limiting the effects of lesions and stroke; and the effects of lithium prophylaxis on neurochemical imbalances (e.g., in dopamine and acetylcholine). Continuing projects include analysis of the circadian photoentrainment pathway in a murine model; regulation of peptide amidation; cortical information processing; and immediate early gene requirements for long-term potentiation and learning. Studies of deployment risk factors and of stress in relation to eating disorders, nicotine use, physical exertion, and immunosuppression also continue, as do investigation of transcriptional control of neural cell differentiation, the role of AP-1 proteins in synergistic signaling, and the role of neuromodulators in neuroplasticity in the amygdala. These studies support essential military missions by increasing our understanding of effective mechanisms of pain control, leading to enhancement of their potencies and limitation of their side-effects; identifying the processes of learning and memory at the physiological level; sorting out factors and effects in the sleep-wake cycle; and maximizing the effectiveness of DoD measures to support warfighters and their families as they contend with common deployment stressors. ($ 0.942 million)

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(U) Combat Casualty Care: Ongoing projects include an investigation of signal transduction; analysis of cellular mechanisms of endotoxin sensitivity; exploration of the mechanism of liver failure in a disulfiram-based model; analysis the role of aurin tricarboxylic acid in apoptosis; and studies of malignant hyperthermia, aimed primarily at developing a reliable, noninvasive diagnostic test and genetic marker. New studies include an exploration of a possible protective mechanism against cell death based on the addition of phosphorus via aurin tricarboxylic acid, and an animal-model feasibility study of rapid induction of hypothermia via interosseus fluid infusion to produce suspended animation. Each of these studies supports essential military missions by protecting those injured in battle; by targeting and controlling likely sources of systemic toxicity due to serious trauma; by preserving essential organs (such as the liver and kidneys) and supporting crucial life functions (blood pressure, normal brain activity, anti-shock mechanisms) once a warfighter has sustained serious injury on the battlefield; and by developing a simple, portable test to identify those at particular risk of a specific, life-threatening complication to injury. ($ 0.359 million)

(U) FY 2003 Plans:

(U) Efforts will continue in all of USUHS's major research areas (CCC, ID, and MOM) in FY 2003. Since specific, investigator-initiated projects compete for funding each year, no detailed description of the research is possible at this time. ($2.126 million)

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(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	2.007	2.086	2.094	Continuing
Delta	-0.018	0.011	0.000	Continuing
FY 2002 Amended President's Budget Submission	1.989	2.097	2.094	Continuing
Appropriated Value	2.007	2.097		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.016	0.000	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.018	0.000	0.000	Continuing
c. Other	0.000	0.000	0.032	Continuing
Current FY 2003 Budget Submission	1.989	2.081	2.126	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research (ILIR) **PE 0601101D8Z**

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

(U) **Technical**:

(U) **C.** **OTHER PROGRAM FUNDING SUMMARY COST**: N/A

(U) **D.** **ACQUISITION STRATEGY**: N/A

(U) **E.** **SCHEDULE PROFILE**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	292.355	248.997	221.610	243.977	265.456	249.536	241.718		Continuing	Continuing
URI/P103	292.355	248.997	221.610	243.977	265.456	249.536	241.718		Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

(U) P103, University Research Initiative (URI). The URI has three primary objectives: (1) to support basic research in a wide range of scientific and engineering disciplines pertinent to maintaining the U.S. military technology superiority; (2) to contribute to the education of scientists and engineers in disciplines critical to defense needs; and (3) to help build and maintain the infrastructure needed to improve the quality of defense research performed at universities. Paralleling these objectives, this project competitively supports programs at universities nationwide in three interrelated categories:

- Research. The main thrust of the URI is multidisciplinary research. Multidisciplinary efforts involve teams of researchers investigating high-priority topics that intersect more than one traditional technical discipline; for many complex problems, this multidisciplinary approach serves to accelerate research progress and expedite transition of results to application. The URI also supports the Presidential Early Career Awards for Scientists and Engineers (PECASE), single-investigator research efforts performed by outstanding academic scientists and engineers early in their independent research careers.

- Education. The URI promotes graduate education in science and engineering for U.S. citizens through the National Defense Science and Engineering Graduate Fellowship Program. Beginning in FY 2003, the Awards to Stimulate and Support Undergraduate Research Experiences (ASSURE) program provides research opportunities for undergraduate students in science and engineering fields important to national defense, to encourage them to continue their studies and pursue advanced degrees.

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- Infrastructure. Through the Defense University Research Instrumentation Program (DURIP), the URI contributes to the university research infrastructure that is essential for the performance of cutting-edge defense research. The DURIP allows researchers to purchase more costly items of research equipment than typically can be acquired under single-investigator awards. Through FY 2001, the URI also included the URI Support Program (URISP), which broadens the base of academic institutions participating in defense research by involving institutions that historically have not received much defense funding.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY2001 Accomplishments:

(U) Programmatic accomplishments:

- Research. The Services and DARPA made 84 new awards as a result of three FY 2001 competitions for new multidisciplinary research efforts. The first competition, resulting in 48 new awards, was for basic research underpinning high-priority technology areas such as: infrared detection; wideband communications; networked and distributed systems; microchemical systems; biological and chemical sensing; smart and adaptive structures; visualization of multi-source information; space weather effects; self-configuring surveillance networks; machine language translation; low-noise, solid state electronics; high-temperature superconductors; nano-engineered coatings; and polymeric, smart skin materials. The second competition was under the Department of Defense portion of the National Nanotechnology Initiative. As a result of that competition, the Services made 16 new awards focused on defense-relevant electronics, materials and biotechnology at the nanoscale. The awards are in areas such as machines and motors; energetic materials; electronic and magnetic structures; quantum computing; carbon nanotubes; and deformation, fatigue, and fracture of interfacial materials. The third competition was for an initiative in critical infrastructure protection. Following that competition, the Services made 20 new awards focused on information assurance and high-confidence adaptable software, including novel network architectures, network surveillance and software protection, high-confidence embedded systems, mobile codes, distributed computing, dynamic network management, and software quality assurance. Multidisciplinary and PECASE programs begun in prior years are continuing, with new competitive awards under the PECASE program. ($194.068 million)

- Education. As a result of the FY 2001 competition under the National Defense Science and Engineering Graduate Fellowship program, 285 new graduate fellowships were awarded for study leading to advanced degrees in science and engineering fields of importance to national defense. Another competition, part of the FY 2001 initiative in critical infrastructure protection, led to 12 postdoctoral fellowship awards. ($43.545 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
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- Infrastructure. FY 2001 competitions resulted in more than 240 new awards for research instrumentation under the DURIP program and National Nanotechnology Initiative. Efforts begun in prior years under the URI Support Program were completed. ($54.742 million)

(U) Selected technical accomplishments:

- Researchers at Arizona State University, working with researchers from the University of Illinois, the University of Notre Dame, and the University of California at Berkeley found a way to increase metal-oxide semiconductor (MOS) device lifetimes, by substituting deuterium for hydrogen to reduce rates at which damage is caused by electron collisions with hydrogen atoms in the MOS material. Hydrogen atoms are added to MOS materials to eliminate holes that otherwise trap conduction electrons and disrupt device operation. Damage results when electrons, accelerated by the electric field in a device, collide with and ionize the hydrogen atoms. Previously, it was assumed that this damage was caused primarily by a relatively small number of "hot" electrons, electrons accelerated by the field to an energy high enough to ionize the hydrogen. By measuring effects of electron bombardment of MOS material, the researchers surprisingly found that much of the damage was due to a cumulative effect of collisions by a larger number of lower energy electrons. Using computer simulations of the quantum mechanics of device materials, the researchers were able to attribute the result to the electrons progressively exciting the hydrogen to higher energy levels, ultimately culminating in ionization. The researchers discovered through simulation and experiment that they could reduce damage rates 100-fold, and correspondingly increase device lifetimes, by adding deuterium (a heavy hydrogen isotope) to the MOS material, rather than hydrogen. Increases in device lifetimes are greatest in ultrasmall devices but still significant in larger devices, particularly devices used at high frequencies (where deuterium substitution yields either a longer lifetime at a given operating frequency or higher frequency operation with the same lifetime as hydrogen). The computer simulation techniques and deuterium processing technology have been transferred to major semiconductor device manufacturers, which will result in longer-lived and higher frequency devices for military applications.

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- Researchers at Northwestern University extended their revolutionary dip-pen nanolithography (DPN) technique to biological molecules and coupled it with their successful binding of DNA to nanoparticles, opening up new possibilities for nanoassembly and for detection of chemical and biological agents. The DPN method uses an atomic force microscope (AFM) tip coated with an "ink" to write lines on a substrate that are as small as 15 nanometers wide and less than 5 nanometers apart. A detailed understanding of the transport of "ink" molecules through the fluid meniscus formed between the AFM tip and the surface enabled the researchers to deposit biological molecules such as collagen fibers, proteins, and single-strand DNA. The ability to write with single-strand DNA, with linewidths of less than 50 nanometers, is especially important because: (1) the DNA selectively binds to complementary DNA strands; (2) the researchers developed a method to bind complementary DNA strands to nanoparticles; and (3) that enables them to use DNA patterns written on a substrate to attach nanoparticles in precise locations as building blocks for assembling complex, three-dimensional structures of nanometer dimensions. This nano-fabrication technique has important applications in defense-relevant areas such as molecular electronics and compact power sources. In another application, the researchers and the Army tested a portable device using single-strand DNA bound to gold nanoparticles to detect genetic markers for anthrax at levels lower than one part per billion, up to 100 times better sensitivity than current methods; the method is faster and less expensive than existing DNA-based detection methods because it avoids using bulky polymerase chain reaction techniques to amplify and detect the bioagent.

- Yale University scientists used atom interferometry for the first time to detect gradients in gravitational forces, which may help answer a long-standing military need for remote standoff detection of underground structures such as tunnels and bunkers. With sufficient resolution, sensitivity, and noise immunity, gravity gradiometers can detect minute variations in gravitational fields caused by underground voids. Gravity gradiometers using atom interferometry inherently can resolve small-scale features due to the short wavelengths of the matter waves (approximately 10,000 times shorter than visible light). To get higher sensitivity, the Yale researchers used an atom interferometer with atoms cooled to low temperatures using techniques developed for Bose-Einstein condensation. This method for getting a beam with laser-like coherence (i.e., a small spread in atomic velocities that translates into a narrow range of wavelengths) improved the sensitivity of their interferometer relative to previous atom interferometers that used uncooled beams and passed them through slits to narrow the spread of atomic velocities (thereby reducing beam intensity). The resulting sensitivity is ten times higher than conventional gravity gradiometers. Immunity to noise results from the gravity gradiometer's use of two adjacent and parallel atomic beams; that helps the device discriminate against noise from vibrations, which is critical for airborne applications, and other environmental factors (since the factors affect the two beams equally, the interferometer detects no resulting phase difference between the beams that would otherwise interfere with small signals from slight gradients in gravity). The atomic beam gradiometer also has significantly enhanced long-term stability. The resulting performance may allow, for the first time, detection from low flying aircraft at altitudes up to 500 feet of tunnels and bunkers with 5-meter diameters. The researchers are working with the Department of Defense on a field demonstration of the technique. Calculations suggest that sensors based on atomic interferometry have the potential for increased sensitivity that could allow detection of structures from higher altitudes.

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(U) FY 2002 Plans:

- Research. In the second quarter of FY 2002, the Department of Defense will announce the results of the competition conducted by the Services for new multidisciplinary basic research efforts underpinning high-priority technology areas such as: adaptive coordinated control of multiple platforms, multifunction materials, energetic material design, explosive-specific chemical sensors, land-target spectral signatures, optical clocks for precision timing, renewable logistic fuel cells, adaptive software system interoperability, energy absorbing materials and structures, scalability of networked systems, and integrated nanosensors. Multidisciplinary and PECASE programs begun in prior years will continue, with new competitive awards under the PECASE program. ($176.326 million)

- Education. The FY 2002 competition under the National Defense Science and Engineering Graduate Fellowship Program will result in the award of approximately 180 graduate fellowships. ($26.586 million)

- Infrastructure. The FY 2002 competition under the DURIP program will lead to approximately 240 new instrumentation awards. ($46.085 million)

(U) FY2003 Plans:

- Research. Topics for the FY 2003 multidisciplinary research competition will be selected in strategic basic research areas related to transformational and other high-priority technologies, such as research areas related to: biomimetic sensor networks, intelligence information fusion, smart materials and structures, efficient energy and power conversion, high energy materials for propulsion and control, and enhancing human performance for military missions. A new multidisciplinary thrust in FY 2003 will address a need for research and related student training in instrumentation development. Multidisciplinary and PECASE programs begun in prior years will continue, with new competitive awards under the PECASE program. ($155.299 million)

- Education. A FY 2003 competition will be conducted to award approximately 140 graduate fellowships under the National Defense Science and Engineering Graduate Fellowship Program. The first competition will be conducted under the new ASSURE program to support undergraduate research experiences. ($23.118 million)

- Infrastructure. A FY 2003 competition will be conducted to make approximately 230 new instrumentation awards under the DURIP program. ($43.193 million)

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(U) ACQUISITION STRATEGY: Not Applicable

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	253.627	217.549	217.957	Continuing
Delta	38.659	22.825	0.000	
FY 2002 Amended President's Budget Submission	292.286	240.374	217.957	Continuing
Appropriated Value	295.077	250.874	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-1.877	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-2.722	0.000	0.000	
c. Other	0.000	0.000	3.653	
Current FY 2003 Budget Submission	292.355	248.997	221.610	Continuing

Change Summary Explanation:

(U) Funding: FY 2001 adjustments reflect Congressional undistributed reductions and a reprogramming action included in the FY 2000 omnibus reprogramming request. FY 2003-2005 adjustments are to establish a stable profile for the multidisciplinary research portion of this program element, with a comparable number of new efforts competitively begun each year.

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(U) **Schedule:** Not applicable.

(U) **Technical:** Not applicable.

(U) **C. Other Program Funding Summary Cost** Not applicable.

(U) **D. Schedule Profile** Not applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** Force Health Protection Research **PE 0601105D8Z**

COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.366	36.442	9.973	9.937	9.965	10.131	10.861	Continuing	Continuing
Gulf War Illnesses Research/P105	29.366	36.442	9.973	9.937	9.965	10.131	10.861	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) Force Health Protection Research seeks to enhance the protection of Service members against health threats in military deployments both by increasing our understanding of military health issues and by applying the findings from a decade of research on the etiology and treatment of Gulf War illnesses (GWI). This program is conducted in coordination with the Research Working Group of the interagency Military and Veterans Health Coordinating Board.

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COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.366	36.442	9.973	9.937	9.965	10.131	10.861	Continuing	Continuing
Gulf War Illnesses Research/P105	29.366	36.442	9.973	9.937	9.965	10.131	10.861	Continuing	Continuing

(U) Project Number and Title: P105 Gulf War Illnesses Research

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) In FY 2001, this program supported essential military missions through the following accomplishments: Initiated new competitively funded projects in neurobiology of stress, with emphasis on development of objective measures of brain changes and functional deficits in symptomatic Gulf War veterans; deployment toxicology methods, with emphasis on methods to detect chemical exposures; health risks of heavy metals, including depleted uranium and its proposed replacement, tungsten, that may be used in munitions and armor; and force health protection epidemiology, including comparison of U.S and U.K. Gulf War veteran cohorts ($ 10.000 million).

(U) Awarded continuations of projects at the University of Texas Southwestern Medical Center on Gulf War Illnesses diagnostic criteria, and Georgetown University on comparative studies of Gulf War Illnesses, Chronic Fatigue Syndrome, and Fibromyalgia (Congressional adds $ 11.000 million)

(U) Continued program on Health Behaviors Interventions research with multi-Service studies on alcohol abuse prevention, tobacco cessation, unintended pregnancy and sexually transmitted disease prevention, and weight management studies.
($ 2.000 million)

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(U) Continued Leishmania diagnostics and treatments research, completed milestone review, and planned remaining science and technology base studies ($ 1.500 million)

(U) Completed external peer review and continued the DoD epidemiological research effort at the Deployment Health Research Center, including initiation of the Millenium Cohort Study (MCS), Recruit Assessment Program (RAP), and deployment health assessments ($ 3.250 million)

(U) Provided program management, contract servicing, and supplemental funding to previously funded GWI research studies. Specific findings from completed and ongoing studies are summarized for more than 120 DoD-sponsored projects in the Annual Report to Congress ($ 1.616 million)

(U) FY 2002 Plans:

(U) In FY 2002, this program will continue to support essential military missions through the following activiteis: Competively fund studies of low level chemical exposures relevant to Gulf War veterans ($1.650 million).

(U) Initiate new projects in risk communications research, neurobiology of stress and immune function, deployment toxicology methods, and force health protection epidemiology ($ 15.000 million).

(U) Continue program on Health Behaviors Interventions Research with completion of unintended pregnancy and sexually-transmitted disease longitudinal study, continuation of multi-Service studies on weight management, alcohol abuse prevention, and tobacco cessation ($ 3.000 million).

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(U) Continue the DoD epidemiological research effort at the Deployment Health Research Center, including the Millenium Cohort Study (MCS) collaboration with the Department of Veterans Affairs, Recruit Assessment Program (RAP), and deployment health assessments ($ 3.250 million)

(U) Continue development of Leishmania diagnostics and treatments ($ 1.500 million).

(U) Provide program management, contract servicing, and supplemental funding to previously funded GWI research studies ($ 2.552 million).

(U) Award continuations of peer-reviewed projects at the University of Texas Southwestern Medical Center on Gulf War Illnesses diagnostic criteria, and Georgetown University on comparative studies of Chronic Fatigue Syndrome, and Fibromyalgia (Congressional adds $ 9.490 million)

(U) FY 2003 Plans:

(U) In FY 2003, this program will support essential military missions through the following activities: Continue projects in risk communications research, neurobiology of stress and immune function, deployment toxicology methods, and force health protection epidemiology ($ 3.000 million).

(U) Continue program on Health Behaviors Interventions research and expand multi-Service studies on biology, individual variation, and readiness associations of weight management ($ 3.000 million).

(U) Continue an expanded Tri-Service epidemiological research effort at the Naval Health Research Center involving deployment health assessments, including continuation of the Millenium Cohort Study and forward deployed research on Reserve and National Guard units ($ 3.000 million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Force Health Protection Research **PE 0601105D8Z**

(U) Provide program management, contract servicing, and supplemental funding to previously funded GWI research studies ($ 0.973 million).

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	16.978	16.856	5.033	Continuing
Delta	+12.388	+10.096	0.000	
FY 2002 Amended President's Budget Submission	29.366	26.952	5.033	
Appropriated Value	27.978	36.652	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.210	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	1.388	0.000	0.000	
c. Other	0.000	0.000	4.904	
President's Budget Submission	29.366	36.442	9.937	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Force Health Protection Research **PE 0601105D8Z**

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments and increases reflect adds for continuation of efforts at University of Texas Southwest Medical Center and Georgetown University. FY 2002 and FY 2003 reflects increases in the Amended President's Budget for force health protection research.

(U) **Schedule**: FY 2003 funding projects permit continuation of key Force Health Protection efforts including longitudinal studies such as the Millenium Cohort Study and health behaviors interventions research.

(U) **Technical**: FY 2002 and FY 2003 increases permit follow on studies using emerging findings and new technologies in functional brain imaging, neuropsychological testing, and biochemical techniques that will substantially advance deployment stress management and environmental exposure and health risk assessments.

(U) C. OTHER PROGRAM FUNDING SUMMARY COST: N/A

(U) D. ACQUISITION STRATEGY: N/A

(U) E. SCHEDULE PROFILE: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** High Energy Laser Initiative **PE 0601108D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	11.785	12.082	12.310	12.553	12.812	13.084	Continuing	Continuing
High Energy Laser/P108	0.000	11.785	12.082	12.310	12.553	12.812	13.084	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This program element funds basic research aimed at developing fundamental scientific knowledge to support future DOD high-energy-laser (HEL) systems. HEL weapons systems have many potential advantages, including speed-of-light time-to-target, high precision, nearly unlimited magazine depth, low cost per kill, and reduced logistics requirements because of no need for stocks of munitions or warheads. As a result, HELs have the potential to perform a wide variety of military missions, including some that are impossible, or nearly so, for conventional weapons. These include interception of ballistic missiles in boost phase, defeat of high-speed, maneuvering anti-ship and anti-aircraft missiles, and the ultra-precision negation of targets in urban environments with no collateral damage. Research conducted under this program element develops the technology necessary to enable these and other HEL missions.

(U) This program element is part of an overall DOD initiative in HEL science and technology being conducted by the HEL Joint Technology Office (JTO). The goals of this HEL JTO funded research are to provide the technology to make HEL systems more effective and also to make them lighter, smaller, cheaper, and more easily supportable on the battlefield. In general, efforts funded under this program element are chosen for their potential to have major impact on multiple HEL systems and on multiple Service missions. As a result of this focus and of close coordination with the military departments and defense agencies, this program element complements other DOD HEL programs that are directed at more specific Service and agency needs.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** High Energy Laser Initiative **PE 0601108D8Z**

(U) A broad range of technology is addressed in key areas such as chemical lasers, solid-state lasers, beam control, optics, propagation, and free-electron lasers. Research is conducted principally by universities, but also by Government laboratories and industry. The program element funds theoretical, computational, and experimental investigations. In many cases, these three types of investigations are combined under a single effort, thereby creating synergistic effects between various scientific approaches, and greatly enhancing the potential for making important breakthroughs in HEL-related technologies. DOD intends to translate the knowledge developed under this program element into proof-of-concept solutions to broadly defined HEL-related military problems as part of further laboratory experiments and field-testing.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** High Energy Laser Initiative **PE 0601108D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	11.785	12.082	12.310	12.553	12.812	13.084	Continuing	Continuing
High Energy Laser /P108	0.000	11.785	12.082	12.310	12.553	12.812	13.084	Continuing	Continuing

(U) Project Number and Title: P108 High Energy Laser

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) None; this program element is a new initiative as of FY 2002.

(U) FY 2002 Plans:

(U) Funds will be used to support university-led multidisciplinary basic research in areas applicable to DOD's HEL program. Each research topic will be investigated by one or more teams of researchers representing different academic disciplines. The projects will be closely monitored by the military departments and defense agencies for breakthrough advances that can be rapidly transitioned to DOD HEL applied-research and advanced-technology-development programs. Using a competitive process designed to select only the highest payoff proposals, DOD intends to fund six topic areas:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

- (U) Fundamental research in solid-state lasers. This research will seek to develop the scientific knowledge needed for revolutionary advances in fieldable high-brightness and high-power diode-pumped solid-state lasers. Over the long term, solid state lasers, because they run on electricity, promise to greatly simplify logistics requirements. Achieving this promise, however, requires that cost, power, and efficiency barriers be breached. To enable these developments, research areas of interest include laser materials with large fluorescence lifetime and cross-section and the ability to operate at high temperatures, athermal laser gain media, modular and scalable architectures for laser power scaling, means of increasing efficiency to in excess of 20%, operation in harsh environments, and corrections for thermally induced distortions in gain media.
- (U) Fundamental research in affordable HEL fiber-laser modules. This research will examine the scientific concerns involved in developing and producing low-cost, manufacturable modules in the 100 Watt to kilowatt range and in developing methods to combine modules to achieve the weapons power levels. The focus on affordability could lead to drastic reductions in acquisition cost for future HEL systems. Areas of interest include laser materials and devices, nonlinear optical phenomena at high power levels, reliable and low-cost design techniques, and integrated optics and beam/pulse forming.
- (U) Fundamental research in modeling, design, and simulation of beam-control systems for military HEL applications. This research will examine the scientific concerns associated with atmospheric beam control, to include characterization efforts in aerial, battlefield, and maritime-like environments. These efforts could lead to substantial increases in the lethality of HEL systems without the need for ever-higher power levels. Areas of interest include improved theoretical and computer-based analysis of propagation effects, advanced wavefront sensing and reconstruction (especially in the presence of thermal blooming), the effects of extended reference sources used for wavefront correction, and new concepts for effective wavefront sensing and correction, especially under high-scintillation conditions.
- (U) Fundamental research in high power, lightweight optics. This research will attempt to establish a multidisciplinary program that addresses advanced technological elements and concepts relevant to the development of lightweight optics for HEL systems. This research will be aimed at greatly reducing weight while simultaneously improving performance and reducing cost, issues of importance to all potential military HEL systems, particularly space-based systems. Areas of interest include basic materials and fabrication techniques, large optics lightweight structure and deployment concepts, HEL optical coatings, multipurpose materials (e.g., wavefront correction combined with aperture adjustment), and control mechanisms.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

- (U) Fundamental research in chemical lasers. This research will focus on improved understanding of the processes necessary for the realization of truly closed cycle, lightweight, high-power, continuously operating chemical lasers. A completely closed cycle chemical-laser HEL weapon would require only electrical power and not expensive, heavy exhaust systems or chemical supplies, thereby capitalizing on the high efficiencies inherent in the chemical-laser process, while enhancing supportability. Areas of interest include studies of chemical processes and reactions for a closed-cycle chemical-laser system, new sources of the high-energy chemical species needed to produce the lasing event, and novel recovery systems for regeneration of the laser fuels.
- (U) Fundamental research in high-average-power ultra-short-pulse free-electron lasers (FELs). This research will advance the average power obtainable by ultra-short-pulse FELs significantly over the current state-of-the-art, while increasing efficiency and lethality and decreasing relative size and cost, thus enhancing opportunities for eventual weaponization of FELs for military applications. Areas of interest include high-current devices and control methods, higher damage threshold resonator optics, advanced optical cavity designs for high power and compact spaces, design methods for scaling FELs to reach multi-megawatt class average power levels.

(U) Funds from this program element will also support research on specific HEL-related problems for which fundamental scientific research promises to offer innovative and revolutionary solutions, and which are amenable to solution by a small team from a single academic discipline. The areas of interest include, but are not limited to: beam-control theory, propagation analysis and measurement, chemical-laser mixing and diagnostics, solid-state-laser materials and design concepts, modeling and simulation of HELs, and education and training of HEL scientists and engineers for public and private-sector service.

(U) FY 2003 Plans:

(U) Funds will be used to continue supporting university-led multidisciplinary basic research in areas applicable to DOD's HEL program. Each research topic will be investigated by one or more teams of researchers representing different academic disciplines. The projects will be closely monitored by the military departments and defense agencies for breakthrough advances that can be rapidly transitioned to DOD HEL applied-research and advanced-technology-development programs. This multidisciplinary basic research program will be divided into the following areas:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

- (U) Fundamental research in solid-state lasers. This research will continue seeking to develop the scientific knowledge needed for revolutionary advances in fieldable high-brightness and high-power diode-pumped solid-state lasers. Over the long term, solid state lasers, because they run on electricity, promise to greatly simplify logistics requirements. Achieving this promise, however, requires that cost, power, and efficiency barriers be breached. To enable these developments, research areas of interest include laser materials with large fluorescence lifetime and cross-section and the ability to operate at high temperatures, athermal laser gain media, modular and scalable architectures for laser power scaling, means of increasing efficiency to in excess of 20%, operation in harsh environments, and corrections for thermally induced distortions in gain media.
- (U) Fundamental research in affordable HEL fiber-laser modules. This research will continue examining the scientific concerns involved in developing and producing low-cost, manufacturable modules in the 100 Watt to kilowatt range and in developing methods to combine modules to achieve the weapons power levels. The focus on affordability could lead to drastic reductions in acquisition cost for future HEL systems. Areas of interest include laser materials and devices, nonlinear optical phenomena at high power levels, reliable and low-cost design techniques, and integrated optics and beam/pulse forming.
- (U) Fundamental research in modeling, design, and simulation of beam-control systems for military HEL applications. This research will continue examining the scientific concerns associated with atmospheric beam control, to include characterization efforts in aerial, battlefield, and maritime-like environments. These efforts could lead to substantial increases in the lethality of HEL systems without the need for ever-higher power levels. Areas of interest include improved theoretical and computer-based analysis of propagation effects, advanced wavefront sensing and reconstruction (especially in the presence of thermal blooming), the effects of extended reference sources used for wavefront correction, and new concepts for effective wavefront sensing and correction, especially under high-scintillation conditions.
- (U) Fundamental research in high power, lightweight optics. This research will continue a multidisciplinary program that addresses advanced technological elements and concepts relevant to the development of lightweight optics for HEL systems. This research will be aimed at greatly reducing weight while simultaneously improving performance and reducing cost, issues of importance to all potential military HEL systems, particularly space-based systems. Areas of interest include basic materials and fabrication techniques, large optics lightweight structure and deployment concepts, HEL optical coatings, multipurpose materials (e.g., wavefront correction combined with aperture adjustment), and control mechanisms.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

- (U) Fundamental research in chemical lasers. This research will continue to focus on improved understanding of the processes necessary for the realization of truly closed cycle, lightweight, high-power, continuously operating chemical lasers. A completely closed-cycle chemical-laser HEL weapon would require only electrical power and not expensive, heavy exhaust systems or chemical supplies, thereby capitalizing on the high efficiencies inherent in the chemical-laser process, while enhancing supportability. Areas of interest include studies of chemical processes and reactions for a closed-cycle chemical-laser system, new sources of the high-energy chemical species needed to produce the lasing event, and novel recovery systems for regeneration of the laser fuels.
- (U) Fundamental research in high-average-power ultra-short-pulse free-electron lasers (FELs). This research will continue to seek advances in the average power obtainable by ultra-short-pulse FELs significantly over the current state-of-the-art, while increasing efficiency and lethality and decreasing relative size and cost, thus enhancing opportunities for eventual weaponization of FELs for military applications. Areas of interest include high-current devices and control methods, higher-damage-threshold resonator optics, advanced optical cavity designs for high power and compact spaces, design methods for scaling FELs to reach multi-megawatt class average power levels.

(U) Funds from this program element will also support research on specific HEL-related problems for which fundamental scientific research promises to offer innovative and revolutionary solutions, and which are amenable to solution by a small team from a single academic discipline. The areas of interest include: beam-control theory, propagation analysis and measurement, chemical-laser mixing and diagnostics, solid-state-laser materials and design concepts, modeling and simulation of HELs, and education and training of HEL scientists and engineers for public and private-sector service.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	0.000	0.000	9.456	Continuing
Delta	0.000	11.877	0.000	Continuing
FY 2002 Amended President's Budget Submission	0.000	11.877	9.456	Continuing
Appropriated Value	0.000	11.877	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.092	0.000	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	Continuing
c. Other	0.000	0.000	2.626	Continuing
Current FY 2003 Budget Submission	0.000	11.785	12.082	Continuing

Change Summary Explanation:

(U) **Funding**: PE 0601108D8Z is a new PE established for FY 2000-2007 to better balance research in new revolutionary laser technology with large demonstration programs.

(U) **Schedule**:

(U) **Technical**:

(U) **C.** **OTHER PROGRAM FUNDING SUMMARY COST**:

(U) **D.** **ACQUISITION STRATEGY**:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE High Energy Laser Initiative **PE 0601108D8Z**

(U) E. SCHEDULE PROFILE:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE FEBRUARY 2002	
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)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		6.654	9.195	3.467	0.000	0.000	0.000	0.000	Continuing	Continuing
GICUR/P111		6.654	9.195	3.467	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) A shared commitment between industry and Government continues to be created via the Government/Industry Co-sponsorship of University Research (GICUR) program. It will capitalize 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 will provide the military with leading-edge technologies as well as reducing vulnerabilities of industries involved, increase long-term technical growth in these areas, infuse 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 will be established for personnel exchange and interactions to provide for continuing education of highly qualified researchers already working in leading edge and emerging S&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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research **PE 0601111D8Z**

This thrust is unique to DoD. The thrust is by no means limited to silicon-based CMOS (complementary metal oxide silicon) digital topics. Research here is aimed at breakthroughs to enable rapid, correct, verifiable, implementable designs of complex circuits. Interconnect research will include causes of delays and performance limits as features become smaller (for higher speed). Higher conductivity metals and very low dielectric constant materials will be investigated, as will non-conventional, innovative fabrication processes beyond present vision. These areas require truly innovative research. A new focus on research on sub-10-nanometer silicon-based quantum effect devices, molecular and organic semiconductor electronics and nanotube electronics.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
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 2001	FY 2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	6.654	9.195	3.467	0	
GICUR/P111	6.654	9.195	3.467	0	

(U) Project Number and Title: P111 GICUR

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments: (U) Continue research in semiconductor technology. Theoretical and experimental achievements will be fully documented. Research will continue along lines both needs and opportunity driven, dependent upon success to date.($ 6.654 million)

(U) FY 2002 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research **PE 0601111D8Z**

(U) In cooperation with the Microelectronics Advanced Research Corporation (MARCO) the Semiconductor Electronics Microelectronics project funds four university research centers. The University of California at Berkley leading a team of 14 other universities performing research into "Design and Test" technologies for the Giga-scale semiconductor integrated circuits. Georgia Tech leads a team of six universities for research into "Interconnect" technologies to solve the impending materials, processes, and architecture challenges in connecting billions of devices. Two new Focus Research Centers were initiated in FY2001. The "Materials, Structures and Devices" Center is led by MIT and involves 9 other major research universities and focuses 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 led by Carnegie Mellon University and involves 9 other major research universities. The Center's research focuses on the analysis and synthesis of analog and analog/mixed signal circuits, explores novel system level technologies and seeks software solutions and workarounds for the deep submicron CMOS process limitations. Under MARCO the electronics Industry provides at least three dollars for each dollar provided by DoD ($ 9.195 million).

(U) FY 2003 Plans:

(U) Complete the Semiconductor Electronics Microelectronics technology projects funded at 2 university centers ($ 3.476 million). Continue support for the 2 new research centers.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research **PE 0601111D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget Submit	6.715	6.838	4.026	
Delta	0.000	-3.417	0.000	
FY02 Amended President's Budget Submission	6.715	3.421	4.026	Continuing
Appropriated Value	0.000	10.221	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	-0.000	0.226	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.061	0.800	0.009	
c. Other	0.000	0.000	-0.550	
Current FY 2003 Budget Submission	6.654	9.195	3.467	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research PE 0601111D8Z

(U) **Funding** FY 2001and FY 2002 reductions reflect Section 8086 adjustments and Congressional undistributed and program reductions.

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

(U) **Technical**

(U) **C.** **OTHER PROGRAM FUNDING SUMMARY COST**: N/A

(U) **D.** **ACQUISITION STRATEGY**: N/A

(U) **E.** **SCHEDULE PROFILE**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** Defense Experimental Program to Stimulate Competition **PE 0601114D8Z**

COST *(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		21.797	16.824	9.864	9.819	9.780	9.946	10.141	Continuing	Continuing
DEPSCoR/P104		21.797	16.824	9.864	9.819	9.780	9.946	10.141	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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 FY2000 DEPSCoR was funded within the University Research Initiative Program (PE 0601103D8Z).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** Defense Experimental Program to Stimulate Competition **PE 0601114D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY2003	FY2004	FY2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		21.797	16.824	9.864	9.819	9.780	9.946	10.141	Continuing	Continuing
DEPSCoR/P104		21.797	16.824	9.864	9.819	9.780	9.946	10.141	Continuing	Continuing

(U) Project Number and Title: P104 DEPSCoR

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Research. The Department of Defense (DoD) awarded 69 separate grants for research/infrastructure support to 29 academic institutions in 18 States, including Puerto Rico, 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, the Office of Naval Research, and the Ballistic Missile Defense Organization (Science and Technology Directorate) to receive an average of $315,000 each over the three year grant period. The DEPSCoR is designed to expand research opportunities in States that have traditionally received the least funding in federal support for university research. ($ 21.797 million)

(U) FY 2002 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Defense Experimental Program to Stimulate Competition **PE 0601114D8Z**

(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.($ 16.824 million)

(U) FY 2003 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.($ 9.864 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** Defense Experimental Program to Stimulate Competition **PE 0601114D8Z**

(U) B. Program Change Summary	**FY 2001**	**FY 2002**	**FY 2003**	**Total Cost**
Previous President's Budget Submission	9.859	9.845	9.891	Continuing
Delta	11.938	.056	0.000	
FY 2002 Amended President's Budget Submission	21.797	9.901	9.891	Continuing
Appropriated Value	22.000	16.901	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.077	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.203	0.000	0.000	
c. Other	0.000	0.000	-0.027	
Current FY 2003 Budget Submission	21.797	16.824	9.864	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	**R-1 ITEM NOMENCLATURE** Defense Experimental Program to Stimulate Competition **PE 0601114D8Z**

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments.

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	**R-1 ITEM NOMENCLATURE** Medical Free Electron Laser **PE 0602227D8Z**

COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.845	19.660	0	0	0	0	0		
MFEL/P483		19.845	19.660	0	0	0	0	0		

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) The MFEL program seeks to develop advanced, laser-based applications for military medicine and electronic materials research. 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.
(U) The majority of this program is focused on developing advanced procedures 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 enhanced medical imaging. Laser applications will be clinically tested in unique program 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 repair, and neurosurgery. Responsibility for the management and funding of this program is planned for transfer to the National Institutes of Health (NIH) beginning in FY 2003.
(U) A small part of this program is focused on electronic materials research. In this research, the high energy FEL beam is exploited for improved processing applications including more effective microstructure, surface cleaning and modification of transport properties of microelectronic substrates.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser **PE 0602227D8Z**

(U) The program is executed primarily extramurally, but a small amount of funding has been awarded to DOD medical centers to facilitate technology transfer. Performers include 5 major university medical centers, the Army Institute for Surgical Research, and approximately 6 applications groups. Awards are made competitively, following solicitation and peer review, for performance periods of up to 3 years. The program emphasizes the use of interdisciplinary teams of physicians, physicists, biologists, and engineers and collaborative interactions among the major MFEL centers.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	**R-1 ITEM NOMENCLATURE** Medical Free Electron Laser **PE 0602227D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.845	19.660	0	0	0	0	0		
MFEL/P483		19.845	19.660	0	0	0	0	0		

(U) Project Number and Title: P483 MFEL

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Program management was transferred to the Air Force Office of Scientific Research, and the five major university-based medical center awardees completed their first full year of funding. In FY 2001, this program supported essential military missions through the following technical accomplishments: Emphasis continued to be on military-relevant laser medicine with increasing activity in external and endoscopic imaging for rapid battlefield injury diagnostics and treatment. Advances have been made in understanding problems associated with laser vision correction for military personnel, including diseminating knowledge of an important animal model, and demonstrations of laser activated bonding of surgical eye flaps. Major advances have been made in photochemical treatment of infected wounds. Optical Coherence Tomography has demonstrated important capability in burn assessment, and compact, portable units are being designed. A monochromatic x-ray source, based on laser scattering, has performed close to design specifications, with great promise for improved diagnosis and treatment and with greatly reduced dosage to the patient. Promising techniques for enhancing drug delivery and for making bio-polymers have been devised and demonstrated. ($ 19.845 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser **PE 0602227D8Z**

(U) FY 2002 Plans:

(U) Major medical center programs will enter their second year, with continued emphasis on combat casualty care and other militarily relevant medicine. In FY 2002, this program will continue to support essential military missions through the following activities: Laser based imaging procedures, previously demonstrated, will be developed in portable form, with appropriate software, for field use, in conjunction with DOD medical centers. Other field diagnostic imaging applications of Optical Coherence Tomography, and newly invented endoscopic confocal microscopic imaging, will be developed. Animal studies of diagnostics and treatment using the newly developed monochromatic x-ray source will begin. Collaborative studies, between university centers and DOD medical centers involved with military laser vision correction issues, will intensify. Militarily relevant medical procedures introduced under this program will continue to be evaluated by, and transferred to, military medical centers, and the special capabilities and facilities available at such centers will be used extensively. ($ 14.660 million)

(U) FY 2003 Plans:

(U) Transferred to National Institutes of Health (NIH).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser **PE 0602227D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
President's FY2001 Budget Submit	15.029	4.634	4.358	
Delta	4.816	10.026	-4.358	
FY 2002 Amended President's Budget Submit	19.845	14.660	0.000	
Appropriated Value	20.029	19.660	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.184	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current President's Budget	19.845	19.660	0.000	

Change Summary Explanation:.

(U) **Funding:** FY 2001 reductions reflect Section 8086 adjustments. FY 2002 increase to fund new technologies in combat casualty care.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser **PE 0602227D8Z**

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	**R-1 ITEM NOMENCLATURE** Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		22.031	23.784	13.970	14.212	14.476	14.750	15.017	Continuing	Continuing
HBCU/P489		22.031	23.784	13.970	14.212	14.476	14.750	15.017	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) P2228D, Historically Black Colleges and Universities and Minority Institutions (HBCU/MI). The 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 the following areas:

- Research. The research grants are designed 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. Collaborators include other educational institutions (not necessarily HBCU/MIs), a DoD laboratory or Research, Development, and Engineering Center (RDEC), a DoD University Affiliated Research Center (UARC), and/or industry or small business partner.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

- 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. Funds for instrumentation allow institutions to increase their capability to perform research of interest to the Department. 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		22.031	23.784	13.970	14.212	14.476	14.750	15.017	Continuing	Continuing
HBCU/P489		22.031	23.784	13.970	14.212	14.476	14.750	15.017	Continuing	Continuing

(U) Project Number and Title: P489 HBCU

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Continue evaluation of the awards made with the prior year funds. In FY 2001 the HBCU/MI Infrastructure Support Program made 80 awards using the program funds. These 80 awards include 56 instrumentation grants and 24 research grants related to: enhancing instrumental capability in organic, biochemistry, and student research labs; establishment of a UNIX-Based computing facility for mathematics department; encapsulated nanoscale molecular aggregates as enhanced luminophores and chemical sensors; photonics laboratory at Florida A&M University; acquisition of a high speed imaging system for dynamic characterization of advanced materials; acquisition of a nuclear magnetic resonance spectrometer; optical and electron beam material processing and characterization; novel cathodes and catholic catalysts for solid state power sources; development of variable temperature scanning laser microscope for diagnosing coated conductors; DoD computer science instrumentation improvement at Elizabeth City State University; and acquisition of high sensitivity MPMS for magnetic thin films and MEMS research. Among the awardees were 41 historically black colleges and universities, 19 Hispanic-Serving Institutions, three Tribal Colleges and Universities, and 17 other minority institutions. These awards were a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

The Services selected the competitive awards from proposals submitted under the Infrastructure Support Program for HBCU/MIs: FY 2001 broad agency announcement distributed in October 2000. To date, 8 competitions have resulted in 267 Instrumentation grants, 51 research grants, 20 education awards, 9 education centers and 2 technical assistance awards in the Infrastructure Support Program.
($ 14.031 million)

The FY 2001 HBCU/MI program also contained two congressional adds ($3.000 Million) for Tribal Colleges and Universities (TCUs) and ($5.000 Million) for Hispanic Serving Institutions (HSIs), which resulted in two separate/new broad agency announcements. As a result of the competitions, 25 awards were made to HSIs (18 instrumentation awards and 7 research awards); and 17 instrumentation awards to TCUs. Selected awards were made for computer-based physical science curricula enhancement, establishing a science computing center at Texas A&M University-Kingsville, fundamental studies of strengthening mechanisms in metals using dislocation, epitaxial and high permittivity perovskite thin films for microwave applications, instrumental/equipment for introductory math/science at Dine College; analytical chemistry equipment for Sitting Bull College, development of a Tribal College Science Teaching Laboratory at Northwest Indian College, and a state-of-the-art facility for Sisseton Wahpeton Community College.
($ 8.000 million)

(U) FY 2002 Plans:

(U) Continue evaluation of the awards made with prior year funds. The FY 2002 competition will be made for science, mathematics, and engineering research education, and infrastructure efforts are being conducted. In FY 2002, the HBCU/MI program will make additional awards using the program funds. These awards will be a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress. The focus in FY 2002 will be to strengthen the HBCU/MIs in the areas of science, mathematics, and engineering (SME) as well as equip and renovate laboratories for performance of defense research. The Services will select the competitive awards from proposals submitted under the Infrastructure Support Program for HBCU/MIs: FY 2002 broad agency announcement will be distributed in October 2001. These awards will be made for instrumentation for education programs, research, undergraduate scholarships and graduate scholarships/fellowships.
($ 23.784 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

(U) FY 2003 Plans:

(U) Continue evaluation of the awards made with prior year funds. In FY 2003, the HBCU/MI program will make additional awards using the program funds. These awards will be a combination of new starts, and continuations of some grants and other efforts started under previous fiscal years depending on technical progress. The Services will select the competitive awards.
($ 13.970 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
President's FY 2001 Budget Submission	14.236	14.402	14.017	Continuing
Delta	7.795	0.082	0.000	
FY 2002 Amended President's Budget Submission	22.031	14.484	14.017	Continuing
Appropriated Value	22.236	23.784	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.205	0.000	0.000	
c. Other	0.000	0.000	-0.047	
Current FY 2003 Budget Submission	22.031	23.784	13.970	Continuing

Change Summary Explanation:

(U) **Funding:** FY 2001 reductions reflect Section 8086 adjustments.

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA2	R-1 ITEM NOMENCLATURE Historically Black Colleges and Universities (HBCU) **PE 0602228D8Z**

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2							R-1 ITEM NOMENCLATURE Lincoln Laboratory **PE 0602234D8Z**			
COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing
Lincoln Laboratory/P534		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing

(U) Project Number and Title: P534 Lincoln Laboratory

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) The Lincoln Laboratory (LL) program is a high technology research and development effort conducted through a cost reimbursable contract with the Massachusetts Institute of Technology (MIT). LL is operated as a FFRDC administered by the DoD, and is unique among DoD FFRDCs. It has no funding sources other than this Research Line for its innovative research and development efforts. This is due to the fact that LL is operated by MIT at no fee and may not charge for IR&D (under A-21). Other DoD FFRDCs do charge a fee with which they may support research efforts.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** Lincoln Laboratory **PE 0602234D8Z**

(U) The LL Line funds research activities that directly lead to the development of new system concepts, new technologies, and new components and materials. Historically, the Line funding supported many development and demonstration programs which have led to such significant DoD systems as Joint Surveillance Target Attack Radar System (JSTARS), Military Strategic Tactical and Relay (MILSTAR), Ground-Based Electro-Optical Deep Space Surveillance (GEODSS), as well as to solid-state devices and processes of major importance to the military industrial base. Technology developed under the Line research is being used to upgrade existing military systems, e.g., the Navy's Hawkeye, and Aegis radars, and the Air Force's space surveillance and communication systems. The Line also supports ongoing Laboratory programs with state-of-the-art technology developments. The Line program currently has the following 4 research elements:

- Target surveillance and recognition, with emphasis on (1) revolutionary sensing techniques and algorithms for detecting and recognizing battlefield targets both in the clear and in difficult deployments, (2) demonstrating the technologies associated with multi-sensor fusion for target ID, (3) fundamental target-recognition bounds and their implications for sensor and algorithm design, and (4) revolutionary new approaches for automated passive sonar target classification of submarine targets and discrimination of submarines from surface ship clutter.
- High-connectivity, low-cost military global defense network and communications systems, with emphasis on new antennas, RF technology, network protocols (including for mobile users with lightweight transceivers), high-rate fiber and free-space optical communications systems, and the interconnection of these very disparate modalities into a global defense network that can truly realize the vision of a "from sensor to shooter" communications infrastructure which will greatly enhance force effectiveness by providing the right information at the right time anywhere in the world. Developing unique intrusion detection techniques to protect computer networks.
- Advanced combat support technologies including advanced 3D laser radars, active hyperspectral sensing systems, and compact biological agent detection systems. The primary objective for the active hyperspectral sensing system development is to demonstrate the feasibility and utility of combining active illumination with hyperspectral imaging for a range of military applications including Combat Identification (CID). The focus in biological agent detection is in developing technology for compact, lightweight, real-time biological-agent sensors with extremely high sensitivity (< 1 agent containing particle per liter of air) and with strong background clutter rejection for extremely low false-alarm rate (< 1 per week). Continue the development of totally new sensors using Avalanche Photodiode Detector (avalanche photodiode) arrays with new compact, efficient lasers.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** Lincoln Laboratory **PE 0602234D8Z**

• Revolutionary, advanced electronic/optical technology, with specific emphasis on optical sampling for direct analog-to-digital conversion on the microwave carrier in digital receivers for radar and electronic intercept, 3-D imaging and high sensitivity IR focal-plane arrays for advanced missile seekers, mid-infrared semiconductor lasers to counter advanced heat-seeking missiles, new miniature fluorescent and microfluidic sensors for rapidly detecting and identifying low concentrations of biowarfare agents, solid state low-light imagers for improved night vision under starlight illumination, and high-speed, radiation hard, ultra-low power analog and digital circuits for ubiquitous DoD applications.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** Lincoln Laboratory **PE 0602234D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing
Lincoln Laboratory/P534		19.917	21.969	27.732	25.669	27.006	27.490	28.002	Continuing	Continuing

(U) FY 2001 Accomplishments:

(U) Target Surveillance and Recognition: ($4.893 million)

(U) *Surface Surveillance*: Continued to investigate the absolute (vs. relative, between two sensor designs) fundamental ATR performance bounds. Applied multi-sensor ATR concepts to develop of practical multi-sensor ATR architectures for high-performance, resource-efficient, wide-area battlefield target recognition. Designed field experiments to demonstrate such architectures. In addition to being directly applicable to ongoing R&D efforts such as DARPA`s Moving Target Exploitation (MTE) and Moving and Stationary Target Acquisition and Recognition) MSTAR programs, these activities have considerable significance for organizations, such as National Intelligence Mapping Agency (NIMA), NRO and the Services, who are planning and developing next-generation sensing and exploitation systems. Demonstrated multi-sensor data fusion and target recognition system at operational data site.

(U) *Sonar Target Classification*: Expanding application of Interactive Passive Acoustic Classifier (IPAC) began deployment of a classification approach beyond submarine towed array sonars to the fixed (SOSUS) and mobile (SURTASS) surveillance problems. Developed techniques for operator in-situ training and test with field data. Developing dynamic databases to permit sonar to exploit knowledge of environment, intelligence information, external sensor data on surface ship clutter. Testing advanced sonar techniques in submarines in operational environments. Several algorithms have become operational.

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(U) *Underground Structures*: Refined techniques for sparse-array active seismic imaging and demonstrate an existing underground facility. Developed algorithms that allowed detection of underground structures down to about 100m.

(U) Military Communications: ($4.504 million)

(U) Continued to develop technology for global high-rate military communications and networking, including optical communications in space and fiber. Continued demonstration and extension of networking techniques and protocols for interworking among disparate networks including Milsatcom. Demonstrated ultra-fast optical testbed with 100 Gbps transmissions between Lincoln Laboratory and Washington, DC (application to surveillance data processing) using this test bed for distributed radar experiment. Investigated novel application areas for optical technology such as ultra-fast data encryption and processing. Began developing antenna and processing techniques to allow high quality comm.-on-the-move.

(U) *Defensive Information Warfare*: Development and evaluation of advanced techniques for network intrusion detection continued. Focus shifted towards detection of insider attacks (i.e. attacks from users who have authorized access to the system). Built systems that process complementary data from an ensemble of cooperating intrusion detection systems, for improved aggregate performance. Developing technologies that will improve the security of wireless networks. Continue to test Air Force base computer traffic to assess and improve performance.

(U) *Combat Support Technology*: ($4.425 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory **PE 0602234D8Z**

(U) *Active Hyperspectral Sensing System*: Continued to develop a full-spectral active Hyperspectral Imaging (HIS) system for target recognition, using select, discrete-frequency laser wavelengths throughout the visible through mid-wave infrared (IR) spectral regions, broadband illumination in discreet segments of those regions, and passive long-wave IR imaging. The system will be adaptable, where both the sensing wavebands and target-recognition algorithms will be specified by the applications. Developed algorithms to find mines (metal and plastic) with high detection probability using particular wavelength combinations. For some applications, visible avalanche photodiode (avalanche photodiode) arrays are being incorporated that permit range-resolved imaging as well as the standard spatial and spectral imaging that the active hyperspectral (HIS) system affords. The potential is for 4 dimensional sensor systems that could greatly enhance target detection and identification.

(U) *3D Laser Radar*: Continued to improve the performance of 3-D laser radar systems. Developed techniques for scaling avalanche photodiode array sizes to greater than 32 x 32 pixels. These larger arrays have applications for advanced ballistic missile defense (BMD) and tactical seekers and ground mapping and foliage penetration. Continued the development of 1 micron and 1.5-micron-sensitive avalanche photodiode arrays. These devices will enable the single-photon-sensitive 3-D laser radar technologies to be used in the eyesafe regime for applications such as combat identification and tactical seeker homing in urban environments. Initiated the development of multi-function laser transmitters, which are capable of 3-D imaging and laser-vibration sensing, for applications of combat identification and underground-structure sensing. Started building an airborne demonstration system to test ground mapping and target identification. System to be demonstrated in FY2002.

(U) *Bio Agent Detection Systems*: Transitioned the bio agent trigger system Biological Agent Warning Sensor (BAWS), to the Joint Biological Point Detection System (JBPDS). After successful tests, BAWS was transferred to a contractor for fabrication of about 1000 JBPDS systems. Continued to investigate techniques and technologies to make the warning sensor more sensitive and smaller. Improved the performance of the mammalian B-cell bio ID sensor. Developed B-cell lines tuned to a number of bio agents (e.g., plague, foot-and-mouth, tularemia, etc.) Began to explore methods to combine the B-cell-based sensor with a BAWS type trigger sensor. This technology development is directed toward developing integrated, miniature, low-power bio-sensors. Developed techniques to collect and preserve clear samples for diagnosis and threat characterization. Started to develop and test concepts for military base protection and urban defense. Both of these areas require different sensor and warning concepts and close connections with health care institutions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory **PE 0602234D8Z**

(U) Advanced Electronics Technology: ($6.095 million)

(U) Investigated highly scaled Complementary Metal Oxide Silicon/Silicon On Insulator (CMOS/SOI) digital circuits using mixed electron-beam and optical lithography at 25-nm feature sizes for ultra-dense circuits. Explored integration of integrated circuits (ICs) in the third dimension as a means to significantly improve functional density. Demonstrated an optically sampled A/D with multi-GHz bandwidth for radar and electronic intelligence use. Extended highly integrated Charge-coupled Device/Complementary Metal Oxide Silicon (CCD/CMOS) imager to include noiseless jitter compensation of platform motion. Continued development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for "smart" multimode sensors. Transferred advanced mid-IR semiconductor laser technology to industry for dual-wavelength infrared countermeasure (IRCM). Continued development of combined biochemical, micromechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Developed functional 32 x 32 Avalanche Photo Diode array for use in a laser radar demonstration.

(U) FY 2002 Plans:

(U) Target Surveillance and Recognition ($5.017 million)

(U) *Surface Surveillance*: Extend integrated capability to automatic detection and identification of high value targets like Surface-to-Air Missiles. This capability will build upon the trainable search agents and use terrain features as contextual information to help the target recognition process. Focus will center on the automatic target recognition of SA-6s from overhead data and reducing the processing latencies associated with these time-critical targets. Technology will continue to be tested using operational data. Use data from airborne sensors to support development of advanced operational concepts, electronic countermeasures (ECCM), and auto target recognition (ATR) algorithms. Start the transition of this technology to a multi-mode test airborne platform being developed to test a forward C^2 platform for the Air Force.

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(U) *Underground Structures*: Continue to tune sparse arrays for actively imaging underground facilities. Consider sensors, processing, calibration and communications requirements. Use relevant measurement data to understand the phenomenology to tune and validate imaging algorithms. The objective of this work is to identify features of underground structures.

(U) *Sonar Target Classification*: Develop dynamic database concepts to permit sonar to better exploit knowledge of environment, intelligence information, and external sensor data on surface ship clutter. Extend Interactive Passive Acoustic Classifier (IPAC) methodology to sonar classification with multiple sensors, using the hull, sphere, and towed arrays of a typical submarine as an example. Continue Operator-Machine Interface (OMI) development. Explore the benefit of distributed sensor systems to classification. Continue to transfer algorithms to the operational fleet.

(U) *Open Systems Technology and Prototyping Testbed*: Develop concepts and technology using commercial components, tailored high speed very large scale integration (VLSI) designs, and new software architectures and protocols to allow flexible and upgradeable electronics/software for future military sensor and communication systems. This should allow shorter development times, open competition, and the upgrade of military systems much more easily and cheaply. Also developing a modular testbed for ground and airborne measurement systems to allow rapid prototyping of new processing hardware and algorithm concepts.

(U) Military Communications: ($4.489 million)

(U) *Global Networks*: Continue to develop technology for global high-rate (10's to 100's Gbps) military communications and networking, including optical communications in space and fiber. Continue demonstration and extension of networking techniques and protocols for interworking among disparate networks including Milsatcom. Demonstrate networked applications over MILSTAR II to facilitate ability to transfer C4ISR data in the tactical theater. Utilize high-speed fiber network between Lincoln Laboratory and Washington, DC to demonstrate movement of radar data from sensor to remote processing site for fusion with other radar data. Investigate novel application areas for optical technology such as ultra-fast data encryption and processing.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory **PE 0602234D8Z**

(U) *Defensive Information Warfare*: Research, development and evaluation of systems that can determine an attackers intent will be carried out. Research on combined detection and reaction will be extended to mobile, wireless networks. Technology transfer of detection and reaction systems to military users will continue. Methodology for evaluation of intrusion detection and reaction systems will be transferred to other government organizations. Starting to evaluate the security issues associated with net centric warfare.

(U) Combat Support Technology: ($6.170 million)

(U) *Active Hyperspectral Sensing System*: Complete the development of a measurement system consisting of passive hyperspectral and multi-spectral imaging sensors with select, discrete-frequency laser wavelengths. The system will be adaptable, where both the sensing wavebands and target-recognition algorithms will be specified by the applications. In addition to combat ID, these systems will be investigated for detecting bio agents remotely (~100m to 1km). Start integrating hyperspectral techniques with laser radars to obtain true 4 dimensional sensors.

(U) Forward Airborne C^2 Platform: Begin development and testing of an airborne C^2 aircraft for test and evaluation of a forward based C^2 node. The test platform will have all appropriate communication, command and control gear to test gathering, assessing and targeting enemy ground targets.

(U) *Biological Agent Detection Systems*: Field testing of the integrated BAWS/B-cell sensor will be conducted and non-living analogs to the B-cells investigated to enhance sensor operability. Network architectures of warning/ID sensors will be tested in combined modeling and validation measurements. Transition of the bio sensor technologies to aqueous and plant environments will be investigated. Sensor architectures will be considered that fuse biological with chemical sensors and appropriate response strategies. Applications for the cartridge-based nucleic-acid testing will be expanded to include real-time, in-the-field DNA analysis, and confirmation sensing. Working with USAMRIID to transfer these techniques to them. Working with the Joint Biological Program Office to develop follow-on concepts for JBPDS. Continue to work the military base and urban bio defense problem. Measurements have been made in buildings and large public gatherings, to assess backgrounds and sensor system concepts that would work in these environments.

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(U) *3D Laser Radar*: Continue the development of laser radar technologies for applications to advanced ballistic and tactical seekers and combat identification. This includes the development of visible and near-infrared-sensitive Geiger-mode avalanche photodiode arrays with bonded timing circuitry for 3-D laser radars. Upgrade the 3-D imaging brassboard system to operate at the 1.0-micron wavelength. This will allow the functional test and demonstration of the InGaAs avalanche photodiode arrays. Examine the issues related to 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. Continue the development of multi-function laser-radar systems, which combine 3-D imaging and range-Doppler/vibration sensing for applications to BMD interceptors, combat identification and foliage penetration. These systems will use the same laser transmitter for incoherent 3-D laser radar, utilizing the avalanche photodiode arrays, and coherent laser radar for target-vibration sensing. This development will involve the integration of a multi-function laser radar testbed, which will enable the collection of 3-D and range-Doppler image data on a variety of relevant targets. Continue the integration and testing of laser radar concepts on test ranges and air platforms.

(U) Advanced Electronics Technology: ($6.293 million)

(U) Address improvement of CMOS/SOI yield and radiation hardness. Explore limits of optical lithography using phase-shift masking at 157-nm wavelength. Complete the 3-D stacked megapixel imager with on-chip digital image processing. Demonstrate optically sampled A/D at 1-GHz bandwidth in field radar site. Continue development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for “smart“ multimode sensors. Demonstrate near-IR/electronically shuttered 4-megapixel CCD imager for airborne reconnaissance. Build beam-combined high-brightness IRCM demonstration package. Develop high-power laser systems using beam-combined fiber sources and/or cooled ytterbium:yttrium aluminum garnet (Yb:YAG). Develop optimized super-wideband compressive receiver for airborne electronic intelligence (ELINT). Continue development of combined bio-chemical, micro-mechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Begin investigation of the combination of biology and electronics to develop totally new capabilities (e.g., bio batteries, artificial membranes and cell components for detection and control functions, high density storage, etc.)

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(U) FY 2003 Plans:

(U) Target Surveillance and Recognition: ($5.503 million)

(U) *Surface Surveillance*: Incorporate tactical sensor data into the fusion process and complete development of a robust time critical strike architecture. Use the Air Force airborne command and control test aircraft (MC2A) to develop and test advanced concepts for surface surveillance. The architecture will use the components developed in previous programs using data from the MC2A. The algorithms will be designed to find, identify, and target ground forces. Connection to the MC2A platform will allow evaluation of the algorithms in integrated Air Forces exercises. Particular focus will be on difficult targets; moving, in foliage, and urban targets. A number of foliage penetration and "through the wall" sensor technologies will be investigated. In addition to being directly applicable to ongoing R&D efforts such as DARPA's MTE and MSTAR programs, these activities will have considerable significance for organizations, such as NIMA, NRO and the Services that are planning and developing next-generation sensing and exploitation systems.

(U) *Sonar Target Classification*: (U) Continue to develop automation approaches. Consider benefit of new automation and classification concepts to active sonar concepts using off-board sources and distributed receivers. This allows multiple detection geometries and phenomenologies. Test these techniques on submarines to allow transition to full fleet operation.
(U) *New Open Systems Technology* : Further develop VLSI Application-Specific Integrated Circuit (ASIC) design process and show full integration with commercial Internet Protocol (IP) core kernels and structured software leading to full "system on a chip" capability. Initial focus will be a "radar on a chip". This technology (1) enables rapid design cycles, (2) significantly eases hardware and software upgradeability, (3) minimizes hardware and software changes as new computing systems are used, and (4) allows real time flexibility in sensor features and algorithms. These capabilities will be demonstrated in a modular testbed connected to ground and airborne sensor systems.

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(U) Military Communications: ($4.458 million)

(U) *Global Networks*: Continue to develop 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 tactical timeline product transport with 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 very high speed (~100GBps) optical systems, multi-frequency RF systems using MEMs techniques, (uses x-y addressable micro-switches to change the metal shape thereby tuning the RF components over very wide bandwidths) and protocols for high speed wireless networks, antenna designs and architectures for "comm-on-the-move" systems. Expect to have the design of a comm.-on-the-move distributed antenna system for Army vehicles.

(U) *Airborne C^2 Node*: Use the Air Force airborne C^2 testbed to test new communication, command, and control concepts for ISR and weapon targeting.

(U) *Defensive Information Warfare*: Research and development of information assurance for wireless networks will continue, focusing on the problems of node mobility, frequent node unavailability, low-bandwidth communication, and node overrun. Evaluation of next-generation sensors and correlators will continue along with testbeds to evaluate new concepts. Work the wired and wireless security issues facing net centric warfare. Near term focus will be on global ISR problems and use the C^2 testbed described above.

(U) Combat Support Technology: ($7.771 million)

(U) *Active Hyperspectral Sensing Systems*: Operational concepts will continue to be incorporated during this phase for surface surveillance and reconnaissance to be operated on various platforms such as ground vehicles (including unattended ground sensors), UAVs and aircraft. The effort will focus on selected specific applications which will lead to the prototype of compact and/or miniaturized sensing systems, adaptive and automated real-time (or near real-time) processing algorithms, as well as protocols for

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communication and product dissemination. Continue the development of active multi-and hyper-spectral sensors for remote detection of bio agents and reactants.

(U) *Biological Agent Detection Systems*: Sensor designs developed in FY2003 will be transitioned to prototype fabrication and testing, especially in applications of advanced JBPDS units and small (hand-held) units for both air and water-quality monitoring. Expect to transition some of these designs to the Joint Program Office for Bio systems. Emphasis will be on integration of sensing systems, communications, and information management for large-scale applications such as military base and urban defense (building, crowd, and port of entry defense). Forensics applications and diagnostic techniques will continue to seek to meet the military and civilian communities needs for ever smaller, faster, and cheaper sensing modalities. Will continue to work with Joint Program Office for bio defense, USAMRIID, and other government agencies and industry to transfer concepts to the field. A test bed will be used in conjunction with the Boston Emergency Management Agency and National Guard to test new homeland bio defense concepts and to better understand urban defense issues.

(U) *3D Laser Radar*: Continue the development of 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 Geiger-mode avalanche photodiode arrays with bonded timing circuitry for 3-D laser radars. Integrate these systems into small (~150cm^3) lightweight (~1kg), 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. Use unique autodyne techniques for range Doppler imaging. These systems will use the same laser transmitter for incoherent 3-D laser radar, utilizing the avalanche photodiode arrays, 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. Combine laser radar with hyperspectral techniques to achieve 4D systems. Test these systems on ground and air platforms.

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(U) Counter Terrorism Technology: ($2.500 million)

(U) The objective of this effort is to develop concepts and technologies relevant to countering terrorism. New sensing approaches to detect and identify terror weapons (e.g. chemical weapons, bio agents, high explosives) remotely will be investigated. For example, methods will be studied and developed to "tag" source materials to: (1) help locate fabrication facilities, couriers, weapons, (2) support first responders and cleanup, and (3) ease attribution. Effluent monitoring techniques using new multi- spectral and laser technologies will also be investigated. Detection of minute traces of DNA in the environment (vehicles, clothing, buildings) will be considered for terrorist tracking and source attribution.

(U) Counter terrorism requires "defense in depth" which often depends on gathering, communicating and combining, and intelligently sorting information from many disparate sources. Data fusion and decision making techniques focused on this problem will be examined and developed.

(U) Advanced Electronics Technology: ($7.500 million)

(U) Explore low-voltage CMOS/SOI analog and digital circuits for cryo-cooled focal-plane and special-purpose processing applications, including combinations with superconductive and optical devices. Apply 3-D stacking to build high-bandwidth low-power digital processors and fabricate 3-D circuit prototypes as a research foundry for the DoD design community. Demonstrate highly integrated imager with digital output in optimized low-power-consumption configuration suitable for micro-sensor use. Continue development of UV, visible, IR and hyperspectral imaging devices with on-focal-plane processing for "smart" multimode sensors. Demonstrate near-IR/electronic-shuttered 25-megapixel CCD imager for airborne reconnaissance. Demonstrate optimized super-wideband ELINT compressive receiver in airborne field test. Develop ultra-low power charge-to-digital converters for RF receivers at 250 Msps and 14 bits. Demonstrate compact and power efficient version of optically sampled A/D with 3-GHz bandwidth for radar and electronic intelligence use. Extend MEMs reconfigurable microwave circuits to high power for transmitter applications. Continue development of combined biochemical, micromechanical, electronic systems. Continue development of solid-state devices, materials and processing subsystems in support of DoD programs. Continue the investigation of revolutionary bio-electronic devices. Continue collaborations with industry to transition/insert technologies and subsystems into advanced DoD systems.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** Lincoln Laboratory **PE 0602234D8Z**

(U) B. Program Change Summary	**FY 2001**	**FY 2002**	**FY 2003**	**Total Cost**
Previous President's Budget	18.602	18.845	19.934	
Delta	1.315	3.124	1.155	
FY02 Amended President's Budget Submit	19.917	21.969	21.089	Continuing
Appropriated Value	20.102	21.969	NA	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.185	0.000	0.000	
c. Other	0.000	0.000	6.643	
Current FY 2003 Budget Submission	19.917	21.969	27.732	Continuing

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Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 and FY 2003 increases reflect programmatic adjustment to continue emphasis efforts in the areas of Bio Agent Detection Systems and Counter Terrorism Technology.

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** Medical Technology **PE 0602787D8Z**

COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		8.600	8.971	0	0	0	0	0	Continuing	Continuing
Radiation Injury Assessment and Therapeutic Approach/P505		8.600	8.971	0	0	0	0	0	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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. 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 operations for military operates in nuclear or radiological environments, while 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. [NOTE: Funds for this program will transfer to NIH beginning in FY 03.]

(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).

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(U) The Armed Forces Radiobiology Research Institute (AFRRI), because of its multidisciplinary staff and facility resources, is uniquely qualified to execute the program prescribed by its mission. AFRRI`s radiation sources allow the simulation of any radiological environment that might be encountered. AFRRI is currently the sole laboratory with the combined capabilities needed to conduct this research.

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COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		8.600	8.971	0	0	0	0	0	Continuing	Continuing
Radiation Injury Assessment and Therapeutic Approach/P505		8.600	8.971	0	0	0	0	0	Continuing	Continuing

(U) Project Number and Title: P505 Radiation Injury Assessment and Therapeutic Approach

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) In FY 2001, this program supported essential military missions through the following accomplishments: Determined that natural-killer (NK) lymphocytes are the principal immune cell type acted upon by the radioprotectant 5-androstenediol (5-AED). Demonstrated that 5-AED functions in part by activating the antimicrobial and anti-neoplastic activities of NK-cells. ($ 1.033 million)

(U) Characterized pharmacokinetic profiles of injected alpha tocopherol (vitamin E) in irradiated and non-irradiated animals. Identified an early-occurring, radiation-elicited depletion of circulating blood levels of alpha tocopherol. Characterized relationship between alpha tocopherol prophylaxis and reduced rates of programmed cell death (apotosis) within vital tissues of the body ($ 0.790 million)

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(U) Developed simplified drug delivery strategies for new radioprotective drugs and therapies. Completed initial design and testing phases of vehicles for oral and subcutaneous administration of synthetic chemical-, metabolite-, and nutritional-based radioprotectants (aminothiol, androstendiol, alpha tocopherol, and isoflavone radioprotectants). Completed initial efficacy testing of modified delivery regimens for therapeutic cytokines. ($ 1.549 million)

(U) Continued systematic survey of potential radioprotectant and therapeutic compounds under a drug screening protocol. Continued studies on the fundamental mechanisms of cellular and molecular injury, and the repair of blood-forming (hematopoietic) and gastointestinal systems to provide rational basis for improving preventive treatment strategies. ($ 1.315 million)

(U) Filed U.S. provisional patent application (60/271743) on novel cytogenetic bioassay system that does rapid analysis of radiation exposure across broad dose range. Improved sample preparation, incorporated differential chromosome staining technique, applied automated image analysis, and broadened operational dose range to enhance clinical cytogenetic bioassay system. ($ 0.845 million)

(U) Continued development of novel molecular biomarker systems that run on rugged, rapid field-based operating platforms. Continued establishing operational parameters of rapid polymerase chain reaction (PCR) technique for quantifying radiation-induced altered gene expression as dose dependent marker of exposure. Completed initial characterization of the gene expression response to neutron radiation. ($ 0.548 million)

(U) Completed assessment of anthrax vaccine in incases of combined radiation/*B.anthracis* exposure, showing that a sub-lethal dose of radiation causes 20% reduction in protective efficacy. Collected and analyzed animal model data to improve and expand the predictive value of casualty prediction models. ($ 1.019 million)

(U) Completed assessment of treatment strategies for endemic shigellosis in irradiated animals. Completed initial evaluation of therapeutic agents for combined exposure to radiation of *B. anthracis*. ($ 0.598 million)

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(U) Initiated rodent life-span study of cancer risk of embedded DU and tungsten alloys. Continued studies in cultured cells of cancer risk of heavy metal exposure. Initiated full study of effects of DU exposure on the immune system. Initiated studies of female reproductive effects of DU. ($ 0.903 million)

(U) FY 2002 Plans:

(U) In FY 2002, this program will continue to support essential military missions through the following activities: Develop and test surrogate indicators (cellular, sub-cellular, and molecular) of 5-AED drug prophylactic efficacy in preparation for IND application. Assess structural analogs of 5-AED radioprotectants for efficacy and toxicity. ($ 1.098 million)

(U) Assess, optimize, and simplify vehicles and routes of administration for candidate chemical- and nutritional-based radioprotectant drugs (amifostine, vitamin E and genistein). ($ 1.001 million)

(U) Initiate studies to determine therapeutic benefit of combining selected pretreatments (androstenediol, vitamin E, genistein, amifostine) with post-exposure cytokine treatments (IL-11, G-CSF). Initiate studies using recombinant KGF to further characterize the efficacy of natural KGF as a pretreatment for gastrointestinal injury. ($ 0.388 million)

(U) Incorporate new gene response and microsatellite genetic assays into analytical strategy for assessing efficacy of radioprotectant and therapeutic compounds under development for late-arising radiation injuries. Assess efficacy of metabolite- and nutritional-based radioprotectants in blocking radiation-induced leukemogenesis in a small animal model. ($ 0.743 million)

(U) Develop PCR-based bioassay to quantify persistent DNA mutations for diagnostic biodosimetry application. Establish performance parameters of candidate gene expression and protein biomarkers for radiation exposure in an *in vitro* model system of human lymphocytes. Continue studies to characterize radiation quality and inter-individual variation effects on candidate molecular biomarkers. ($ 0.784 million)

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(U) Improve sample preparation for premature chromosome condensation assay to allow development of automated image analysis software. Continue optimizing and extending operating range of novel molecular biomarkers for incorporation into rapid field-deployable platform. Establish reagent sets needed to test and validate molecular biomarker system. Establish analytical system for assessment of antigen-based protein biomarker. ($ 0.920 million)

(U) Initiate and complete validation of a lethal-radiation rodent model involving pathogenic translocation of gut microflora, and ascertain the genus/species spectrum of microorganisms that establish systemic infections in the model. ($ 1.550 million)

(U) Initiate efficacy studies on combined immunomodulator and antimicrobial treatments for cases of exposure to sublethal doses of radiation complicated by endemic disease threats. Initiate studies to determine effectiveness of vaccines to manage endemic disease of the gastrointestinal system after radiation exposure. ($ 0.872 million)

(U) Complete studies of female reproductive effects of DU. Continue studies of carcinogenicity and immunotoxicity of DU and tungsten alloys in cultured cells and rodents. Initiate investigation to determine if males implanted with DU or tungsten alloys transmit genetic damage to offspring. ($ 1.615 million)

(U) FY 2003 Plans: Transferred to National Institutes of Health (NIH).

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(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	8.680	8.921	9.190	Continuing
Delta	-0.080	0.050	0.000	
FY 2002 Amended President's Budget Submission	8.600	8.971	9.190	Continuing
Appropriated Value	8.680	8.971	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.080	0.000	0.000	
c. Other	0.000	0.000	-9.190	
Current FY 2003 Budget Submission	8.600	8.971	0.000	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology **PE 0602787D8Z**

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	**R-1 ITEM NOMENCLATURE** High Energy Laser Research **PE 0602890D8Z**

COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.723	35.231	39.310	42.711	46.151	49.652	53.200	Continuing	Continuing
High Energy Laser/P890	29.723	35.231	39.310	42.711	46.151	49.652	53.200	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This program element funds High Energy Laser (HEL) applied research aimed at translating fundamental scientific knowledge into proof-of-concept solutions relevant to HEL systems. HEL weapons systems have many potential advantages, including speed-of-light time-to-target, high precision, nearly unlimited magazine depth, low cost per kill, and reduced logistics requirements because of no need for stocks of munitions or warheads. As a result, HELs have the potential to perform a wide variety of military missions, including some that are impossible, or nearly so, for conventional weapons. These include interception of ballistic missiles in boost phase, defeat of high-speed, maneuvering anti-ship and anti-aircraft missiles, and the ultra-precision negation of targets in urban environments with no collateral damage. Research conducted under this program element develops the technology necessary to enable these and other HEL missions.

(U) This program element is part of an overall DOD initiative in HEL science and technology being conducted by the HEL Joint Technology Office (JTO). The goals of this HEL JTO funded research are to provide the technology to make HEL systems more effective and also to make them lighter, smaller, cheaper, and more easily supportable on the battlefield. In general, efforts funded under this program element are chosen for their potential to have major impact on multiple HEL systems and on multiple Service missions. As a result of this focus and of close coordination with the military departments and defense agencies, this program element complements other DOD HEL programs that are directed at more specific Service needs.

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(U) A broad range of technology is addressed in key areas such as chemical lasers, solid-state lasers, beam control, optics, propagation, and free-electron lasers. Research is conducted by Government laboratories, industry, and universities. The program element funds theoretical, computational, and experimental investigations. In many cases, these three types of investigations are combined under a single effort, thereby creating synergistic effects between various scientific approaches, and greatly enhancing the potential for breaking through the technology barriers that currently prevent HELs from being fielded as viable weapon systems. DOD intends to transition successful systems concepts developed under this program element into advanced technology demonstrations for particular mission needs.

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COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.723	35.231	39.310	42.711	46.151	49.652	53.200	Continuing	Continuing
High Energy Laser/P890	29.723	35.231	39.310	42.711	46.151	49.652	53.200	Continuing	Continuing

(U) Project Number and Title: P890 High Energy Laser

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) FY 2001 this program element funded 30 different competitively selected technical efforts, totaling $29.767 million, divided into the following areas:

- Solid State Lasers ($8.715 million)
- Beam Control ($7.530 million)
- Chemical Lasers ($6.300 million)
- Mission and Systems Analysis Studies and Program Management ($3.528 million)
- Novel and Innovative Technologies ($2.050 million)
- Lethality ($1.350 million)
- Free Electron Lasers ($0.250 million)

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(U) Solid-state lasers have potential as future HEL weapon laser devices because they require only electrical energy in order to run, thereby greatly simplifying systems engineering and supportability. These devices have the potential to eliminate the need for munitions resupply on the battlefield in key mission areas such as tactical strike and air defense. Solid-state-laser technology development emphasizes combining fiber-laser modules, scaling up power in diode-pumped lasers, and testing new systems concepts. Results of these activities are key to developing solid-state lasers with weapons-class power levels. Examples of FY 2001 solid-state-laser technology-development activities include the following:

- Developing 1 kilowatt-class fiber-laser amplifiers and designing and experimentally testing methods for coherently phasing groups of fiber-laser amplifiers to increase total output power to the 10 to 100 kilowatts level
- Developing new high-power, high-reliability diode-pumped laser power supplies for fiber lasers and amplifiers, to withstand the thermal and material stresses of sustained high-power operation at powers in excess of 1 kilowatt, thereby providing a cornerstone for the development of future lighter, more lethal, more affordable, and more supportable solid-state-laser HEL weapon systems
- Developing, fabricating, and demonstrating a design for a thin-disk (as opposed to bar-like) solid-state laser at a 300 to 500 Watt power level, as a step toward the future development of 8 kilowatt disk-based laser devices, thereby potentially easing thermal-management problems on future high-power solid-state lasers
- Developing, fabricating, and demonstrating amplifiers and correcting mirrors as a means of mitigating the thermal distortions on 300 Watt average power/5 kilowatt peak power solid state lasers, thereby taking an initial step towards scaling the technology to 100 kilowatt and enabling extremely high-power solid-state lasers

(U) Beam-control technology development centers on those technologies directly applicable to surface, air, and space mission areas, as well as development of supporting technologies. Results of these activities will be transitioned to near-term HEL systems and will also serve to enhance the HEL-related technology base and industrial capability. Examples of FY 2001 beam-control technology development activities include the following:

- Developing high-power coatings and substrates, thus reducing the weight and increasing the affordability of HEL subsystems
- Conducting ground-to-space compensated laser beam propagation from a weapons-class aperture (e.g., several meters), thereby demonstrating key Ground Based Laser technologies for future space and missile-defense applications
- Developing advanced adaptive-optics component-level and subsystem-level technologies and control methodologies, thereby contributing to increasing the effective range of future HEL weapons

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE High Energy Laser Research **PE 0602890D8Z**

- Designing, fabricating, and testing novel concepts for adaptive optics, which promise to greatly decrease complexity and weight and increase affordability while still allowing HEL weapons to compensate for atmospheric turbulence
- Designing and fabricating new optical wavefront sensing devices that operate even in conditions of extremely high turbulence, thereby allowing beam-control subsystems to operate effectively even at low altitudes (e.g., for tactical laser systems)

(U) Chemical-laser technology efforts concentrate on developing improved predictive and design capabilities, new chemical-laser concepts, and higher performance and more supportable chemical-laser technologies. Despite the fact that chemical lasers are the most mature of the HEL laser device technologies, further technology development has the potential to greatly enhance their viability as weapon systems. Results of these activities will result in chemical lasers that are lighter and more affordable. Examples of FY 2001 chemical-laser technology-development activities include the following:

- Developing more sophisticated computational models for accurate performance prediction, thereby greatly improving design capabilities for future Hydrogen Fluoride/Deuterium Fluoride (HF/DF) and Chemical Oxygen Iodine (COIL) chemical lasers, particularly in the critical area of mixing nozzle design
- Designing, testing, and fabricating advanced mixing nozzles on HF/DF laser devices, thereby improving performance, reducing weight, and increasing effective magazine size on future space-based and ground-based HEL weapon systems
- Installing and testing a 20 kilowatt closed-cycle (sealed exhaust) COIL device as a means of assessing closed cycle COIL performance and supporting design of future closed-cycle chemical lasers, thereby offering the potential for chemical lasers that can reuse their chemical supplies, which greatly improves their supportability
- Designing, fabricating, and testing a novel means of delivering iodine chemicals to a COIL laser system in a way that eliminates the need for complex chemical tanks, thereby reducing weight and increasing reliability of future airborne chemical-laser-based HEL weapon systems, as well as simplifying iodine-associated logistics requirements

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(U) This program element funds two detailed studies that examine potential military missions for which HELs present unique solutions because of their inherent characteristics (i.e., speed-of-light, possibility of graduated effects, precise target selectability, nearly unlimited magazine size, reduced logistics requirements, etc.) as compared to today's conventional weapons. These studies are being used to focus the investment strategy for technology development. Additional activities of a programmatic nature that are funded by this program element include the operation of the Joint Technology Office (JTO), moving the JTO to Albuquerque, New Mexico, and funding several workshops designed to bring together experts for exchanges of ideas and gathering input for investment strategy development.

(U) Novel and innovative efforts are aimed at cross-cutting and revolutionary topics. Examples of FY 2001 novel and innovative efforts include the following:

- Developing and testing laser thermal-management concepts using a new two-phase, mist-cooling technique, which promises to greatly increase capabilities for removing waste heat from laser systems, thereby removing a technology barrier to extremely high-power lasers
- Developing the theory behind gamma-ray lasers, which could potentially offer different means of damaging targets using non-optical (i.e., gamma-ray) beams of energy generated via nuclear excitation as opposed to electronic excitation, which is the traditional method for creating laser light
- Providing support to the educational community for the specific purpose of sponsoring HEL-related science fairs, funding undergraduate and graduate programs in HELs, and including HEL topics in high-school and college curricular, thereby building the future HEL workforce

(U) Lethality technology development concentrates on developing a strong scientifically based understanding of laser kill mechanisms so that HEL systems can to optimized to produce the maximum kill probability for the minimum system size and cost. Examples of FY 2001 Lethality activities include the following:

- Developing theory and conducting experiments to improve the capability to model the interaction between extremely short laser pulses and various classes of electronic and structural materials, thereby enhancing lethality and damage assessment and countermeasures of targets when struck by HEL pulses

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- Developing and validating a three-dimensional, time-dependent, particle-based computer code that will more accurately predict damage levels at much lower computational costs, thereby ultimately reducing the cost of HEL systems design

(U) Free electron laser (FEL) development concentrates on building the FEL technology base with the overall objective of making the FELs more lethal, smaller, and lighter. Specifically, the FY 2001 FEL activities included the following:

- Designing and testing new technology for using permanent magnets on FELs, which simplify FEL design and increase affordability because permanent magnets eliminate the need for costly electromagnets

(U) FY 2002 Plans:

(U) Pursuant to Congressional direction the DOD is developing a comprehensive, prioritized investment plan for HEL science and technology. This investment plan is being developed by the HEL JTO, in coordination with the military departments and the defense agencies. The plan, which was completed by the beginning of FY 2002, will form the basis for the expanded work to be conducted under this program element in FY 2002 and beyond. Although the plan is not yet completed, the broad outlines of plan are becoming clear. Work will be conducted in solid-state lasers, free-electron lasers, chemical lasers, lethality, atmospheric propagation and compensation, lightweight deployable optics, beam control, chemical lasers, optical components, and modeling and simulation.

(U) Solid-state-laser work will focus on phasing of fiber lasers, the design and manufacture of reliable diode lasers as pump sources, and the thermal control of laser media.

(U) Free-electron-laser (FEL) work will focus on technologies to scale to high power and technologies to permit FELs to be fielded on military platforms.

(U) Chemical-laser research will include efforts to develop COIL lasers appropriate for space-based and tactical applications.

(U) Lethality work will develop a firm scientific understanding of the relative advantages of repetitively pulsed and continuous-wave lasers for defeating different targets of interest.

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(U) Atmospheric propagation and compensation will concentrate on understanding atmospheric limitations in low-altitude tactical scenarios and on developing advanced adaptive-optics technology to increase lethal range in these scenarios.

(U) A new effort will be initiated in lightweight, high-power deployable optics to reduce system weight while increasing laser intensity on target for space-based and other HEL systems.

(U) Beam-control efforts will focus on developing novel techniques, such as phased-array beam control and electronic beam steering, to reduce system size and weight and enable new system configurations (e.g., a conformal configuration on an aircraft).

(U) Advanced components—detectors for tracking systems, high-power coatings, optical substrates, wavefront sensors, deformable mirrors—will be developed to improve HEL system performance and to help protect and enhance the fragile manufacturing base in this critical area.

(U) Modeling and simulation efforts will be increased with the goal of providing a fully realistic model of end-to-end system performance, from birth of photons in the laser to their death at the target, thereby improving the design of HEL systems and reducing the need for expensive field testing.

(U) It is expected that many of the 30 projects begun in FY 2001 will continue in FY 2002, as will mission-analyze efforts. Continuation a project will be contingent on the project's success in FY 2001 and on its relevance to the goals of the investment strategy.

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(U) FY 2003 Plans:

(U) This program element will execute applied research under a comprehensive, prioritized investment plan for HEL science and technology. This investment plan was developed by the HEL JTO, in coordination with the military departments and the defense agencies. The plan, which was completed and approved by the end of FY2001, forms the basis for the expanded work to be conducted under this program element in FY 2002 and beyond. Work will be conducted in solid-state lasers, free-electron lasers, chemical lasers, lethality, atmospheric characterization, advanced optics, beam control for tactical scenarios, beam control components, and modeling and simulation. The investment strategy will continue to be refined, and the results of earlier mission-systems-technology studies will be considered for inclusion in this ongoing refinement process. Major, but not necessarily exclusive, emphasis will be placed on the tactical mission-type scenarios and applications in which HELs can contribute. Some efforts will also be directed at critical technologies that contribute to meeting the needs of strategic mission-type scenarios and applications. The major technology areas are:

(U) Beam Control Component Technology will be developed to improve HEL system performance and to help protect and enhance the fragile manufacturing base in this critical area. Specific objectives include: (1) developing windows, coatings, aperture-sharing elements, deformable mirrors, wavefront sensors, etc., (2) developing sensitive, low-noise focal plane arrays of appropriate sizes and operating at appropriate wavelengths for wavefront sensors and trackers, and (3) nurturing and enhancing the design, manufacturing, and testing base for beam-control components.

(U) Atmospheric Characterization for Tactical Scenarios will continue concentrating on understanding atmospheric limitations in low-altitude tactical scenarios. The payoff will be increased lethal range in these optically stressing scenarios. Specific objectives include: (1) making precise absorption measurements at HEL weapon-relevant wavelengths, (2) measuring and assimilating information on turbulence, aerosol scattering, and other optical effects in environments relevant to tactical HEL systems, and (3) developing real-time characterization tools to assist with HEL weapon system mission planning and operational employment.

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(U) Tactical Beam Control technology development efforts will seek to provide critical technology options for use in tactical scenarios on tactical platforms such as aircraft, ground vehicles, and maritime platforms, thus enabling the advantages of HELs to be applied in a wide variety of military operations. The expected payoffs from these efforts are validated beam control techniques to enable a whole new class of Army, Navy, Air Force, and Marine Corps tactical HEL systems. Specific objectives include (1) developing techniques for pointing and tracking in cluttered tactical backgrounds, (2) developing thermal blooming and turbulence compensation in tactical scenarios, and (3) demonstrating beam control on appropriate tactical platforms.

(U) Advanced Optics technology development will seek to extend the state-of-the-art in lighter weight, nonconventional approaches to adaptive optics systems. The potential payoffs are large reductions in overall HEL system weight and significant improvement in the ability to correct for stressing atmospheric aberrations, particularly for space-related applications. Specific objectives include (1) developing large, lightweight deployable optics and (2) developing practical nonlinear or other nontraditional adaptive optics.

(U) Solid-state-laser work will focus on developing technologies needed to make solid-state-lasers of high enough power, reliability, and affordability to make them viable candidates for HEL weapons applications. This work may also include, as a stepping stone, the development of moderately powered (i.e., 10-20 kiloWatts) illuminator laser technologies. The anticipated payoff for this work is the demonstration of the scalability of solid-state-lasers to weapons-class power levels. Specific objectives include (1) developing reliable, low-cost diodes for pumping lasers, (2) developing techniques for combining the output beams of laser modules, and (3) developing thermal-management techniques adequate for continuous wave or high-duty-cycle solid-state-lasers.

(U) Chemical-laser research will include efforts to develop and demonstrate closed-cycle chemical lasers, especially COIL-derived lasers, appropriate for space-based and tactical applications. The anticipated payoffs are tactically-suited chemical lasers of high power that are supportable on the battlefield. Specific objectives include (1) optimizing performance of chemical feed systems, mixing nozzles, exhausts, and other components, (2) developing and testing new processes and chemistries for running chemical lasers using a closed as opposed to open architecture, and (3) developing means of regenerating chemical laser fuels so they can be reused.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE High Energy Laser Research **PE 0602890D8Z**

(U) Free-electron-laser (FEL) work will focus on technologies to scale to high power and technologies to permit FELs to be fielded on military platforms. The expected payoff is the demonstration of critical FEL technology to support a Navy decision to proceed with weapon-class FEL development for shipboard demonstration. Specific objectives include (1) developing high-current photo-injectors, (2) developing new, high-efficiency wigglers, and (3) designing advanced resonators, to include optics and coatings, for high-energy FELs.

(U) Lethality work will develop a firm, physics-based understanding of the mechanisms involved in the interaction between HEL beams and the targets they strike. The expected payoffs from these efforts are databases accepted by the HEL community and validated models that are available to systems designers. Specific objectives are (1) developing and validating physics-based models, and (2) understanding and being able to apply the differences between continous wave lasers and pulsed lasers.

(U) Modeling and simulation efforts will continue to be increased with the goal of providing a fully realistic model of end-to-end system performance, from birth of photons in the laser to their death at the target, thereby improving the design of HEL systems and reducing the need for expensive field testing. Specific objectives include improving the HEL community's ability to simulate and model (1) individual HEL components, (2) HEL subsystems, (3) end-to-end HEL performance, and (4) HEL technology utility.

(U) It is expected that some of the projects begun in FY 2002 will continue in FY 2003. Continuation of a project will be contingent on the project's success in FY 2002 and on its relevance to the goals of the investment strategy.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE High Energy Laser Research **PE 0602890D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	0.000	0.000	0.945	Continuing
Delta	29.767	36.005	0.000	Continuing
FY 2002 Amended President's Budget Submission	29.767	36.005	0.945	Continuing
Appropriated Value	30.000	36.005	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.774	0.000	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.277	0.000	0.000	Continuing
c. Other	0.000	0.000	38.365	Continuing
Current FY 2003 Budget Submission	29.723	35.231	39.310	Continuing

Change Summary Explanation:

(U) Funding: PE 06020890D8Z was established to address the imbalance in enabling science and technology and large demonstration programs for high-energy laser technology. FY 2001 reductions reflect Section 8086 adjustments. FY 2003 increases reflect a continued commitment by DoD in HEL Science & Technology.

(U) Schedule:

(U) Technical:

(U) C. Other Program Funding Summary Cost:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE High Energy Laser Research **PE 0602890D8Z**

(U) D. Acquisition Strategy:

(U) E. Schedule Profile:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Medical Advanced Technology Program **PE 0603002D8Z**

COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		2.025	2.066	0	0	0	0	0	Continuing	Continuing
Risk Assessment and Biamedical Applications/P506		2.025	2.066	0	0	0	0	0	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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: (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. [NOTE: Funds for this program will transfer to NIH beginning in FY 03.]

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Medical Advanced Technology Program **PE 0603002D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		2.025	2.066	0	0	0	0	0	Continuing	Continuing
Risk Assessment and Biomedical Applications/P506		2.025	2.066	0	0	0	0	0	Continuing	Continuing

(U) Project Number and Title: P506 Risk Assessment and Biomedical Applications

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) In FY 2001, this program supported essential military missions through the following accomplishments: Demonstrated in a large animal (canine) model that the radioprotectant, 5-androstenediol, is well tolerated when administered subcutaneously in single injected doses at concentrations at or below 20 mg/kg of body weight. Completed preliminary pharmacokinetic and hematological profiles in canines that suggest a broad time window (~24 hrs) of radioprotection can be achieved by subcutaneous administration of 5-androstenediol. ($ 0.248 million)

(U) Completed study in a large animal (canine) model designed to reduce the toxicity (nausea) of aminothiol prophylaxis by supplemental anti-emetic treatment. ($ 0.080 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**

(U) Completed pilot study in a large animal (canine) model demonstrating that enhanced production and mobilization of blood granulocytes and platelets following a combined treatment regimen with two recombinant growth factors, interleukin 11 (IL-11) and granulocyte colony stimulating factor (G-CSF), correlates with the synergistic survival response to lethal doses of radiation seen in earlier studies of combined cytokine therapy. ($ 0.401 million)

(U) Continued *in vivo* validation of the newly patented premature chromosome condensation assay in radiation therapy patients to quantify dose-dependent chromosome aberration responses in cases of partial body exposures. Added to validation database by participating in an international scientific collaboration to study patient samples from a serious Feb 2000 radiation accident in Thailand. ($ 0.288 million)

(U) Continued optimizating single analytical platform for a field-based biodosimetry system, including development of sample preparation protocols and protocols to allow measurement of multiple gene-expression biomarkers. Using an *in vivo* mouse model, began characterizing dose-dependent elevations of gene expression at the mRNA and protein levels that had earlier been demonstrated *in vitro*. ($ 0.058 million)

(U) Distributed pre-beta version of the Biodosimetry Assessment Tool (BAT) software program for radiation casualty management to selected laboratories and clinical centers for review and comment. Field-tested two small-footprint blood cell counters for use by deployed military laboratories to quantify radiation exposure based on measuring changing lymphocyte counts in serial blood samples. ($ 0.039 million)

(U) Completed assessment of aberrations in *B. anthracis* vaccine efficacy as a consequence of exposure to ionizing radiation. Initiated efforts to incorporate performance-degrading consequences from combined radiation/BW agent exposures into the CATS casualty prediction models. ($ 0.547 million) Initiated study to increase sensitivity of mass spectrometric detection of DU in biological samples.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**

(U) Initiated *in vivo* cancer and immunotoxicity studies with embedded DU and tungsten alloys. Submitted patent for a rapid, simple DU fragment identification method and generated protocol for application centers to assess the analytical procedure as a potentially fieldable methodology. Initiated study to increase sensitivity of mass spectrometric detection of DU in biological samples. DU research results used to reassess exposure guidelines. ($ 0.364 million)

(U) FY 2002 Plans:

(U) In FY 2002, this program will continue to support essential military missions through the following activities: Complete pharmacokinetic, toxicity, and efficacy assessment of 5-androstenediol as an injectable radioprotectant using a canine animal model. ($ 0.323 million)

(U) Initiate toxicity and pharmacokinetic assessments of trans-oral-mucosal rout of delivery of 5-androstenediol in both small and large animal models. ($ 0.203 million)

(U) Initiate efficacy studies of the therapeutic cytokine combination, IL-11 plus G-CSF, in the canine animal model. ($ 0.225 million)

(U) Continue validation testing of the premature chromosome condensation assay using samples from radiotherapy patients, and initiate complementary study in a murine model to develop complete data set for whole-body and partial-body exposures to full spectrum of radiation qualities, doses and dose rates. Determine marker persistency for this assay relative to time post-irradiation. Determine specificity of candidate gene expression and protein biomarkers for radiation-induced alterations relative to other battlefield toxicants of military relevance known or expected to have genotoxic effects. Develop internal reference and external calibration standards for relative and absolute quantification of gene expression and protein biomarkers. Update BAT software application to include new data (onset of vomiting, lymphocyte depletion) based on criticality accidents and distribute beta test version of software to customers. ($ 0.220 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**

(U) Continue validation of multi-biomarker field biodosimetry system for radiation dose assessment. Initiate murine studies to begin assessing *in vivo* performance of molecular biomarker sets satisfactory *in vitro* performance. ($ 0.052 million)

(U) Begin studies to automate sample processing and to enhance chromosome separation on metaphase spreads, in order to facilitate development of a fully automated lymphocyte metaphase dicentric assay system with high sample throughput capability for managing mass casualty situations through biological dose assessment of the radiation injured. Incorporate functional parameters into the assay system that will meet or exceed International Standards Organization (ISO) guidelines. ($0.125 million)

(U) Initiate study to develop new medical countermeasures against endogenous pathogens that lead to death by sepsis. Initiate studies to evaluate genistein as a biological response modifier to enhance recovery from infection following low-dose radiation. ($ 0.543 million)

(U) Continue *in vivo* cancer and immunotoxicity studies with embedded DU and tungsten alloys. Initiate investigation to determine if males implanted with DU or tungsten alloys transmit genetic damage to offspring. Initiate tests of new analytical separation techniques to improve sensitivity of methodologies for the rapid detection of DU in urine. Finalize protocols to increase sensitivity of mass spectrometric detection of DU in biological samples. Continue data input for reassessment of DU exposure guidelines. ($ 0.375 million)

(U) FY 2003 Plans: Transferred to National Institutes of Health (NIH).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	2.043	2.075	2.129	Continuing
Delta	-0.018	0.011	0.000	
FY 2002 Amended President's Budget Submission	2.025	2.086	2.129	Continuing
Appropriated Value	2.043	2.086	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.018	0.000	0.000	
c. Other	0.000	0.000	-2.129	
Current FY 2003 Budget Submission	2.025	2.086	0.000	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2003 increases support the product transition and clinical trials that are required for eventual approval by the FDA.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program **PE 0603002D8Z**

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology **PE 0603104D8Z**			
COST *(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		29.886	16.925	8.935	9.502	10.031	10.215	10.409	Continuing	Continuing
JDTP/P486		29.886	16.925	8.935	9.502	10.031	10.215	10.409	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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 treatment and seeks 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 1,450,000 tons to flow through the stockpile by 2006. This is funded under Advanced Technology Development based upon its supports to the development and exploration of new munitions concepts and technology preceding system engineering development.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology **PE 0603104D8Z**

(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 through the leadership of the Joint Ordnance Commanders Demilitarization 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 Program, and complementary Service 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 program. The program supports an annual Global Demilitarization Symposium, which focuses on technology transfer opportunities and the technical review 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 1998-Department of Defense Joint Demilitarization Technology Program (March 1999) and the FY 1999-Department of Defense Joint Demilitarization Technology Program (February 2000).

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COST*(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		29.886	16.925	8.935	9.502	10.031	10.215	10.409	Continuing	Continuing
JDTP/P486		29.886	16.925	8.935	9.502	10.031	10.215	10.409	Continuing	Continuing

(U) Project Number and Title: P486 JDTP

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) The Test Site Demonstration Program continued to focus on demonstrating improved field detonation operations. Open detonation events data gathered from previous experiments were analyzed. Open detonation demonstration events were accomplished along with advanced instrumentation and diagnostics demonstration. Modification to the contained burn chamber for tactical missiles continued. Advanced molten salt oxidation technology prototype was installed with demonstration/validation initiated. ($ 4.136 million)

(U) Advanced removal/conversion efforts continued. Explosive D conversion to picric acid in a 500 pound per day pilot facility was initiated. Demonstration of a 2,000 pound per batch transportable modular unit to convert single based propellant to fertilizer was successfully completed. Completed design for a 500 pound per day prototype system to recover RDX from Comp A-3. ($ 1.100 million)

(U) Improved liquid ammonia reduction pilot process was designed for tactical missiles.($ 3.000 million)

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(U) Advanced cutting technology continued with the femto second laser demonstrated for cutting metal and explosives. Flexible work cell with waterjet cutting capability for 60mm mortars was completed. Dexterous manipulation involving force control integrated with vision technology was demonstrated. Work was initiated to adapt the work cell to process other munitions such as the 155mm M483, M692 and M731 ADAM ICMs. ($ 1.900 million)

(U) Near IR unit and thin layer chromatography kit for propellant stabilizer analysis were reconfigured and tested for improved field use. Near IR spectrometer was developed to analyze explosives in the field as well as propellant. ($ 4.650 million)

(U) A fixed contained detonation chamber was designed, installed and initial demonstrations were conducted. Advanced fixed contained detonation chamber capable of increased through put was initiated. Design for a transportable contained detonation chamber was initiated. ($7.000 million)

(U) Fabrication and assemblage of equipment and pads, erection of components and prove-out of hydrothermal oxidation system was completed. Initial demonstration/validation of prototype system was initiated. ($3.000 million)

(U) Modified hot gas decontamination prototype system design for system optimization was completed. Initiated procurement of system for installation at Hawthorne Army Depot was completed. Fabrication and assembly of equipment and pad, erection of components and initial prove-out was initiated. ($1.500 million)

(U) Demonstration and validation of HMX recovery pilot facility was successfully completed for processing LX-14. Initiated characterizaton and requalfication of recovered HMX for use in military applications. ($1.500 million)

(U) Process development for application of the Adams Process to destruction of energetic material was initiated. ($0.600 million)

(U) Developed methodology using cost as an independent variable to manage program risk, safety risk and risk from external threats. Initiated efforts to establish a chemical release database for munitions demilitarization operations. ($1.500 million)

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(U) FY 2002 Plans:

(U) The Test Site Demonstration Program will continue to focus on demonstrating improved field detonation operations. Open detonation demonstration events will be designed and implemented based on data gathered from previous experiments. Noise and emission mitigation techniques, stand off monitoring techniques and technologies will be investigated. Testing and modification for tactical missiles for the contained burn chamber will continue. Advanced molten salt oxidation technology will be demonstrated/validated. Joint program integration will continue.($ 5.065 million)

(U) Advanced removal/conversion efforts will continue. Explosive D conversion to picric acid in a 500 pound per day pilot facility will be completed. System and process optimization for the 2,000 pound per batch transportable modular unit to convert double and triple based propellant to fertilizer will be completed. Fabrication, assembly and demonstration of a 500 lb per day prototype system to recover RDX from Comp A3 will be completed. Process development will begin on inductively coupled plasma conversion process.($ 1.000 million)

(U) Fabrication and assembly of equipment and erection of components will be initiated for the improved liquid ammonia reduction pilot process for tactical missiles. ($ 0.750 million)

(U)) Advanced water jet and laser cutting technology will be integrated into the flexible work cell. Dexterous manipulation involving force control integration with vision technology will continue to be optimized. Work will continue to adapt the work cell to process 155mm improved conventional munitions.($ 1.750 million)

(U) Continue analytical tools development for optimizing recovered items and demilitarization process for munitions. These tools will focus on explosive and propellant recovery.($ 1.550 million)

(U) Demonstration/validation of prototype hydrothermal oxidation system. ($0.510 million)

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(U) Complete fabrication and assembly of hot gas decontamination equipment and pad, erection of components and begin demonstration/validation of system. ($1.400 million)

(U) Complete characterizaton and requalfication of recovered HMX for use in military applications. Initiate design of prototype equipment for HMX recovery. ($1.400 million)

(U) Investigate the use of photocatalysis to assist in the destruction of explosives ($1.500 million)

(U) Demonstrate enhanced rotary furnace technology and resource recovery for conventional munitions. ($2.000 million)

(U) FY 2003 Plans:

(U) The Test Site Demonstration Program will continue to focus on demonstrating improved field detonation operations. Open detonation demonstration events will be designed and implemented based on data gathered from previous experiments. Optimization of process efficiencies and minimization of emissions will be initiated. Testing and modification for tactical missiles for the contained burn chamber will continue. Joint program integration will continue. ($4.285 million)

(U) Advanced removal/conversion efforts will continue. Microwave removal/conversion technology will be explored. Design for the inductively coupled plasma conversion pilot process will be initiated. Advanced biodegradation of demilitarization process wastewater from waterjet cutting and autoclaves will be initiated. ($1.000 million)

(U) Advanced cutting technology development using waterjets and lasers will continue. Automated munitions disassembly capabilities focused on anti-armor/anti-personnel mines from ICMs and CBUs will continue. Integration of automated munitions disassembly with advanced cryofracture technology will be initiated. ($1.650 million)

(U) Complete fabrication, assembly and installation of equipment for improved liquid ammonia reduction pilot plant process for tactical missiles. ($1.500 million)

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(U) Expanded analytical tools for explosive and propellant evaluation will continue to be optimized for recovered items. ($0.500 million)

(U) B. Program Change Summary	FY2001	FY2002	FY 2003	Total Cost
President's FY2001 Budget Submit	8.964	9.265	10.167	
Delta	20.922	-0.450	0.000	
FY02 Amended President's Budget Submit	29.886	8.815	10.167	Continuing
Appropriated Value	30.164	17.015	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.090	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.278	0.000	0.000	
c. Other	0.000	0.000	-1.232	
Current President's Budget	29.886	16.925	8.935	Continuing

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Change Summary Explanation:

(U) **Funding:** FY 2001 reductions reflect Section 8086 adjustments. Fy 2003 reductions were due to programmatic budget decisions.

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

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

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

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

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

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COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.543	14.509	13.800	9.484	10.013	10.197	10.390	Continuing	Continuing
Explosive Ordnance Disposal/Low Intensity Conflict/P206	7.317	7.486	7.801	8.115	8.567	8.725	8.890	Continuing	Continuing
Special Operations/Low Intensity Conflict (SO/LIC)/P205	1.226	1.313	1.317	1.369	1.446	1.472	1.500	Continuing	Continuing
Special Reconnaissance Capabilities (SRC)/ P207 (See note below)		5.710*	4.682					Continuing	Continuing
DERF			9.000	7.000	7.000	7.000	7.000		

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC program provides advanced technology and equipment solutions to the needs military EOD operators as they face 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 conventional ordnance and improvised explosive threats including weapons of mass destruction. Requirements submitted by the Joint Service EOD community and other EOD-oriented military users are prioritized by the EOD/LIC Coordination Group.

* The R1 reflects this program transferring from USSOCOM to ASD SO/LIC starting in FY 2002. The program will not transfer until FY 2003.

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(U) 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 that war. This 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.

(U) P207, Special Reconnaissance Capabilities (SRC). The SRC program identifies, evaluates, integrates and demonstrates technologies to enhance DoD Special Reconnaissance mission applications. It addresses requirements essential to provide actionable intelligence against high-value, denied area targets. Supporting technologies include the application of unattended ground sensors, tagging, tracking and locating, communications, power management, command, control and networking of sensors, mobility and delivery of sensors and situational awareness interfaces. The SRC program supports multiple requirements and addresses historical special reconnaissance deficiencies.

Note: Beginning FY 2003, the SRC program will be transferred to PE 0603121D8Z. DoD had planned to execute the transfer in FY 2002 but could not accomplish the transfer prior to the budget submission. All FY 2002 funds will be executed as appropriated.

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COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.543	14.509	13.800	9.484	10.013	10.197	10.390	Continuing	Continuing
Explosive Ordnance Disposal/Low Intensity Conflict/P206	7.317	7.486	7.801	8.115	8.567	8.725	8.890	Continuing	Continuing

(U) Project Number and Title: P206 Explosive Ordnance Disposal/Low Intensity Conflict

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Completed development of an advanced EOD explosive storage system. This system consists of two magazines that will safely store 256 lbs. net explosive weight of EOD tools and equipment. One system was delivered to Al Dhafra AFB, United Arab Emirates in June 2001. The USAF plans to procure 10 additional systems.

(U) Completed improvements to the unmanned surface vehicle developed under the EOD/LIC program. The focus areas of this effort were to improve vehicle reliability and maintainability, improve data links, ruggedize and reduce in size the command and control system and improve situational awareness capabilities.

(U) Completed development of a maritime ballistic armor system for the Coastal Assault Craft (CAC) and provide data for input into the Special Operations Craft - Riverine (SOC-R) operational requirement. The armor system provides ballistic protection to the passengers, crew and critical systems of the craft. One complete armor package has been installed on a Naval Special Warfare Development Group CAC and delivered for acceptance testing.

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(U) Completed a SO/LIC EOD Study to evaluate the lessons learned by EOD teams from each of the NATO countries participating in Kosovo peacekeeping operations. Copies of the report have been delivered to all participating countries.

(U) Completed task to identify the optimum COTS/GOTS remote chemical and nuclear (CN) sensors for integration onto EOD robotic platforms. The sensors identified were the ADM 300 for alpha, beta and gamma detection and the HAZMATCAD for chemical detection. The sensors are able to identify and quantify CN threats and are easily integrated onto host robotic platforms.

(U) Completed development of an EOD Tactical Decision Aid (TDA). The TDA is a software based information tool that supports EOD field analysis. The TDA includes: time fuse burn calculations, standard mathematical calculations and unit conversions, blast/frag distance and blast overpressure effects calculations, nuclear weapon stay times, safe swimmer distance from explosions calculations and a time zone conversion tool. The TDA was distributed to EOD units worldwide and will be integrated into the next generation automated EOD publication system in FY 2002.

(U) Completed development of an EOD incident site C3I system that allows seamless audio, video, and data transfer between the two sites via digital RF link. The system is HERO safe, modular, man-portable and wireless. Two complete systems were delivered to JSEOD.

(U) Continued development of a system for limpet mine detection. The Limpet Mine Imaging System (LIMIS) is a diver-held or submersible mounted acoustic lens sonar that provides photographic quality images in turbid water. It was developed to detect and identify limpet mines on ship hulls. It is also used to identify bottom mines and other objects where optical systems fail.

(U) Continued development of an integrated diver display mask. This device consists of an in-mask liquid crystal diver display that provides the diver with depth, dive time and tank pressure via wireless underwater RF link.

(U) Continued development of an improved underwater demolition charge to counter threats in the very shallow water mine countermeasure (VSW/MCM) area of responsibility. The system will allow a diver to carry multiple charges and will interface with existing and emerging firing devices.

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(U) Continued development of a small, easy to use limpet mine neutralization tool that will interface with existing and emerging firing devices. This task is scheduled to transition into a product improvement program to upgrade and eventually replace current U.S. Navy EOD limpet render safe tools.

(U) Continued the development of an EOD laser ordnance neutralization system to demonstrate the use of high-powered diode-pumped lasers to neutralize unexploded ordnance (UXO). This project focuses on neutralizing small UXO on active target ranges. Specific areas being studied include cost benefits, neutralization efficiency, and environmental impact.

(U) Continued development of a field disassembly system based on hydro-abrasive water cutting technology that will allow EOD technicians to cut open UXO remotely. The system's use will be expanded and integrated with the USAF robotic All-purpose Remote Transport System.

(U) Continued development of a hull acoustic navigation system for diver's search that will assist EOD divers to ensure thorough hull searches are performed. The system will be man-portable, accurate to within 1-meter and provide real-time location of divers and contacts in the water column and on a ship's hull.

(U) Continued development of a low-cost and highly portable EOD miniature reconnaissance vehicle (MRV) based on COTS equipment. Potential applications of the vehicle include use as a remote observation post, linking on-site operators to a remote command center, and acting as a mobile platform for auxiliary sensors such as chemical and nuclear alarms with the addition of a disruptor capability.

(U) Continued development of an EOD underwater search remotely operated vehicle (ROV). The task focuses on the use of COTS systems that have the potential to provide Navy EOD teams with a small (i.e. 2-person portable or smaller) ROV/sensor package for employment from rigid hull inflatable boats (RHIB) or similar small craft of opportunity to reacquire, investigate and identify previously reported mine-like contacts in the water column and on the seabed.

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(U) Continued development of a SOF Tactical Decision Aid (TDA). The TDA is a software based information tool that supports SOF target analysis operations.

(U) Continued development of an incident site reconnaissance (ISR) system. This project will provide EOD technicians with a field capability to gather digital imagery, GPS coordinates and laser range finder information with the ability to relay that data to a rear area commander. This system will automate the reconnaissance of an area of interest and provide a communications link by which to relay that information. The data will be transmitted over an RF link to a computer containing an appropriate software package to allow for the overlay of data onto a digital map. COTS technology will be used to the greatest extent possible.

(U) Continued development of an RF-controlled digital x-ray imaging system. This effort will modify the existing RTR-4 X-ray system used by Joint Service EOD to increase the effective image transfer range from 300 feet to over one (1) mile and through walls via the use of a digital RF link. The system will be configured such that operation can be controlled from the command post of the EOD incident site.

(U) Continued development of a chemical leak seal system. This system will be used to stop chemical or biological agent leakage from damaged munitions. The system will have minimal set up time, will seal a variety of ordnance types, holes and hole sizes, will utilize COTS materials to the greatest extent possible and will be packaged in a kit to allow for rapid field deployment and ease of use. The system will be an alternative to existing Plaster-of-Paris procedures outlined in EOD publications.

(U) Continued development of a miniature diver display system that will provide full color, high-resolution imagery to the diver. The system will employ miniature, lightweight optics that will provide a clear, fixed focus, magnified image. The diver will control the image brightness so that the display can be optimized for daytime, or nighttime use.

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(U) Started the integration of sub-system components onto the robotic miniature reconnaissance vehicle (MRV) developed under a previous EOD/LIC task. This task will integrate the chemical and nuclear sensors also identified under a previous EOD/LIC effort, provide the MRV with an EOD disruption tool capability and incorporate a digital communications and control suite onto the MRV.

(U) Started development of a single sided x-ray system. This task will explore and develop backscatter x-ray technologies that will give the EOD technician the capability to X-Ray an object without the necessity to move or place a film cassette or imager behind the object of interest

(U) Started development to expand the capabilities of the EOD Information System (EODIS) Advanced EOD Publications System (AEODPS). This effort will convert preprocessed legacy information from text fields in the corporate database into discreet data elements, validating that information and proving the ability to reassemble the information properly to the user in the form of the existing AEODPS product.

(U) Started development of an EOD large package X-ray apparatus. It is anticipated that the system shall incorporate a grid arrangement of fifteen 8" X 10" X-ray film cassettes to provide the user with a large mosaic image.

(U) Started development of an unmanned reconnaissance and observation craft (UROC) for riverine environments. The focus will be on forwarding technology developed under the unmanned surface vehicle task and optimizing size for deployment from special operations riverine craft.

(U) Started development of a CO2 Laser Ordnance Neutralization System mounted on the All-purpose Remote Transport System (ARTS) for EOD range clearance applications.

(U) Started development of an EOD dispersion suppressive system to reduce the damage caused by the detonation of a range of explosive devices and hazardous substances. The effort will focus on COTS items or materials.

(U) Started development of an EOD improved incendiary tool that will be more effective and efficient than the M-14 Thermite Grenade.

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(U) Started development of an EOD X-ray interpreter. This effort will develop the means to identify and interpret the components and contents of digital X-ray images utilizing custom software and recognition algorithms.

(U) Started development of an obscurant system for the Special Operations Craft - Riverine (SOC-R).

(U) Started development of a SOF incendiary device. This device will have the capability to adhere to vertical and overhead surfaces as well as mines placed on the ground.

(U) Started development of a remote automated munitions clearance system utilizing the commercially available Tele-present-Rapid-Aiming-Platform (TRAP). The system will be evaluated for EOD standoff munitions disruption applications.

(U) Started integration of the 90mm water cannon recoilless aiming system onto the USAF All-purpose Remote Transport System as part of a technology exploration initiative for emergent or compelling requirements.

(U) FY 2002 Plans:

(U) Complete development of a field disassembly system based on hydro-abrasive water cutting technology that will allow EOD technicians to cut open UXO remotely. The system's use will be expanded and integrated with the USAF robotic All-purpose Remote Transport System.

(U) Complete development of an integrated diver display mask. This device consists of an in-mask liquid crystal diver display that provides the diver with depth, dive time and tank pressure via wireless underwater RF link.

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(U) Complete development of a low-cost and highly portable Remote EOD miniature reconnaissance vehicle (MRV) based on COTS equipment. Potential applications of the vehicle include use as a remote observation post, linking on-site operators to a remote command center, and acting as a mobile platform for auxiliary sensors such as chemical and nuclear alarms with the addition of a disruptor capability.

(U) Complete development of a SOF Tactical Decision Aid (TDA). The TDA is a software based information tool that supports SOF target analysis operations.

(U) Complete development of an incident site reconnaissance (ISR) system. This project will provide EOD technicians with a field capability to gather digital imagery, GPS coordinates and laser range finder information with the ability to relay that data to a rear area commander. This system will automate the reconnaissance of an area of interest and provide a communications link to relay that information. The data will be transmitted over an RF link to a computer containing an appropriate software package to allow for the overlay of data onto a digital map. COTS technology will be used to the greatest extent possible.

(U) Complete development of an RF-controlled digital x-ray imaging system. This effort will modify the existing RTR-4 X-ray system used by Joint Service EOD to increase the effective image transfer range from 300 feet to over one (1) mile and through walls via the use of a digital RF link. The system will be configured such that operation can be controlled from the command post of the EOD incident site.

(U) Complete development of a chemical leak seal system. This system will be used to stop chemical or biological agent leakage from damaged munitions. The system will have minimal set up time, will seal a variety of ordnance types, holes and hole sizes, will utilize COTS materials to the greatest extent possible and will be packaged in a kit to allow for rapid field deployment and ease of use. The system will be an alternative to existing Plaster-of-Paris procedures outlined in EOD publications.

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(U) Complete development of a miniature diver display system that will provide full color, high-resolution imagery to the diver. The system will employ miniature, lightweight optics that will provide a clear, fixed focus, magnified image. The diver will control the image brightness so that the display can be optimized for daytime, or nighttime use.

(U) Complete development of a remote automated munitions clearance system utilizing the commercially available Tele-present-Rapid-Aiming-Platform (TRAP). The system will be evaluated for EOD standoff munitions disruption applications.

(U) Complete development of an EOD large package X-ray apparatus. It is anticipated that the system shall incorporate a grid arrangement of fifteen 8" X 10" X-ray film cassettes to provide the user with a large mosaic image.

(U) Continue development of a system for limpet mine detection. The Limpet Mine Imaging System (LIMIS) is a diver-held or submersible mounted sonar that provides photographic quality images in turbid water. It was developed to detect and identify limpet mines on hulls of ships. It is also used to identify bottom mines and other objects where optical systems fail.

(U) Continue development of a hull acoustic navigation system for diver search that will assist EOD divers to ensure thorough hull searches are performed. The system will be man-portable, accurate to within 1-meter and provide real-time location of divers and contacts in the water column and on a ship's hull.

(U) Continue the development of an EOD laser ordnance neutralization system to demonstrate the use of high-powered diode-pumped lasers to neutralize unexploded ordnance (UXO). This project focuses on neutralizing small UXO on active target ranges. Specific areas being studied include cost benefits, neutralization efficiency, and environmental impact.

(U) Continue development of an improved underwater demolition charge to counter threats in the very shallow water mine countermeasure (VSW/MCM) area of responsibility. The system will allow a diver to carry multiple charges and will interface with existing and emerging firing devices.

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(U) Continue development of a small, easy to use limpet mine neutralization tool that will interface with existing and emerging firing devices. This task is scheduled to transition into a product improvement program to upgrade and eventually replace existing U.S. Navy EOD limpet tools.

(U) Continue development/evaluation of a fragmentation protection shelter. The shelter is man-portable, easy to setup and provides frontal and overhead protection during the performance of EOD operations.

(U) Continue development of an EOD underwater search remotely operated vehicle (ROV). The task focuses on the use of COTS systems that have the potential to provide Navy EOD teams with a small (i.e. 2-person portable or smaller) ROV/sensor package for employment from rigid hull inflatable boats (RHIB) or similar small craft of opportunity to reacquire, investigate and identify previously reported mine-like contacts in the water column and on the seabed.

(U) Continue development of a single sided X-ray system. This task will explore and develop technologies that will give the EOD technician the capability to X-Ray an object without the necessity to place a film cassette or imager behind the object of interest.

(U) Continue development of an EOD X-ray interpreter. This effort will develop the means to identify and interpret the components and contents of digital X-ray images utilizing custom software and recognition algorithms.

(U) Continue development of an unmanned reconnaissance and observation craft (UROC) for riverine environments. The focus will be on forwarding technology developed under the unmanned surface vehicle task and optimizing size for deployment from a special operations riverine craft.

(U) Continue development of an obscurant system for the Special Operations Craft - Riverine (SOC-R).

(U) Continue development of a SOF incendiary device. This device will have the capability to adhere to vertical and overhead surfaces as well as mines placed on the ground.

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(U) Continue development of a CO2 Laser Ordnance Neutralization System mounted on the All-purpose Remote Transport System (ARTS) for EOD range clearance applications.

(U) Continue development of an EOD dispersion suppressive system to reduce the damage caused by the detonation of a range of explosive devices and hazardous substances. The effort will focus on COTS items or materials.

(U) Continue development of an EOD improved incendiary tool that will be more effective and efficient than the M-14 Thermite Grenade.

(U) Continue development to expand the capabilities of the EOD Information System (EODIS) Advanced EOD Publications System (AEODPS). This effort will convert preprocessed legacy information from text fields in the corporate database into discreet data elements, validating that information and proving the ability to reassemble the information properly to the user in the form of the existing AEODPS product.

(U) Continue the integration of sub-system components onto the robotic miniature reconnaissance vehicle (MRV) developed under a previous EOD/LIC task. This task will integrate the chemical and nuclear sensors also identified under a previous EOD/LIC effort, provide the MRV with an EOD disruption tool capability and incorporate a digital communications and control suite onto the MRV.

(U) Continue integration of the 90mm water cannon recoilless aiming system onto the USAF All-purpose Remote Transport System.

(U) Continue technology exploration initiatives in response to unforeseen emergent or compelling requirements.

(U) Start effort to adapt existing automated EOD ordnance identification guide software to commercial PDA equipment. The PDA will fit into the cargo pocket of the Battle Dress Uniform (BDU) and comply with standing security requirements.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

(U) Start development of a flame-retardant, antistatic garment to be worn by EOD operators during the performance of EOD operations with explosives. The garment should be of single piece construction, easily donned and doffed and approved for use during the performance of EOD operations with explosives.

(U) Start the integration of the EOD/LIC C3I, Incident Site Reconnaissance and the Remotely Controlled Digital RF X-ray systems into a single multiple use system. The new system will combine all command and control features, avoid proprietary software and comply with DoD and industry standards.

(U) Start development of a digital database for creating, storing and retrieving Joint Service EOD (JSEOD) incident reports. The system will provide EOD technicians the means to exercise existing JSEOD incident report databases, develop the means to digitally capture future reports into a workable database and provide JSEOD with a standardized format.

(U) Start effort to evaluate thermal imaging systems for EOD applications. The focus of the effort will be on COTS system performance of locating ordnance and improvised explosive items within packages, building structures and buried below the surface of the ground.

(U) Start development/evaluation of a real-time digital radiography system for large improvised explosive devices and port mortuary operations.

(U) Start the integration of the Tele-present Rapid Aiming (weapons) Platform into the USAF robotic All-purpose Remote Transport System (ARTS) to support EOD standoff munitions disruption operations. This effort will combine all optical and command and control systems into the ARTS.

(U) Start development of an insensitive explosive that meets DOT Hazardous Classification 1.4 specifications and possess the performance specifications of military C-4 explosives. The insensitive explosive should also be low cost and environmentally safe.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) Start development of a shock tube initiation module for the Remote Activation Munitions System (RAMS) firing device. The module will add a new capability to the RAMS that will enable special operations forces and EOD technicians to utilize military and commercially available shock tube for non-electric demolition procedures.

(U) Start development of a bladderless (single membrane) lift balloon system to support the recovery of underwater ordnance during mine countermeasure operations.

(U) FY 2003 Plans:

(U) Complete development of a system for limpet mine detection. The Limpet Mine Imaging System (LIMIS) is a diver-held or submersible mounted sonar that provides photographic quality images in turbid water. It was developed to detect and identify limpet mines on hulls of ships. It is also used to identify bottom mines and other objects where optical systems fail.

(U) Complete development of a hull acoustic navigation system for diver search that will assist EOD divers to ensure thorough hull searches are performed. The system will be man-portable, accurate to within 1-meter and provide real-time location of divers and contacts in the water column and on a ship's hull.

(U) Complete the development of an EOD laser ordnance neutralization system to demonstrate the use of high-powered diode-pumped lasers to neutralize unexploded ordnance (UXO). This project focuses on neutralizing small UXO on active target ranges. Specific areas being studied include cost benefits, neutralization efficiency, and environmental impact.

(U) Complete development of an improved underwater demolition charge to counter threats in the very shallow water mine countermeasure (VSW/MCM) area of responsibility. The system will allow a diver to carry multiple charges and will interface with existing and emerging firing devices.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) Complete development of a small, easy to use limpet mine neutralization tool that will interface with existing and emerging firing devices. This task is scheduled to transition into a product improvement program to upgrade and eventually replace existing U.S. Navy EOD limpet tools.

(U) Complete development/evaluation of a fragmentation protection shelter. The shelter is man-portable, easy to setup and provides frontal and overhead protection during the performance of EOD operations.

(U) Complete development of an EOD underwater search remotely operated vehicle (ROV). The task focuses on the use of COTS systems that have the potential to provide Navy EOD teams with a small (i.e. 2-person portable or smaller) ROV/sensor package for employment from rigid hull inflatable boats (RHIB) or similar small craft of opportunity to reacquire, investigate and identify previously reported mine-like contacts in the water column and on the seabed.

(U) Complete development of an obscurant system for the Special Operations Craft - Riverine (SOC-R).

(U) Continue the integration of sub-system components onto the robotic miniature reconnaissance vehicle (MRV) developed under a previous EOD/LIC task. This task will integrate the chemical and nuclear sensors also identified under a previous EOD/LIC effort, provide the MRV with an EOD disruption tool capability and incorporate a digital communications and control suite onto the MRV.

(U) Complete integration of the 90mm water cannon recoilless aiming system into the USAF All-purpose Remote Transport System.

(U) Complete effort to adapt existing automated EOD ordnance identification guide software to commercial PDA equipment. The PDA will fit into the cargo pocket of the Battle Dress Uniform (BDU) and comply with standing security requirements.

(U) Complete development of a flame-retardant, antistatic garment to be worn by EOD operators during the performance of EOD operations with explosives. The garment should be of single piece construction, easily donned and doffed and approved for use during the performance of EOD operations with explosives.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

(U) Complete effort to evaluate thermal imaging systems for EOD applications. The focus of the effort will be on COTS system performance of locating ordnance and improvised explosive items within packages, building structures and buried below the surface of the ground.

(U) Complete development of an EOD large package X-ray apparatus. It is anticipated that the system shall incorporate a grid arrangement of fifteen 8" X 10" X-ray film cassettes to provide the user with a large mosaic image.

(U) Continue development of a single sided x-ray system. This task will explore and develop technologies that will give the EOD technician the capability to X-Ray an object without the necessity to place a film cassette or imager behind the object of interest.

(U) Continue development of an EOD X-ray interpreter. This effort will develop the means to identify and interpret the components and contents of digital X-ray images utilizing custom software and recognition algorithms.

(U) Continue development of an unmanned reconnaissance and observation craft (UROC) for riverine environments. The focus will be on forwarding technology developed under the unmanned surface vehicle task and optimizing size for deployment from a special operations riverine craft.

(U) Continue development of a SOF incendiary device. This device will have the capability to adhere to vertical and overhead surfaces as well as mines placed on the ground.

(U) Continue development of a CO2 Laser Ordnance Neutralization System mounted on the All-purpose Remote Transport System (ARTS) for EOD range clearance applications.

(U) Continue development of an EOD dispersion suppressive system to reduce the damage caused by the detonation of a range of explosive devices and hazardous substances. The effort will focus on COTS items or materials.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) Continue development of an EOD improved incendiary tool that will be more effective and efficient than the M-14 Thermite Grenade.

(U) Continue development to expand the capabilities of the EOD Information System (EODIS) Advanced EOD Publications System (AEODPS). This effort consists of converting preprocessed legacy information from text fields in the corporate database to discreet data elements, validating that information and proving the ability to reassemble the information properly to the user in the form of the existing AEODPS product.

(U) Continue the integration of the EOD/LIC C3I, Incident Site Reconnaissance and the Remotely Controlled Digital RF X-ray systems into a single multiple use system. The new system will combine all command and control features, avoid proprietary software and comply with DoD and industry standards.

(U) Continue development of a digital database for creating, storing and retrieving Joint Service EOD (JSEOD) incident reports. The system will provide EOD technicians the means to exercise existing JSEOD incident report databases, develop the means to digitally capture future reports into a workable database and provide JSEOD with a standardized format.

(U) Continue development/evaluation of a real-time digital radiography system for large improvised explosive devices and port mortuary operations.

(U) Continue the integration of the Tele-present Rapid Aiming (weapons) Platform onto the USAF robotic All-purpose Remote Transport System (ARTS) to support EOD standoff munitions disruption operations. This effort will combine all optical and command and control systems into the ARTS.

(U) Continue development of an insensitive explosive that meets DOT Hazardous Classification 1.4 specifications and possess the performance specifications of military C-4 explosives. The insensitive explosive should also be low cost and environmentally safe.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

(U) Continue development of a shock tube initiation module for the Remote Activation Munitions System (RAMS) firing device. The module will add a new capability to the RAMS that will enable special operations forces and EOD technicians to utilize military and commercially available shock tube for non-electric demolition procedures.

(U) Continue development of a bladderless (single membrane) lift balloon system to support the recovery of underwater ordnance during mine countermeasure operations.

(U) Continue technology exploration initiatives in response to unforeseen emergent or compelling requirements.

(U) NEW STARTS – EOD/LIC candidate submission input was received June 2002. Candidate selection was conducted in summer 2002 for additional FY 2003 new start tasks.

(U) Start development and integration of an optical system for the USAF robotic All-purpose Remote Transport System that will provide a remote viewing capability able to peer into or through access holes cut into vehicles or buildings.

(U) Start development of an improved underwater bottom mine countermeasure charge that utilizes a modular configuration, acoustic firing device technology and is easier to assembly than current bulk high explosive satchel charges.

(U) Start development of an improved underwater mine countermeasure charge system for moored mine countermeasure operations.

(U) Start development of a 3D ship hull database to assist EOD divers during limpet mine countermeasure planning and execution.

(U) Start development of a wrist-worn EOD underwater data resource device that will allow the EOD diver to access digital information underwater regardless of visibility.

(U) Start testing and evaluation of fiberscope and video scope optical equipment for EOD applications. The task will focus on commercial non-developmental items.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

(U) Start the development of an improved EOD hook and line tool kit. The task will focus on improving performance and efficiency of hook and line tools as well as form/fit functionality issues.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.543	14.509	13.800	9.484	10.013	10.197	10.390	Continuing	Continuing
Special Operations/Low Intensity Conflict (SO/LIC)/P205	1.226	1.313	1.317	1.369	1.446	1.472	1.500	Continuing	Continuing

(U) Project Number and Title: P205 Special Operations/Low Intensity Conflict (SO/LIC)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Completed prototype of handheld voice-to-voice language translation capability.

(U) Initiated voice-to-voice data extraction and data mining feasibility study.

(U) Initiated cognitive analysis tool research to support planning and execution of special operations and low intensity conflict.

(U) Continued research efforts for a Human Factors Assessment and Selection Tool addressing human factors requirements and relationships with respect to employing advanced technology, personnel selection and SOF training.

(U) Conducted "Readiness 21" study assessing personnel and unit readiness issues against 21st century issues.

(U) Initiated study on future SOF Roles and Missions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) FY 2002 Plans:

(U) Continue operator field assessment of handheld voice-to-voice language translation capability.

(U) Complete voice-to-voice data extraction and data mining feasibility study.

(U) Complete cognitive analysis tool research to support planning and execution of special operations and low intensity conflict.

(U) Complete analysis of future SOF roles and missions.

(U) FY 2003 Plans:

(U) The FY 2003 program will be finalized in August 2002, ensuring that study projects are timely and responsive to the requirements of DoD policy makers.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8.543	14.509	13.800	9.484	10.013	10.197	10.390	Continuing	Continuing
Special Reconnaissance Capabilities (SRC)/ P207		5.710*	4.682					Continuing	Continuing

(U) Project Number and Title: P207 SO/LIC Advanced Development, Special Reconnaissance Capabilities

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY2001 Accomplishments:

(U) Initiated acquisition and test of advanced development sensor and tagging technologies in support of operational special reconnaissance requirements.

(U) Completed development of an advanced Remote Sensor and Camera Controller that serves as a communications/sensor hub for sensor data relay and cueing.

(U) Provided rapid-prototype units to support urgent mission requirements.

(U) FY 2002 Plans:

(U) Continue development, test, and operationalization of special reconnaissance related technology to include integration of sensors, communication, and power requirements.

(U) Develop remote sensor and camera controller in support of multiple DoD agency and service requirements.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) Initiate research on advanced measurement and signature tagging and sensing technologies in concert with Central MASINT Office

(U) FY 2003 Plans:

(U) Continue development, test, and operationalization of special reconnaissance related technology to include integration of sensors, communication, and power requirements.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE SO/LIC Advanced Development **PE 0603121D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	8.622	8.750	9.881	
Delta	0.079	0.045	0.000	
FY 2002 Amended President's Budget Submit	8.543	8.799	9.881	Continuing
Appropriated Value	8.622	10.199	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.079	0.000	0.000	
c. Other	0.000	4.310	3.919	
Current FY 2003 Budget Submission	8.543	14.509	13.800	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** SO/LIC Advanced Development **PE 0603121D8Z**

(U) Funding: Funding changes are due to congressional undistributed reductions and inflation adjustments. FY 2001 reductions reflect Section 8086 adjustments. FY 2002 /FY 2003 reflects the transfer from USSOCOM to SO/LIC for special reconnaissance capabilities.

(U) Schedule: N/A

(U) Technical: Funding changes are due to congressional undistributed reductions and inflation adjustments.

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

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE FEBRUARY 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**			
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	48.852	56.011	49.015	38.894	39.722	40.568	41.296		Continuing	Continuing
Combating Terrorism Technology Support (CTTS)/P484	48.852	56.011	49.015	38.894	39.722	40.568	41.296		Continuing	Continuing
DERF		12.000	70.000	19.000	3.000	11.000	0.000			

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) 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. Projects support antiterrorism, counterterrorism, 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) All projects are distributed among nine mission categories: Chemical, Biological, Radiological, and Nuclear Countermeasures; Explosives Detection; Improvised Device Defeat; Infrastructure Protection; Investigative Support and Forensics; Personnel Protection; Physical Security; 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.

(U) Project Number and Title: P484 Combating Terrorism Technology Support (CTTS)

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES. Demonstrated the utility of Fourier transform near infrared (FT-NIR) analysis for food adulteration detection. Developed and tested escape mask designs for DoD first article and qualification testing. Developed new training aids for canine pre-release detection of sarin devices. Developed guidelines for biological agent surface sampling in offices. Incorporated new mask filter material that provides protection against toxic industrial chemicals. Developed standard laboratory protocol for analysis of anthrax and plague in foods. Improved immobilized enzyme nerve agent detection capability. Demonstrated advanced biological protective system. Modified palmtop HAZMAT database to include chemical warfare agents. Developed aerogel formulations to increase effectiveness of chemical and biological agent sample collection. Developed and fielded enhanced human, animal and plant pathogens characteristics databases. Developed prototype urban dispersion model. Designed handheld low-level chemical detector. ($5.600 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) EXPLOSIVES DETECTION AND DEFEAT. Delivered and fielded prototype ion mobility spectrometer explosives detector. Developed method to detect explosives from a five-foot standoff distance. Demonstrated ability to detect composition C-4 with nuclear quadrupole resonance (NQR) portal. Demonstrated NQR detection of ammonium nitrate in vehicles. Developed a prototype handheld, explosive detector pre-concentrator with improved sensitivity and versatility. Developed prototype flat-panel imager for a digital x-ray. Developed and fielded dilute-explosive-tile prototype to defeat large vehicle bombs (LVB). Developed and demonstrated software to integrate robotic modular PC-based control architecture. Developed and delivered interactive IED database. ($4.353 million)

(U) INFRASTRUCTURE PROTECTION. Delivered a developmental hacker publication database and site replication tool in response to an urgent operational need. Developed a tool to detect, read and characterize flash-read-only memory chips embedded in modems, computers, network printers, personal digital assistants and cell phones. Developed and delivered water pipeline assessment and data analysis tools. Developed and fielded a risk assessment methodology for dam operators and owners. ($2.500 million)

(U) INVESTIGATIVE SUPPORT AND FORENSICS. Developed and delivered First Responder's Toolset prototypes. Developed and demonstrated proof-of-concept and protocols for stable isotope ratio sourcing of explosives. Developed and fielded magnetic nanoflake fingerprint powders technology. Developed techniques to recover DNA evidence from processed fingerprints. ($3.800 million)

(U) PERSONNEL PROTECTION. Developed and fielded an advanced transparent portable shield for personnel protection. Designed reduced weight, composite hybrid vehicle armor. Developed and fielded advanced models to evaluate blast effects on vehicles and to facilitate the design of transparent armor. Developed and demonstrated prototype body armor cooling system. ($2.630 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) PHYSICAL SECURITY. Demonstrated the effectiveness of a mobile, gamma ray imaging system for vehicle/cargo inspection at entry control points. Demonstrated the ability to retrofit a U.S. European Command facility for improved blast protection. Developed and fielded a vehicle inspection checklist for entry point detection of improvised explosive devices (IED). Prototyped quick reaction detection sensors for improved perimeter intrusion detection. Designed and developed a ground surveillance radar for perimeter intrusion detection system. Prototyped high-volume flat mail and parcel scanner for IED detection. Designed and developed a semi-automated under vehicle inspection system. Developed interim military construction standards for a new DoD antiterrorism/force protection security-engineering manual. Designed and developed a vessel identification and positioning system for port security. Completed development of a man-portable, motion-activated electronic trip flare. Designed and developed an advanced entry point vehicle/driver identification system with Arabic license plate reader and access to terrorist databases. Developed a perimeter early warning and intruder detection system using thermal imaging and forward-looking infrared (FLIR). Designed and developed a blast effects estimation model for vulnerability assessment. ($16.337 million)

(U) SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT. Developed and fielded a system that uses name recognition technology across multiple data sources to identify known terrorists attempting entry into U.S.. Developed and fielded Name Search Reference Library that permits searches involving unfamiliar and complex cultural naming patterns. Developed and fielded a full-motion, wireless video transmission system. Improved quality of Facial Recognition Technology resulting in turnkey access control system being commercially available ($5.200 million)

(U) TACTICAL OPERATIONS SUPPORT. Developed innovative cost-effective manufacturing techniques for the production of low-halo image intensifier tubes. Successfully tested proof-of-concept small chemical agent detector for special operations. Completed prototype of a night vision sensor fusion system. Developed and demonstrated interim personnel navigation system that is independent of global positioning system (GPS) input. ($4.565 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) PROGRAM MANAGEMENT. Staffed the Combating Terrorism Technology Support (CTTS) Office, Arlington, Virginia. Aligned existing staff and added program staff members to provide program management oversight and technical support for all CTTS R&D projects. Augmented the CTTS program office with contract and financial management personnel. Includes management of an additional $25 million in funds from other agencies; and management of cooperative research and development programs with the United Kingdom, Canada and Israel. Directed the program/project planning and execution for all projects including the daily management and reporting on more than 250 separate contracts and funding. Developed and implemented improvements for the automated approach to the Broad Agency Announcement (BAA) solicitation process, including the establishment of collaborative source evaluation and selection tools. Continued the planning and development of process efficiency and re-engineering analysis, encompassing a complete review of CTTS mission area management and reporting responsibilities internal to the organization and in support of external reporting requirements. ($3.867 million)

(U) FY 2002 Plans:

(U) CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES. Complete development of prototype toxic industrial chemicals, layered bed mask filters. Design a low profile escape mask. Evaluate the miniature multisensor water quality monitor. Research the viability and stability of eight BW agents in foods over a range of environmental conditions. Evaluate advanced preservative material for bacterial and viral BW agent samples. Develop standard laboratory protocols for analysis of five biological warfare (BW) agents in foods. Evaluate prototype handheld, low-level chemical detector. Determine effectiveness of prototype electrostatic decontamination system against actual CB agents. Peer review mass decontamination protocols. Evaluate initial performance of advanced building collective protection filtration materials. Laboratory test the modular portable NBC filtration system for small room protection. ($11.374million)

(U) EXPLOSIVES DETECTION. Research and evaluate new technologies for standoff detection of explosives. Validate NQR portal sheet explosive detection capability. Research canine ability to generalize from domestic to foreign explosives. Evaluate handheld detector for plastic explosives and triacetone triperoxide (TATP). ($2.177 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) IMPROVISED DEVICE DEFEAT. Evaluate a developmental precision IED disruption device. Characterize and model foreign developed IED/LVB countermeasure tools. Begin design of next generation EOD robotic system. Test and evaluate a single-sided imaging system to diagnose IEDs in confined spaces. Develop field-portable, directional remote LVB disablement charges. Develop enhanced IED detection, diagnostic and render safe tools. Develop and test prototype of an urban explosive magazine. Demonstrate an automated in situ information system to access and extract threat assessment, render safe data and disposal procedures. Evalute prototype of an environmental monitoring system that links vital signs of bomb squad/EOD personnel and protective apparel temperatures to a central monitoring hub. Integrate a standoff connectivity and command unit with different sensors. Conduct extensive testing of non-intrusive detection systems. ($3.477 million)

(U) INFRASTRUCTURE PROTECTION. Beta test a software tool to model interdependencies of energy infrastructures. Continue development of method to remotely track an electronic file through a network. Complete development of and deliver an advanced communications firewall prototype for secure facilities. Develop a software application that automates the risk assessment methodology for dams. Complete research on encryption algorithm suite for supervisory control and data acquisition (SCADA) system protection and provide recommendations to industry. Complete an alert trend-change detection tool for protection of computer networks against autonomous malicious agents. ($1.610 million)

(U) INVESTIGATIVE SUPPORT AND FORENSICS. Test pulsed infrared beacon prototypes. Expand research on sampling for sourcing of explosives and organic materials using stable isotopic ratios. Complete testing of voice stress analyzer. Characterize peroxide-based explosives for post-blast forensics. Complete development of DNA recovery and analysis protocols, ink dating, float glass exams, latent print baseline evaluations and handwriting comparison of different character sets. Isolate additional identification segments from DNA. Complete validation of questioned document analysis and implement national automated system. Develop techniques for shredded document reconstruction and for sourcing documents to inkjet printers. Develop forensic protocols for evidence recovery in hot zones. Verify computer forensic tool performance and assess computer readback signals for forensic use. Begin development of next generation audio, visual and computer forensic tools. ($3.785 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Combating Terrorism Technology Support **PE 0603122D8Z**

(U) PERSONNEL PROTECTION. Complete development of methods to defeat enhanced tungsten carbide ammunition and counter the effects and lethality of sheet metal on non-armor piercing projectiles. Extend development of body armor cooling system to include heating capability. Evaluate vehicle blast model. Develop passive passenger restraint system for VIP vehicles. Begin development and testing of comprehensive standards for armored passenger vehicles. Apply composite armor concepts to full-scale applications. Evaluate enabling technologies for bullet countermeasure system. Initiate development of systems to detect and classify potential laser-enhanced threats to personnel. Initiate development of optical-based sniper detection system. ($4.626 million)

(U) PHYSICAL SECURITY. Complete development and field a man-portable, motion-activated electronic trip flare. Evaluate an advanced entry point vehicle/driver identification system with Arabic license plate reader and access to terrorist database access. Develop a small watercraft and a railcar inspection guide for explosives detection. Complete development of high-volume flat mail and parcel scanners for detecting IEDs. Complete development and demonstrate an automatic false alarm assessment and filtering system for perimeter intrusion detection. Complete development and demonstrate a perimeter early warning and intruder detection system using thermal imaging and FLIR. Test and evaluate a vessel identification and positioning system for port security. Conduct an operational evaluation of video detection and assessment systems for suspect vehicles. Develop research and testing based final construction standards for a new DoD antiterrorism/force protection security-engineering manual. Conduct developmental testing and evaluation of a prototype ground surveillance radar for perimeter intrusion detection system. Demonstrate proof of concept for and initiate development of a semi-automated under vehicle inspection system. Develop a backscatter radio frequency identification system for entry point screening and tracking of high value assets. Develop a lightweight, portable boom to protect ship defense zones. Develop a radio frequency identification system to tag and track designated assets. ($14.590 million)

(U) SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT. Conduct pilot program that demonstrates specialized security and surveillance equipment that use facial recognition technology to identify terrorists. Complete development of a video exploitation toolkit that provides processing functions for video stabilization, video super resolution enhancement, heat and scintillation removal, and the construction of enhanced, panoramic still image mosaics from video streams, as well as multisensor fusion of real-time video. ($5.768 million)

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(U) TACTICAL OPERATIONS SUPPORT. Demonstrate rifle-mounted video and thermal image display. Demonstrate prototype personal navigation system in typical tactical environments where GPS is not available and transition to design hand-held system. Complete development and field hand-held chemical agent detector. Develop and field hardened breaching explosives storage containers. Evaluate advanced close-quarter battle carbine. Evaluate controlled breeching system capabilities. Determine feasibility of remotely characterizing transparent materials (such as windows). Begin concept development of advanced weapon sight that provides correction for wind effects. Reduce size and improve capabilities of tactical communications systems. Begin baseline evaluation of advanced, three-dimensional, through-wall imaging technology that provides user-friendly display for tactical forces. Initiate development of a microphone for use in very high background noise environments. ($4.124 million)

(U) PROGRAM MANAGEMENT. Provide program management oversight and technical support for all CTTS R&D projects including funds from other agencies and management of cooperative research and development programs with the United Kingdom, Canada and Israel. 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 solicitation for new initiatives. Act as the interface to other government agencies for CTTS related initiatives and on-going and new projects. Establish goals, objective, and immediate revisions to plans that will reinforce interagency and international participation for the identification and prioritization of CTTS mission area requirements. Enhance the CTTS automated approach to the BAA solicitation process. Review and revise existing process and execution plans for CTTS mission area management and internal and external reporting responsibilities. ($4.480 million)

(U) FY 2003 Plans:

(U) CHEMICAL, BIOLOGICAL, RADIOLOGICAL, AND NUCLEAR COUNTERMEASURES. Evaluate and field the low profile escape mask. Validate standard laboratory protocols to analyze eight BW agents in foods. Complete development of database incorporating viability and stability of eight BW agents in foods over a range of environmental conditions. Demonstrate prototype advanced aerogel-based sample collection system with improved chemical and biological agent capture efficiency. Test prototype building filters based with advanced filtration materials at domestic and overseas sites. Complete testing and transition modular portable NBC filtration system for small room protection at domestic and overseas sites. ($3.599 million)

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(U) EXPLOSIVES DETECTION. Integrate multiple explosives and weapons detection technologies into one portal. Determine feasibility of NQR to detect TNT in vehicles. Characterize NQR enhancements for false alarm reduction in computed tomographic explosive detection systems. Develop methods to improve canine handler selection and training. Continue development of technologies for standoff detection of explosives. Develop techniques to detect suicide bombers. ($2.665 million)

(U) IMPROVISED DEVICE DEFEAT. Complete development of a portable one-sided x-ray system, next generation EOD robot system, and a IED disruptor. Complete enhancement of directional remote LVB disablement charges and IED detection, diagnostic, and render safe tools. Develop target recognition algorithms for detection and identification of potential IED components. Test an urban explosive storage magazine and environmental portable monitoring system. ($4.187 million)

(U) INFRASTRUCTURE PROTECTION. Begin to develop methods to protect commercial energy infrastructure systems to non-lethal weapons and technologies. Develop tools to monitor propagation of malicious computer software code, as well as to surveil and defend external networks against large-scale attacks. Complete SCADA protection algorithm suite. ($2.002 million)

(U) INVESTIGATIVE SUPPORT AND FORENSICS. Characterize foreign explosive samples for forensic purposes. Continue isolation of additional identification segments from DNA. Complete hyperspectral document imager prototype and standardized latent print evaluation criteria. Evaluate developmental computer forensic tools. Continue to develop next generation audio, visual, and computer forensic tools. Demonstrate link analysis of computer data through readback signals. Design passive RF vehicle tag. Develop components for retrieval and handling of encrypted incident management, interagency radio communications tools, and terrorism-related telecommunications information. ($4.548 million)

(U) PERSONNEL PROTECTION. Demonstrate full-scale composite armor applications in selected vehicle components. Introduce enabling technologies for bullet countermeasures into system design. Demonstrate practical application of laser and sniper detection and warning concepts. ($5.532 million)

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(U) PHYSICAL SECURITY. Demonstrate prototype ground surveillance radar for perimeter intrusion detection system. Develop and demonstrate a high-volume flat mail and parcel scanner that detects radiological material. Complete development of a semi-automated under vehicle inspection system. Complete and field a backscatter radio frequency identification system for entry point screening and tracking of high value assets. Complete development of construction standards for a new DoD antiterrorism/force protection security-engineering manual for military construction. Evaluate a vessel identification and positioning system for port security overseas. Develop and demonstrate high-energy x-ray and enhanced gamma radiation vehicle and cargo inspection systems for entry point screening. Test a lightweight, portable boom to protect ship defense zones. Demonstrate a radio frequency identification system to tag and track designated assets. Demonstrate a backscatter radio frequency identification system for entry point screening. Complete a personnel-screening guide for entry point screening. Develop a rail car inspection guide for explosives detection. ($13.907 million)

(U) SURVEILLANCE, COLLECTION, AND OPERATIONS SUPPORT. Continue to integrate facial recognition technology into surveillance systems. Improve intelligence analyst automation tools for dealing with large volumes of data. Improve the capabilities for clandestine collection and enhancement of video and audio surveillance by expanding previously developed video exploitation toolset. Develop increased capability for tagging, tracking and locating. Develop advanced tactical systems to degrade, disrupt, deny or destroy adversary information systems. ($3.709 million)

(U) TACTICAL OPERATIONS SUPPORT. Demonstrate design improvements of advanced close quarter battle carbine to existing weapons in the inventory. Evaluate effectiveness of prototype transparent material characterization systems. Complete development of and test microphone for use in very high background noise environments. Demonstrate promising three-dimensional through-wall technologies for continued development. ($4.945 million)

(U) PROGRAM MANAGEMENT. Provide program management oversight and technical support for all CTTS R&D projects including funds from other agencies and management of cooperative research and development programs with the United Kingdom, Canada and Israel. Direct the program/project planning and execution for projects and associated contracts using direct and indirect budget allocations. 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

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prioritization of CTTS mission area requirements. 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. ($3.921 million)

(U) B. Program Change Summary	FY2001	FY2002	FY2003
President's FY2001 Budget Submission	49.929	50.754	39.451
DELTA	-1.077	-8.511	0.000
FY 02 Amended President's Budget Submission	48.852	42.243	39.451
Appropriated Value	49.307	56.443	0.000
Adjustments to Appropriated Value			
a. Congressionally Directed Undistributed Reduction	0.000	-0.432	0.000
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.455	0.000	0.000
c. Other	0.000	0.000	9.564
Current FY 2003 Budget Submission	48.852	56.011	49.015

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Change Summary Explanation:

(U) Funding: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 decrease reflects Congressional undistributed reductions. FY 2003 increases efforts in the areas of detection, personnel and infrastructure protection supporting national counter terrorism priorities.

(U) Schedule: N/A

(U) Technical: N/A

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

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A

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COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	16,516	18,982	25,420	20,671	21,823	22,223	22,270		Continuing	Continuing
DoD/DOE Munitiond/P225	16,516	18,982	25,420	20,671	21,823	22,223	22,270		Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This R&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&E investment by accessing the specialized skills, scientific equipment, facilities and computational tools not available in DoD.

(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 38 projects in warhead technology, energetic materials, advanced initiation and fuze development, munitions lifecycle technology, and computer 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, 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.

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DoD/DOE Munitiond/P225	16,516	18,982	25,420	20,671	21,823	22,223	22,270		Continuing	Continuing

(U) Project Number and Title: P225 DoD/DOE Munitions

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) **FY 2001 Accomplishments:**

(U) Fuzing is a key element in every Department munition system and advanced initiation is an enabling technology for the next generation of warheads. It supports the development of advanced aimable warheads, target-adaptable warheads, and survivable high-velocity hard target penetrators. This program continues to provide improved component options and new architectures for use in advanced electronic safing, arming and firing systems. The objective is to provide a set of characterized, qualified, generic components (and suppliers) and to demonstrate their use in prototype designs. In FY1997 an effort was initiated to reduce the size and cost of ESADs by a factor of 10 over currently fielded technology. Utilizing newly developed and qualified all-commercial components, a low-energy prototype ESAD was demonstrated last year that represents a factor of 10 reduction in size and a factor of 4 reduction in cost. While this technology enables significant improvement in weapon design and capability, cost remains a barrier to utilization in low-cost, mass-produced munitions. An analysis of the cost drivers shows that we are close to the limits with the current component designs and architectures. Therefore, the focus of the component effort was shifted last year to exploit recent advances in microelectronics, micro-electromechanical systems, micro-lasers and optical initiation. These new technologies offer opportunities for increased operational capability from micro firing systems along with a further order-of-magnitude decrease in size and reduced cost. In FY01 a significant test milestone in the effort to engineer an optically charged fireset was achieved by initiating a high explosive using a multilayer nanostructure capacitor and a high voltage photocell. Efforts continued on component shock hardening and

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packaging in support of Service initiatives in high-velocity penetrators. The accelerometer to be used in new G-hardened fuzes was characterized in two axes in FY 2001 with one observed anomaly that is currently under investigation. Towards miniaturizing fuze systems using nano-technology, early progress has been made in the use of photolithography to deposit 0.5-mil lines and spaces needed for a microtransformer fireset application. Similarly, a nanostructure dielectric film deposition method for further miniaturization of firesets was demonstrated in FY 2001. The computerized knowledge base initiated last year to preserve and transition the advanced initiation technology base developed under this program is now operational and transition to the DoD has begun. This classified tool will ensure experience retention in archives and support government laboratories and contractors. The two knowledge bases distributed this year contain expertise associated with firing circuits and slapper detonators. ($ 3.290 million)

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(U) DoD and DOE continue to have very similar requirements for energetic materials. Both agencies desire high explosives with increased or tailored performance and decreased sensitivity, and recent accomplishments have benefited both agencies. Like advanced initiation, improved energetic materials are enabling technology for the next generation of weapon systems that will be safer, smaller and more lethal. Under this program a combination of evolutionary and novel technologies are under development. Conventional chemistry has been used to develop more powerful, less sensitive explosives. Nano-structured and engineered materials are being explored to increase energy density and energy on target by factors of three or more. Higher risk efforts are also underway to explore the possibility of metastable High Energy Density Materials (HEDM). Using conventional chemistry, a number of new candidate molecules have been synthesized, characterized and formulated. The development of new materials is based on theoretical molecular design. The structure, performance and sensitivity of new molecules are predicted computationally, then synthesis is attempted. The focus is in two areas: molecules with significantly increased energy over current materials and very insensitive materials with reasonable energies. As reported last year, another new explosive under development is LLM-105. It is dense, thermally stable and very insensitive. With 30% more energy than TNT it has possible detonator and booster applications and is an alternative to TATB in special purpose weapons such as hard target penetrators that have to survive high shock loading. The synthesis, scale-up, and characterization of this material have been completed and its use as insensitive booster material for Navy weapons applications is now being evaluated. Efforts to crystallize the pure form of a newly synthesized energetic material with predicted energy greater than CL-20, LLM-121 continued in FY 2001. Two other very fast burning materials, BTATz and DHT, have been successfully synthesized and are under evaluation as enhanced performance gun and rocket propellant ingredients. Metastable Intermolecular Composites (MIC) developed under this program were the first successful examples of nano-structured energetic materials with significantly enhanced performance. They demonstrated that tailored, ultra-fine reactant particles could dramatically increase the energy release rate of thermite-like materials and provide twice the total energy of high explosives. The first application of this technology is for lead-free percussion primers for small arms ammunition, and this program is now in engineering development under SERDP funding. The current focus is on the optimization of this material for other weapons applications via better diagnostic and measurement methods. A new bulk process for manufacturing nano-structured energetic materials using sol-gel chemistry has been developed with the promise of precise control of material homogeneity, properties, and geometry. Samples of this material were manufactured this year for testing and evaluation in support of reactive warheads that better couple energy to the target and applications that require very high thermal loading. Extended solid HEDMs are also under development. This work uses intense pressure and temperature to force elements into highly energetic bonding states that can be recovered to ambient conditions. Current synthesis techniques have

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produced CO-derived solids and a family of novel nitrogen materials, but in very small quantities. These materials are expected to be highly energetic, but characterizing them, and particularly verifying the energy content, has been difficult due to the microscopic quantities of material available. This year, the energy content of laboratory produced high energy density material was preliminarily measured. A special press was installed for production of milligram sample sizes, which can then be characterized more accurately using standard and improved techniques. The creation of the thermochemical code Cheetah represents a major accomplishment of this program. The code predicts the performance of energetic materials including high explosives, propellants and pyrotechnics and reduces the number of tests necessary to develop a new material. Cheetah 3.0 was released this year to DoD, DOE and DoD contractor users. This version includes new equations of state resulting in greatly enhanced stability and accuracy of the code. A major effort is also underway to develop a suite of codes for use in predicting the response of energetic materials in weapon systems subjected to thermal and mechanical insult. The objective is to reduce the number and cost of the current go/no-go insensitive munitions test protocols required to qualify a new system for military use and to improve our understanding of the physical mechanisms and safety margins. As reported last year, a collaborative effort with the Navy was initiated to experimentally assess and validate codes for use in predicting the response of weapon systems including the violence of reaction in cookoff accidents. Quantitative data on cookoff violence have been generated by both the Navy in small-scale experiments and by DOE in the scaled thermal explosion experiments. Data on both HMX based explosives and PBX-109 have been obtained for use in establishing the accuracy and range of validity of the predictive models. The measured properties were used this year to successfully predict the time to explosion in cookoff tests performed by the Navy. In order to preserve and transition the energetic materials technology generated under this program, two explosives databases have been distributed to government laboratories and contractors. One database, HEAT1, contains over 3,000 chemical structures, and is a compilation of measured heats of formation for a wide range of organic molecules of interest to researchers in the weapons community. A second database is APEX, A Pure Explosives Database. This database contains over 500 energetic materials of different molecular structure to guide the synthesis of new materials and ensure the retention of important characterization data. ($ 4.526 million)

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(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. 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 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. ($ 2.410 million)

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(U) A major thrust of this program continues to be hard target defeat. Over the last four years a new concept for hard target weapons, the Monolithic Ballasted Penetrator, has been developed for high-velocity delivery that significantly increases penetration into concrete and payload volume. A 350# penetrator of this design will be able to duplicate the penetration capability of our current 5000# class penetrators. Testing was completed this year with a 2/3-scale prototype launched at 3360 fps into an oblique, layered target that is characteristic of cut-and-cover buried structures. The weapon successfully penetrated a total of 16 feet of concrete interspersed with layers of soil and void. The penetrator maintained a stable trajectory and survived with no indication of deformation or cracking. A patent was awarded on the penetrator design, and it has been selected for use in the TACMS penetrator Demonstration ACTD. An ongoing problem in hard target research has been that differences are observed in the predictions from the various penetrator design codes used by the community. Global parameters such as penetration depth are tending to converge, but differences in important details such as the maximum deceleration and trajectory remain. The results can be contradictory predictions about penetrator survival or weapon effectiveness at conditions near the design envelope. To address this issue an experimental test-bed program was initiated in FY 2000 to collect high-quality data on well-characterized targets for use in code comparisons and validation. A comprehensive series of penetration tests into concrete was completed this year that is expected to resolve questions about the effect of target strength, nose shape, penetrator scale, and penetrator velocity. Results have been distributed to the S&T community for use in benchmarking and validating the current design tools. New munitions applications such as kinetic energy projectile sabots, warhead cases, lightweight gun barrels, and artillery projectiles place several stringent demands on composite material performance. During FY2001, failure characterization of both thermoset and thermoplastic unidirectional composites under multiaxial stress states was completed. This achievement enables analysis, evaluation, and design of stronger, lighter, three-dimensional, composite components for advanced munitions. Metallography, mechanical property, and chemical and processing tests indicated last year that an Air Force identified low alloy steel had good potential as a low-cost replacement for current ultra-high-strength steels being postulated for future high-velocity penetrators. This was corroborated in subsequent studies and in FY 2001 a commercial manufacturer entered into an agreement with government researchers to pursue industrial scale development of this steel for penetrating weapons applications. In an alternative approach to hard target defeat, work continued on developing the concept of using a multiple shaped charge array as a precursor warhead to increase the penetration into concrete of a follow-through penetrator. Last year, tests conducted at China Lake verified the hypothesis that jet interactions can augment structural damage. This year, additional tests were completed against full-scale concrete targets, which demonstrated a large, but unoptimized, hole using warhead dimensions relevant to the Navy's SLAM-ER program. Relating warhead performance to material properties requires a detailed knowledge of material properties under dynamic

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conditions and is considered a fundamental issue in computationally based design of future weapon systems. To evaluate the accuracy of the current materials models, an experimental Ta liner test-bed program was undertaken. In this study, Ta EFP liners have been fabricated to a generic design by four different process routes resulting in four well-characterized microstructures. The resulting liners are currently being loaded with high explosive and will be fired early in FY 2002 in order to soft catch the slugs and compare them to the shapes predicted by the advanced material models. ($ 3.830 million)

(U) DoD and DOE efforts toward munitions lifecycle technologies including stockpile aging, surveillance, demilitarization and disposal are coordinated under the auspices of this program. As the 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. Last year, a process was demonstrated that utilizes waste Explosive D available from demilitarization operations to form picramide, the starting material for synthesis of the insensitive explosive TATB, a high value product for both the DoD and DOE. Since the existing inventory of Explosive D will be consumed by demilitarization activities in a matter of years, the focus of this project has shifted to include TNT as a recyclable material. Scale up of the TNT inclusive picramide to TATB process from 1kg to 10 kg in support of a Navy manufacturing technology program is underway and will be completed by the end of FY 2002. The potential for cutting explosives both bare and encased in steel has been demonstrated using a femtosecond laser. Unlike conventional cutting lasers that melt and vaporize material, the femtosecond laser ablates material with no evidence of heating. It offers unique capabilities for use in munitions demilitarization and manufacture. A dedicated femtosecond laser has been built in conjunction with a small blast chamber for use in scoping experiments. Several experiments were performed to determine cutting depths in different explosives and work continued towards an FY 2003 full scale, live munition demonstration of the laser cutting technology in a 10-kg explosive tank. To provide automated remote capability for munition demilitarization activities, a robotic workcell for disassembling 155-mm projectiles was designed and assembled. High-level software was written for remote disassembly of artillery shells to expose the submunition layers for handling and safing. This year, the capability to disassemble the M483A1 rounds containing 88 bomblets was successfully demonstrated. Age-related degradation of materials within high value weapon systems is studied in order to understand and predict changes in munition safety, performance, and reliability during long term storage. Predictive models for materials and system aging are under development with a focus on solder interconnect reliability, corrosion of electronics with an emphasis on plastic encapsulated microcircuits, the aging of propellants, and the aging and fracture of adhesive joints. In the solder reliability task, physical models were exercised on several applications in an effort to validate its output against test vehicle experiments. The goal of

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the task is to develop a computational tool that predicts the overall reliability of Sn-Pb solder interconnections of any geometry from physically-based calculations of deformation and crack damage by FY 2003. ($ 2.460 million)

(U) FY 2002 Plans:

(U) Improvement of electronic safing, arming and firing systems will continue with a focus on miniaturization, cost reduction and shock survivability for hard target penetrators. The development of a micro firing system will continue with a design goal of a further factor of 10 reduction in size over the recently demonstrated low-energy systems (and a factor of 100 over currently fielded technology). Activities will include component development and evaluation, improved system integration, and demonstration of manufacturing technologies. In support of a viable fuze industrial base, work will commence with Raymond Engineering and other suppliers on improving the manufacturing process for chip detonators and characterizing their performance. The miniature fireset project will focus work on the development of the solid dielectric break down switch. This will utilize much of the same nanolayer technology demonstrated in this year's multilayer capacitor milestone completion. An advantage of this approach is the use of lower voltage trigger circuits, thus smaller size, while maintaining reliability of operation. 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, in FY 2002 processes to preferentially load or coat simple MEMS structures with film energetic materials will be investigated. The testing program initiated last year to evaluate the long-term performance and reliability of chip slappers in realistic military environments will be continued. Toward the program goal of demonstrating a prototype ESAD in a high-velocity penetrator in FY 2003, characterization of detonators, capacitors, switches, etc. in shock environments for application to hard target munitions will be completed. Design issues causing current oscillations in multipoint detonator arrays utilizing low-energy chip slapper detonators will be resolved and improved design principals will be developed. Preparations will commence for the large multipoint array demonstrations scheduled for FY 2003 and transition of the technology to DoD contractors will begin. Support and development of the knowledge base tool for preservation of advanced initiation technology will be continued with an expanded scope to include other fireset components beyond detonators. A new initiative to focus and apply mature microfuze technology towards expanded and enhanced Special Operations Forces (SOF) warfighting capabilities will be started. ($ 3.949 million)

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(U) Work in energetic materials will be aligned with the recommendations from the DoD 2000 Weapons Technology Area Review and Assessment (TARA) and, in particular, will be coordinated with the recently established national initiative in advanced energetic materials. Concern from the DoD 2000 Weapons TARA regarding the need to maintain weapon lethality as weapon and platform size decrease will continue to be 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 will continue with synthesis based on theoretical molecular design. Efforts to crystallize the new high energy molecule, LLM-121, in its pure form will continue. Efforts sponsored under this program will continue 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. With the completion of the LLM-105 synthesis and scale-up work, efforts will focus on formulation for evaluation and eventual qualification as a Navy booster material. The creation of new HEDMs will continue, along with the development and implementation of accurate techniques for determining crystal structure and energy content of the newly synthesized materials. With the installation of a special press in FY 2001 designed to produce sample sizes of 100mm3, the feasibility of bulk synthesis on CO-derived and nitrogen HEDMs will be demonstrated and initial measurements of their energy content with larger sample sizes will be completed. The synthesis of additional extended solid HEDMs will also be explored. With the release of Cheetah 3.0, the emphasis in Cheetah development will turn towards implementing more sophisticated kinetic models into the code that account for differences in explosive microstructure including explosive particle morphology and towards generating more accurate equations of state for detonation products. To support this work, a new impulsive stimulated light scattering spectrometer will be used to conduct measurements in a diamond anvil cell to monitor the onset of chemical reactivity at extreme conditions with great accuracy. Efforts to develop and validate computational tools for predicting munition system response to operational threat and accident environments will continue. The first generation of simulation tools for munitions response to accident environments will be exercised against test data to validate the codes and expand their ability to predict weapon system performance and response in accident situations. The joint experimental program with Navy to measure the violence of reaction in cookoff accidents will be expanded to testing and analyses of a full weapon systems. Experiments to determine mechanical property of both fielded high explosives and their constituents will continue for development and validation of high explosive mechanical response models. ($ 5.687 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint DoD/DOE Munitions **PE 0603225D8Z**

(U) 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.($ 2.553 million)

(U) Design improvements for hard target penetrators will be explored that add penetration capability and survivability and increase payload volume. Work on the Monolithic Ballasted Penetrator concept will be completed. Analysis of data from the final prototype test performed late in FY 2001 will be evaluated, an industrial supplier will be developed, and the technology transitioned to the TACMS Penetrator Demonstration ACTD. Efforts to resolve differences between various computational models and design tools will continue. Data from the extensive set of penetration experiments into concrete completed in FY 2001 will be used to benchmark and validate current codes. A miniaturized 3-axis accelerometer and data recorder that is able to survive high velocity hard target penetration events will be developed. This new diagnostic will support continued studies of oblique penetration and code validation and benchmarking of tools used to predict lateral loading of the penetrator and its components. Advanced materials will be evaluated for high-velocity applications. A large suite of experiments will be undertaken jointly with Air Force and National Forge Company, a supplier of current penetrator bombs, to study a low-alloy steel that holds promise as a low-cost replacement for the ultra-high-strength steels postulated for future high-velocity penetrators. These experiments and subsequent mechanical property tests will define heat-treat schedules necessary to harden the alloy and maximize its strength and toughness. The composites work will shift attention to understanding the failure of metal matrix composite materials in support of stronger and lighter military systems. A new project will be initiated to develop the underlying technologies needed for a Low Collateral Damage Munition which will provide an enhanced alternative to the use of inert munitions against soft targets in urban areas. The initial effort will focus on the development and characterization of a new explosive material with increased near-field impulse. ($ 4.136 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Joint DoD/DOE Munitions **PE 0603225D8Z**

(U) The demonstrated small scale process to convert Explosive D and TNT to TATB will be scaled up from 1kg to 10 kg in collaboration with Mason and Hangar, Amarillo, Texas, in support of an ongoing Navy manufacturing technology program. Exploitation of femtosecond laser cutting and machining of explosives for both munitions demilitarization and manufacturing will continue. The emphasis this year will be on the use of the 10-kg explosive tank for large scale laser cutting in preparation for demonstrations on live munitions in FY 2003. Determination of optimum cutting parameters, safety limits, and geometry limits for munitions related materials and high explosives will be completed. Work on the robotic workcell will focus 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 by FY 2003. The development of materials and system aging models with a focus on predicting the reliability of solder interconnects, plastic encapsulated microcircuits, propellants, and adhesive joints will be continued. A new project will be initiated to characterize the particle emissions generated from open burn/open detonation (OB/OD) events. 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. Laboratory experiments will be performed to generate particle signatures anticipated in larger scale events. Open air detonation experiments will be conducted in support of sensor development and testing. ($ 2.657 million)

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(U) **FY 2003 Plans:**

(U) Continue the development and demonstration of improved components and architectures for robust, low-cost, miniature safing, arming and firing systems. Continue component development and evaluation and explore commercial sources for manufacturing. Demonstrate an integrated capacitor and switch in a single package for use as a next generation microfuze component. Apply and focus current state of the art micro-fuze technology to the Special Operations Forces (SOF) arena in order to enhance and expand SOF capabilities in various mission scenarios. Transition latest miniaturization technology to production-type facilities and to the services in order to begin exploitation. Complete the study to understand instabilities in multiple-slapper, highly miniaturized systems to permit design of highly reliable and uniquely flexible ordnance. Perform experiments and begin to develop the theory and models of microdetonics, the explosive behavior in very small geometry. Continue to work with services in areas of landmine alternatives, multi-mode and multi-mission munitions, integrated logic/fireset functions, and innovative solutions. In FY 2003 and beyond, booster materials resulting from new formulations and the sol-gel process will be characterized and performance tested. In the miniature fireset area, the voltage capability of the solid state dielectric switches will be improved and performance of the high voltage photocell will be enhanced in order to reduce volume, improve light coupling efficiency, and increased charging current. ($ 5.922 million)

(U) Continue efforts to synthesize, characterize and scale-up new energetic materials with increased or tailored performance and decreased sensitivity. Complete development and qualification of an LLM-105 booster explosive. Complete sol-gel metal oxides research and focus on applications development. Complete energy and performance measurements of bulk synthesized CO-derived and nitrogen HEDM's. Explore the synthesis of additional extended solid HEDMs. Continue the development and maintenance of the Cheetah thermochemical code for performance predictions of energetic materials, and provide user support to the DoD community. Complete development of ignition phenomenology model and design of ignition location experiments in support of the effort to validate and expand codes for predicting weapon system performance and response in accident situations. Continue the joint experimental program with Navy to measure the violence of reaction in cookoff accidents for full weapon systems. Continue to populate the explosives databases HEAT1 and APEX to ensure archival retention of critical energetic materials knowledge and transition of the technology. Continue energetic material development in support of Low Collateral Damage Munition and expand SOF focused microfuze technology activities. ($ 7.962 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint DoD/DOE Munitions **PE 0603225D8Z**

(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 a broader class of real-world problems. Continue to support the transition of these tools, the training and consulting for the DoD user community. ($ 2.807 million)

(U) Continue the study of advanced hard target penetrator concepts and adapt designs to state-of-the-art materials and manufacturing methods. Investigate fabrication processes for the new Air Force low-cost penetrator steel, including weldability and melt processes to optimize properties and castability. Complete the experimental hard target test-bed program by conducting instrumented penetration tests on well-characterized concrete targets using the new miniaturized 3-axis data recorder to gather the data necessary for code validation. 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. Accelerate 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. Conclude study on the texture effect on a shaped charge jets and evaluate the technique for application to next generation warhead concepts. Complete temperature measurements of shocked materials and provide results to the DoD community for model validation and warhead design. Continue 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. Complete the simulations of the Ta liner test-bed experiments and assess the utility of the new materials models. Continue the development of advanced aimable warheads exploiting the individually controlled, distributed micro-firesets under development in the advanced initiation task.($ 5.541 million)

(U) Demonstrate femtosecond laser technology for demilitarization using live munitions. Begin mid-scale testing of sensors that can detect particle emissions in explosive events. Use small and mid-scale sensor test results to generate a data base and analysis tools for standoff identification and specification of particles generated in detonation events. Initiate efforts to correlate remotely detected gas-phase emissions during detonation events to military damage objectives for Bomb Damage Assessment (BDA). ($ 3.188 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint DoD/DOE Munitions **PE 0603225D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	16.670	16.785	15.675	Continuing
Delta	-0.154	2.393	0.000	
FY 2002 Amended President's Budget Submission	16.516	19.178	15.675	Continuing
Appropriated Value	16.670	19.178	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.196	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.154	0.000	0.000	
c. Other	0.000	0.000	9.745	
Current FY 2003 Budget Submission	16.516	18.982	25.420	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 and FY2003 increases reflect programmatic adjustments.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint DoD/DOE Munitions **PE 0603225D8Z**

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3							R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**			
COST *(In Millions)*	FY2001	FY2002	FY 2003	FY 2004	FY 2005	FY200	FY 2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.465	7.638	7.404	7.566	7.645	7.918	8.094		Continuing	Continuing
ATR/P232	7.465	7.638	7.404	7.566	7.645	7.918	8.094		Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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 siginifcantly increased while significantly reducing false alarm rates by exploiting multi-sensor fusion concepts for ATR algorithms.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

(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 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.465	7.638	7.404	7.566	7.645	7.918	8.094		Continuing	Continuing
ATR/P232	7.465	7.638	7.404	7.566	7.645	7.918	8.094		Continuing	Continuing

(U) Project Number and Title: P232 ATR

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Robustness of selected ATR's was assessed over a wider range of challenging operating conditions using innovative applications of real, hybrid and synthetic imagery. The first DoD-wide "Problem Sets" were created for government/industry/academia evaluation of SAR ATR performance in a benchmarking exercise conducted/led by AFRL. This effort provided the basis for the creation of a D0D-wide standard procedure for the development and use of expanded Problem Sets for SAR, EO/IR, LADAR, and Hyperspectral sensor/ATR evaluations. The Problem Sets and DoD standards for submission, review, approval, and use of Problem Sets have been posted on the Virtual Distributed Laboratory (VDL) website and distributed to the government and industry community. The application of such multi-sensor synthetic imagery in High Level Architecture (HLA) simulations was assessed as a technique to determine ATR effectiveness dynamically. In the hyperspectral area, an end-to-end performance model, incorporating sensor and processor models, was validated. The end-to-end model was used to conduct performance and subsystem trade off analyses between hyperspectral sensors and their ATR's. Service models developed to predict ATR performance were refined to include evolving high fidelity multi-mode sensors. An initial assessment of sensor fusion for ATR was conducted by the services reported at a DoD-wide technology review. This will pave the way for further work in refining network-centric sensing and ATR processing using sensor fusion algorithms and advanced architectures for information fusion to reduce false alarms and increase situational awareness.
($ 7.465 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

(U) FY 2002 Plans:

(U) Building on the database from sensor data collected during FY01, algorithms will be benchmarked for detection and false alarm performance. A major new data collect, involving the Services, DARPA, and NASA, will be pursued. This data collect will take place over a 2-year period and will be conducted in a variety of terrains, seasons and weather conditions, involving fielded and advanced developmental sensors covering the broad electromagnetic spectrum (RF, Vis/NIR/MIR/FIR, LADAR, multi and Hyperpectral) for a wide variety of targets employing the latest CCD technicques. New Problem Sets for EO/IR, LADAR, and Hyperspectral sensor data will be created andsubmitted for evaluation by the ATR community. Continuing with the sensor fusion initiative, technical emphasis will continue to be focused on assessment of emerging ATR algorithms based on multi-sensor inputs. Using the nodes established in FY01 at AFRL and NVESD, performance results and raw data will be distributed and analyzed using the Virtual Distributed Laboratory (VDL). High Performance Computing assets will be incorporated to allow faster access and shorter algorithm processing cycles. The role of synthetic and hybrid data will be expanded in FY02 by comparing ATR algorithm performance for measured vs inserted targets. Hyperspectral databases will be expanded and enhanced using Forest Radiance II and Desert Radiance III data. Hyperspectral ATR performance predictions will be demonstrated. In the ATR transition area, additional IR problem sets will be collected and scoring and analysis methods for moving vehicles will be completed for LRAS3. LADAR algorithms will be demonstrated and evaluated. Mid-wave IR tests will also be conducted. ($ 7.638 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

(U) FY 2003 Plans:

(U) Continue sponsroship, along with Service/DARPA investments (to include NASA), of a major data collect to support a DoD-wide, advanced evaluation of single and multi-sensor fusion techniques, including SAR, EO/IR, LADAR, Hyperspectral Imaging on single and multi-platforms. Targets, scenarios and background clutter will be representative of multiple battlefield conditions for a wide variety of user applications. Advanced Problem Sets will be created for DoD-wide, ATR assessments and will be posted on the VDL for use by the government, industry, and academia. Continue advanced assessment of sensor fusion techniques for enhanced ATR. ($7.404 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's President's Budget Submission	7.534	4.673	7.424	Continuing
Delta	(0.069)	3.043	0.164	Continuing
FY 2002 Amended President's Budget Submission	7.465	7.716	7.588	Continuing
Appropriated Value	7.534	7.716		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	(0.078)	0.000	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.069)	0.000	0.000	Continuing
c. Other	0.000	0.000	(0.184)	Continuing
Current FY 2003 Budget Submission	7.465	7.638	7.404	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments.

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition **PE 0603232D8Z**

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

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 3								R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D8Z**	
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	29.304	12.107	11.168	11.877	12.539	12.769	13.013	Continuing	Continuing
Project Name/No. and Subtotal Costs – Special Technology Support/P704	29.304	12.107	11.168	11.877	12.539	12.769	13.013	Continuing	Continuing

A. Mission Description and Budget Item Justification:

Brief Description of Element: Special Technology Support to Intelligence and Light Forces is a classified program. See the Congressional Justification Book for program details. This program is funded under Budget Activity 3, Advanced Technology Development because it supports intelligence efforts assessing technological feasibility and operating capabilities.

Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Mission Support -29.304 million

FY 2002 Plans:

- Mission Support -12.107 million

FY 2003 Plans:

- Mission Support -11.168 million

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test & Evaluation, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D**

B. Program Change Summary	FY 2001	FY 2002	FY 2003	To Complete	Total Cost
Previous President's Budget	29.304	11.019	11.198		
Appropriated Value				Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally-directed undistributed reduction		-.112			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment					
c. Other		1.200	-.030		
Current President's Budget	29.304	12.107	11.168	Continuing	Continuing

Change Summary Explanation:

FY 2002: Adjustments for FFRDC reduction (Section 8032) -.035; Cross-cutting congressional adjustments (Section 8123) -.077. Congressional add $1.2 million.

FY 2003: Non-pay purchase inflation adjustments -.030

C. Other Program Funding Summary Cost: Not applicable.

D. Schedule Profile Not Applicable.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	**R-1 ITEM NOMENCLATURE** Strategic Environmental Research and Development Program **PE 0603716D8Z**

COST *(In Millions)*	FY2001	FY2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	59.007	62.165	60.468	63.172	64.191	64.771	65.734	Continuing	Continuing
SERDP/P470	59.007	62.165	60.468	63.172	64.191	64.771	65.734	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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, 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	**R-1 ITEM NOMENCLATURE** Strategic Environmental Research and Development Program **PE 0603716D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	59.007	62.165	60.468	63.172	64.191	64.771	65.734	Continuing	Continuing
SERDP/P470	59.007	62.165	60.468	63.172	64.191	64.771	65.734	Continuing	Continuing

(U) Project Number and Title: P470 SERDP

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) General: Continue development of environmental technologies that respond to the DoD`s highest priority environmental needs

(U) By Thrust:

Pollution Prevention : Development of new plating materials and technologies to replace toxic chromium and cadmium in weapon systems and platforms has shown exceptional progress. Technologies to inspect aircraft, ships and tanks for corrosion without stripping the paint continue under development. Efforts on the development of non-ozone depleting chemicals for firefighting remained a focal point as have the elimination and reduction of hazardous air emissions. ($ 18.797 million)

(U)Cleanup: Technology development efforts continued to address the remediation high priority pollutants including energetics, chlorinated solvents and ammonium perchlorate. These include advances in site characterization focusing on optimization of long-term groundwater monitoring systems; Risk Assessment and Standards; Bioremediation; and Physio-chemical Remediation. ($ 14.723 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**

(U)Compliance : The Compliance Thrust Area continued efforts to support waste treatment and disposal, environmental monitoring and environmental management that is not directly related to site restoration but is meeting current and future environmental compliance requirements of DoD and DOE. Focus was on reduction of hazardous air emissions, fate and impact of contaminants, and characterization and treatment of contaminated waters and sludges.
($12.304 million)

(U)Conservation : Work continued in the assessment and mitigation of military impacts on DoD lands with an emphasis on range sustainability. Efforts addressed issues associated with threatened and endangered species and Ecosystem Management to develop the scientific understanding of ecosystem processes on military lands that will permit the continued use of these lands.
($10.488 million)

(U) Unexploded Ordnance (UXO) Detection : Continuing efforts to improve UXO detection capability, including the development of sensor technologies that exploit all of the physical characteristics of UXO. Equally important is the continued development of methods and techniques for accurately discriminating UXO from scrap in order to significantly reduce the cost of clearance.
($ 2.695 million)

(U) FY 2002 Plans:

(U)General: SERDP will continue research and technology efforts to address the high priority requirements in Pollution Prevention ; Cleanup; Compliance; Conservation; and Unexploded Ordnance (UXO). Particular attention is being directed to UXO and other issues which impact the sustainability of the Department's training and testing ranges. The increase in the FY2002 request was directed towards the detection and discrimination of UXO as well as the multitude of issues concerned with the contamination of soil and groundwater due to energetic materials expended during live fire operations.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**

In the Pollution Prevention thrust area: In addition to the ongoing projects, the new start focus areas for FY 2002 include: environmental fate, transport and effects of the new energetic material CL-20; environmentally benign polymer matrix composites; tagging technologies to permit the remote localization and identification of UXO; environmentally benign, low-temperature, powder coatings; environmentally benign packaging for military rations; environmentally acceptable pyrotechnics; technologies to prevent or limit marine fouling of ship hulls and heat exchangers; and environmentally acceptable replacements of fluorescent dyes for non-destructive testing of weapons systems. In addition, a major effort to develop "green" medium caliber ammunition began. ($15.576 million)

For the Compliance thrust area: The areas of interest for new start projects include: determination of the emissions from live fire activities as well as the fate and effects of the energetics on training and testing ranges; source and ambient air toxic monitoring technologies; technologies to control aquatic non-indigenous species in Navy ships; and observation and prediction technologies for hazardous emissions from DoD operations. ($11.610 million)

Within the Conservation thrust area: The new starts focus on: techniques to cost effectively detect and evaluate artifacts on DoD ranges that fall under the Native America Graves Protection and Reparation Act; evaluation of the impact of fog oil "smoke generators" on the plants and animals on DoD ranges; techniques to assess the impact of land use changes (urbanization, encroachment) outside DoD installations on the installations' ecosystems; techniques to determine the impact of noise on animals; and the development of micro- and nano-scale sensors for ecosystem parameters. ($10.047 million)

In the Cleanup thrust area the focus of the new starts includes: technologies for remediation of soil and groundwater contaminated with energetic materials; developing a more complete understanding of the basic chemistry and physics of in-situ oxidation remediation methods; development of techniques to assess and predict the impact of source zone removal on the time and cost of total remediation; developing alternatives to expensive microcosm protocols for bioremediation; and development of technologies for cost effective long term monitoring. ($14.321 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**

In the Unexploded Ordnance (UXO) area the new start areas of interest include: developing technologies for the characterization and remediation of high density areas such as aerial bombing targets; new sensors, platforms or processing techniques for UXO detection in rugged or heavily vegetated terrain; new geolocation techniques and new render-safe or removal technologies. Efforts will be initiated in address the detection and discrimination of underwater UXO. ($ 10.611 million)

(U) FY 2003 Plans:

(U) General: SERDP will continue to aggressively pursue technologies to address the Service's high priority environmental issues. The sustainability of our training and testing ranges as well as our installation infrastructure is a key focus area. The environmental issues surrounding our bases are both numerous and varied. The impacts of live fire training includes not only the UXO issue, but also the contamination of the soil and ground water with explosives, as well as the impact of noise from munitions on threatened and endangered species. Threatened and endangered species are also impacted by range management activities and the potential loss of habitat. Air emissions from both live fire training and military platforms (aircraft, ships and tanks, etc) contribute to regional air pollution and are becoming an issue in non-attainment areas. All of these issues are exacerbated by the encroachment of urban and suburban development upon our installations.

SERDP will continue a comprehensive research agenda to address these issues. Research in all five thrust areas contribute to the solutions. Cleanup projects address the remediation of energetics in soil and groundwater. Compliance projects develop methods to measure and control air emissions as well as determine the fate and effect of explosives in the environment. Conservation projects determine the impact of military operations on threatened and endangered species and develop methods and protocols for managing our natural and cultural resources. The development of "green" munitions and weapon systems that will not impact on the environment as well as low-emissions power sources are core objectives of pollution prevention. And finally, the increased emphasis on UXO detection, discrimination and remediation will continue.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	**R-1 ITEM NOMENCLATURE** Strategic Environmental Research and Development Program **PE 0603716D8Z**

In addition to developing technologies to permit the long term sustainability of our training and testing ranges, SERDP will continue to develop technologies that reduce the Department's future liability. The costs associated with compliance with environmental regulation coupled with the cost of environmental restoration, including the removal of UXO, are extensive and continue to grow. Technologies that reduce these costs significantly are and will be actively pursued. 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, platforms and the processes that we use to repair and maintain them remains a primary objective. The projects include the elimination of heavy metals such as chromium, cadmium and lead, the replacement of volatile organic compounds (VOC's) with benign alternatives and the development of environmentally friendly ship hull coatings.
($ 60.468 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	51.357	53.346	49.360	Continuing
Delta	7.650	16.030	0.000	
FY2002 Amended President's Budget Submission	59.007	69.376	49.360	Continuing
Appropriated Value	59.557	62.876	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.711	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.550	0.000	0.000	
c. Other	0.000	0.000	11.048	
Current FY 2003 Budget Submission	59.007	62.165	60.468	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program **PE 0603716D8Z**

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflected Section 8086 adjustments and recissions. Increases in FY 2002/2003 reflect changes for UXO efforts.

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

(U) **Technical**:

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY: RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE: Joint Warfighting **PE 0603727D8Z**

COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.538	7.536	9.610	9.867	10.156	10.534	10.819	Continuing	Continuing
Joint Warfighting/P727	7.538	7.536	9.610	9.867	10.156	10.534	10.819	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT:

(U) In May 1998 the Secretary of Defense appointed Commander-in-Chief, United States Joint Forces Command (formerly the US 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 Program Element 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. 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 this PE. Program Element 0603727N was established to provide Joint Forces Command with its own funding source in FY 2000.

(U) The Joint Warfighting PE supports three related activities: the JAWP, the ITB, 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 other organizations in addition to Joint Forces Command, and they require a degree of independence from Joint Forces Command to function as envisioned.

(U) 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 a key role in identifying, exploring and evaluating breakthrough warfighting capabilities. It builds on the lessons learned from earlier Service experiments that have underscored the importance of having a firm conceptual basis upon which to build experiments. The JAWP concentrates on joint, vice Service-unique, revolutionary concepts. In identifying and elaborating innovative joint concepts and capabilities, and associated enabling technologies, the JAWP will not only take into account Service efforts, but those of CINCs and Defense agencies as well. The JAWP promotes integration, conducts experiments and assists in implementation. The JAWP's work complements and supports the activities of Joint Forces Command, the Joint Staff and the OSD. It provides an independent source for formulating advanced concept candidates for joint experimentation.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D8Z

The JAWP is composed of both civilian analysts and technologists. The JAWP Analytical Project Office (JAWP-APO), a jointly manned activity established by the Deputy Secretary of Defense, consists of military personnel from the four Services. The civilians provide a level and quality of expertise not generally available in the Department of Defense. 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.

(U) The ITB provides an advanced network infrastructure that extends commercial capabilities to provide capabilities needed to meet JV2020 needs. Information Superiority is a key JV2020 building block and the ITB provides the means to experiment with the digital transmission capabilities that will be available in five years. 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 Defense Information Systems Agency (DISA) - Defense Advanced Research Projects Agency (DARPA) Leading Edge Services Network (DISN-LES), 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 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 and high definition television.

(U) 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 is also being used to initiate a Red Team Pilot Project (DoD Adaptive Red Team – DART) for Joint Forces Command. The DART will participate in Joint Forces Command Concept Development and 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.

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(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 2001 Accomplishments:

(U) The Joint Advanced Warfighting Program (JAWP) continued its support of joint concept development and experimentation for the Office of the Secretary of Defense, the Joint Staff, Joint Forces Command, and DARPA. Building on its FY 98 through FY 00 experiences, JAWP focused on enhancing joint operational-level command and control, ISR integration, and joint force application. To help evolve Joint Forces Command's Rapid Decisive Operations concept and support DARPA's and the Army's Future Combat Systems (FCS) development effort, JAWP planned, developed partnerships, coordinated, and initiated the Future Joint Force I Experiment, investigating innovative command and control applications, integration of theater and tactical ISR efforts, and employment of robust air and ground robotic sensor suites using wargames, constructive modeling, and human-in-the-loop simulation. This effort is a partnership that engaged the Army and Air National Guard, the UK, Canada, the Marine Corps Warfighting Lab, the Army's Mounted Maneuver Battle Lab (MMBL), IDA, RAND, and DARPA. This extensive partnering effort recognizes that transformation requires a common perspective on challenges and solutions, including the perspectives of allies. In support of the Joint Staff, JAWP developed a definition and operational framework for effects-based operations and developed a draft joint operational concept for dominant maneuver. Included in all of JAWP's work are vulnerability assessments using "Red Teaming" techniques that identify weaknesses and help avoid surprises. In support of OSD and the Joint Staff, JAWP completed development of a DoD Roadmap for Urban Operations. JAWP's outreach efforts have engaged: Israel and the UK in effects-based planning and operations; all NATO partners in urban warfare concept development; the UK, Australia, and Canada in joint concept development and experimentation; and Germany and Singapore in possible future participation in joint experimentation. In support of Joint Forces Command, JAWP planned, coordinated, and initiated cooperation with the Warrior Prep Center at Ramstein, Germany to support concept development efforts with the Multinational Interoperability Council nations—Britain, France, Germany, Canada, and Australia. Finally, JAWP supported the Secretary of Defense's Transformation Panel with briefings and concept papers that resulted in recommendations included in the current Defense Planning Guidance. ($4.500 Million)

(U) The ITB support for wide-area network connectivity for joint warfighting experimentation continued, as did the ongoing task of transitioning emerging technology from advanced research network testbeds. Specifically, Unified Vision 01 was supported and executed, while assistance was given to design Millennium Challenge 02. The Future Combat System (FCS) series of experiments linking JFCOM with the MMBL at Ft. Knox was supported using the DREN. Initial implementation of secure (Kerberized) network management protocols (SNMPv3) across selected ITB sites was demonstrated. Development and evaluation of advanced security/information assurance devices and tools, such as ATM and host-based layered firewall technologies, was begun in the lab. Distributed applications, such as collaborative tools, continued. Commercialization of IP Class-of-Service (CoS) to ATM Quality-of-Service was furthered with initial testing

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of Class-Based, Weighted Fair Queuing (CBWFQ). Efforts in support of JFCOM continued. Connectivity to key sites (JFCOM, SPAWAR, WISSARD, etc.) continued, with selected circuits upgraded as required. Significant hardware upgrades to end-sites occurred. ($1.400 Million)

(U) Technology Feeder Support: JFCOM's Campaign Plan 01 identified 31 major exercises and experiments in FY 2001. The Deputy Under Secretary of Defense (Advanced Systems and Concepts), in coordination with JFCOM and the Joint Staff, assisted in determining which ACTDs, ATDs, and/or Technology Demonstrations best support JFCOM's experimentation events. Funding was provided to the selected technology managers to support a joint experiment. Funding was provided for efforts such as system integration, and logistics and test support. Planning and preparations continued for incorporation of as many technology demonstrations as possible into the primary FY 2002 joint experiment, MILLENIUM CHALLENGE 2002. Initial funding was provided to the (DART) which evaluated the major joint experiment of 2001 (Unified Vision 01) and prepared to observe and critique MILLENNIUM CHALLENGE 2002. ($1.638 million)

(U) FY 2002 Plans:

(U) The JAWP will continue its Future Joint Force Experiment, building toward FY 04 completion of the Rapid Decisive Operations (RDO) series of human-in-the-loop simulation experiments. The effort will incorporate insights from JAWP's Future Joint Force I experiment and Joint Forces Command's Unified Vision 01 experiment to build the foundations for a beyond 2010 forcible entry operations capability addressing a broad range of potential contingency environments. The experiment will leverage the results of past JAWP and JFCOM experiments to exploit networked ISR capabilities as an integrated tool of warfare; refine joint command and control organization; integrate manned and unmanned capabilities for reconnaissance and combat applications; and explore innovative ways to overcome opponents' protective measures. Opportunities will be identified to leverage and integrate Service, allied, and other agency programs. Through workshops and limited objective experiments, JAWP will also help integrate the independent joint command and control initiatives of PACOM, CENTCOM, 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. Data collection and independent analysis will be conducted and used to produce reports and papers intended to inform the OSD, Joint Staff and the Joint Forces Command leadership of experimentation results and to inform transformation choices. Vulnerability assessments and "Red Teaming" will be conducted to improve the validity and robustness of experimentation. The JAWP will help identify and exploit opportunities facilitating the early transition of new concepts and technologies to operational capabilities. ($4.500 Million)

(U) 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 testbeds. Specifically, FCS support will continue and Spiral 01, Spiral 02 and Millennium Challenge 02 will be supported and executed. More robust versions of CBWFQ will be implemented to map IP CoS to ATM QoS. Implementation of secure (Kerberized) network

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management protocols (SNMPv3) across the major ITB sites is expected. Information assurance and other security technologies will continue to be tested and deployed, including determining the effectiveness of next-generation Type-1 cryptographic devices on distributed simulation. Initial testing and deployment of high-quality, low-latency, host-based video teleconferencing and collaborative tools will begin. Efforts in support of JFCOM will continue. Connectivity to key sites (JFCOM, SPAWAR, WISSARD, etc.) will continue with selected circuits and equipment upgraded as required. ($1.400 Million)

(U) Technology Feeder Support for Joint Experimentation will continue. JFCOM's Campaign Plan 01 projects 26 major exercise and experiments which can support technology demonstrations. The primary FY 02 effort will be Millennium Challenge 02 and the TFS effort will enable the incorporation of numerous technology demonstrations. Plans for Olympic Challenge 04 will be further defined and work will begin to align the technologies supporting this major integrating exercise. Integrated concept teams (ICTs) will have had the opportunity to prepare more detailed experimentation and assessment plans. Once the concepts and experimentation plans are more clearly articulated, technologies supporting the experiments will be identified. This funding will leverage ongoing developments to support joint experiments, not to fund the development itself. The DOD Adaptive Red Team (DART) Pilot Project will initially be funded from within this project. Its primary focus will be to evaluate Millennium Challenge 02. ($1.636 million)

(U) FY 2003 Plans:

(U) The Joint Advanced Warfighting Program (JAWP) will continue support of the Department's transformation objectives through joint experimentation and joint concept development. Specifically, the JAWP will continue its Future Joint Force experiment to exploit insights gained from FY01 and FY02 experimentation and JFCOM's Millennium Challenge 02 limited objective experiments. It will also help identify an implementation path for a worldwide joint command and control structure emphasizing the creation of standing Joint Task Forces as the foundation on which future joint operations will be based. ($4.500 Million)

(U) 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 testbeds. Information assurance and other security technologies will continue to be tested and deployed. Deployment of high-quality, low-latency, host-based video teleconferencing and collaborative tools will continue. Support for Olympic Challenge 04 planning will be provided. Efforts in support of JFCOM will continue. Connectivity to key sites will continue with selected circuits and equipment upgraded as required. ($1.400 Million)

(U) Technology Feeder Support for Joint Experimentation will continue. Further determination of potential major exercises and experiments which can support technology demonstrations will be completed. Plans for Olympic Challenge 04 will be further defined and work will continue to align the technologies supporting this major integrating exercise. ICTs will continue to complete detailed experimentation and assessment plans. Technologies to support selected experiments will

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be further identified. An expanded DOD Adaptive Red Team (DART) will be used to support a number of selected major exercises to enhance the evaluation. of Joint Experimentation. ($3.710 million)

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
President's FY 2001 Budget Submission	7.607	7.570	7.588	Continuing
Delta	(0.069)	0.043	3.060	
FY 02 Amended President's Budget Submission	7.538	7.613	10.648	
Appropriated Value	7.607	7.613		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.077	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.069	0.000	0.000	
c. Other	0.000	0.000	-1.038	
Current President's Budget	7.538	7.536	9.610	Continuing

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D8Z

Change Summary Explanation:

(U) **Funding**: FY 2001 reduction reflects Section 8086 adjustments.
FY 2003 funding increase reflects an expanded DoD Adaptive Readiness Team (RED TEAM) effort.

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE FEBRUARY 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Agile Port Demonstration **PE 0603728D8Z**			
COST *(In Millions)*		FY 2001	FY 2002	F 2003	FY 2004	FY2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		7.432	8.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ADP/P728		7.432	8,500	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

The goal of the program is to support the development and deployment of advanced concepts and technologies leading to an automated, fully-integrated, multi-modal Defense Transportation System (DTS) able to meet the needs of the 21st century. The Center for Commercial Development of Transportation Technologies (CCDoTT) is a DoD funded consortium of public, private, and academic activities brought together to identify and deploy advanced technologies that can be systematically integrated into ports and other transportation systems supporting both commercial and DoD transportation requirements. The purpose of the program is to compare traditional transportation methodologies with next generation technologies, identify the potential for these new technologies to support DoD mobility requirements, and determine the scenarios and criteria for their economic use. All program activities are put forth in coordination with the Department of Transportation - Maritime Administration (MARAD).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Agile Port Demonstration **PE 0603728D8Z**

COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		7.432	8.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000
ADP/P728		7.432	8.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000

(U) Project Number and Title: P728 ADP

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) A cooperative research and development plan was jointly developed by the DoD and MARAD that focused projects on improving and leveraging Defense and commercial transportation system efficiencies by combining relevant capabilities, resources, and technologies in the following thrust areas; ports, terminals, transfer technologies; high speed sealift ship system configurations and; rapid deployment technologies. Research conducted under the interagency agreement have clear links to national defense requirements addressed by DoD ($ 7.432 million).

(U) FY 2002 Plans:

(U) The FY 2002 program continues the ongoing research and development joint efforts by DoD and MARAD that began in FY 2001. ($8.500 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration **PE 0603728D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
FY 2002 Amended President's Budget Submission	7.432	0.000	0.000	0.000
Appropriated Value	7.500	7.716	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.784	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.068	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current President's Budget	7.432	8.500	0.000	0.000

Change Summary Explanation:.

(U) Funding: FY 2001 reductions reflect Section 8086 adjustments. FY 2002 reductions reflect Congressional undistributed reductions.

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APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration **PE 0603728D8Z**

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

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

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	**R-1 ITEM NOMENCLATURE** Cooperative DoD/VA Medical Research Program **PE 0603738D8Z**

COST *(In Millions)*		FY 2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0.991	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Coop DoD/VA Medical/P464		0.991	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) Congress has added funding in this program element each year since 1987 but appropriated no funds for FY2002. Through FY 1998, the program was managed by the Veterans Administration. In accordance with the FY 1999 Defense Authorization Bill (H.R. 3616, Sec. 244), the Department of Defense now guides investment of these funds as executive agent. Coordination with the VA on research topics ensures that the program benefits the health of both active military forces and veterans. Research proposals are solicited from in-house DoD and VA investigators, and projects are selected for funding based on technical merit and relevance to the solicitation. Technical merit is determined through independent peer review by experts outside the DoD and VA. Projects are selected through independent peer review by intramural VA and DoD physicians and scientists. Funds support cooperative medical research in topics such as emerging infectious diseases, trauma, stress, and exercise physiology as well as other emerging medical issues of importance to DoD and VA.

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APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Cooperative DoD/VA Medical Research Program **PE 0603738D8Z**

COST*(In Millions)*		FY 2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0.991	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Coop DoD/VA Medical/P464		0.991	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) Project Number and Title: P464 Coop DoD/VA Medical

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) The FY 2001 research program focused on two topics related to military health: post-traumatic stress disorder (PTSD) and occupational lung disease. The first effort reflected agreement by the Departments of Defense and Veterans' Affairs to support research on PTSD, which has been found to affect personnel while still on active duty or after they leave military service. This research focuses on PTSD among women, addressing symptoms and health outcomes, etiology and contributing factors, effective preventive measures, and possible treatments. A research protocol involving two types of interventions has been approved and is being implemented. The second research effort focused on "Occupational Lung Disease/Review of Biopsies" as provided by Congress. This study is addressing the extent to which lung diseases, especially sarcoidosis, may have been misdiagnosed among Navy personnel and to evaluate the relationship between sarcoidosis and other lung diseases and service aboard Navy ships. In FY 2001, the project established an Independent External Scientific Advisory Committee with nationally-recognized members and a Public Policy Advisory Committee with community advocates. Consensus on central questions to be addressed and scientific approach were established. A proposal was developed and approved by the advisory committees, and case ascertainment and records review has begun. The general study design is to describe the patterns of sarcoidosis and other related lung disease in the Navy with regard to time, race, sex, occupation, and service aboard ship. A committee of clinical diagnostic experts will conduct a records

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review of a sample of cases and determine the certainty of diagnosis of sarcoidosis or other lung disease. When available, tissue samples will be examined for histologic diagnostic verification, and subjected to content analysis to determine the presence of minerals associated with lung disease. ($ 0.991 million)

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	0.000	0.000	0.000	
Delta	1.000	0.000	0.000	
FY 2002 Amended President's Budget Submission	0.991	0.000	0.000	Continuing
Appropriated Value	1.000	0.000	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.009	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current FY 2003 Budget Submission	0.991	0.000	0.000	Continuing

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(U)FY 2002 Plans: Research will continue in FY 2002 using FY 2001 funds as follows: The PTSD study will begin patient treatment and data collection. The lung-disease study will continue analysis of data and tissue samples.
(U) FY 2003 Plans: N/A

Change Summary Explanation:

(U) Funding: Funding changes are the result of a below treshhold reprogramming. FY 2001 reductions reflect Section 8086 adjustments.

(U) Schedule: N/A

(U) Technical: N/A

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

(U) D. Acquisition Strategy: N/A

(U) E. Schedule Profile: N/A

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COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	118.819*	157.762	199.580	202.022	204.561	207.222	209.893	Continuing	Continuing
ACTDs/P523	118.819	157.762	199.580	202.022	204.561	207.222	209.893	Continuing	Continuing
DERF			2.000						

* Updates the current actuals amount for FY-2001

(U) A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: The Department of Defense (DoD) recognizes the need to rapidly develop and field new technological capabilities, and to explore new and innovative operational and organizational concepts associated with those capabilities. Such advances are critical to the objective of supporting the Chairman's *Joint Vision 2020*. 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 development and employment of technology and innovative, operational concepts by the military user are the primary focus. The demonstrations typically involve a material development organization that develops the mature technology applications, and a warfighting sponsor that assesses the military utility. In addition to stimulating innovation, ACTDs offer three other significant opportunities. They provide experienced combat commanders with an opportunity to develop operational concepts and operational requirements to fully exploit the technologies provided. They allow the users an opportunity to assess the military utility of the proposed capability prior to a major acquisition commitment. They also provide military Services with a mechanism for compressing acquisition cycle time, significantly improving their response to priority operational needs. As such, ACTDs are a key element of the DoD acquisition reform process. They do not substitute for formal DoD acquisition procedures, but can speed effective operational employment of technologies which are verified by combatant commands to have demonstrated military utility. Since FY 1999, ACTDs have been an integral part of 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 to prepare its annual Campaign Plans in order to insure ACTDs integrate technology and develop new concepts of operation to fully leverage with and integrate into future joint experiments. ACTDs continue to fill a critical and unique role in addressing joint warfighting requirements. 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.

(U) Ideally, the Military Departments and Defense Agencies provide most of the funding (80–85 percent) for ACTDs. This encourages Service/Agency commitment to the ACTD. Funding from this program element is used: 1) to support actual demonstrations and experimental employment; 2) to provide hardware to demonstrate military utility; and 3) to fund transition, interim capability operations and support for up to two years after the operational

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demonstration phase of the ACTD. This two-year phase provides the Service, Agency, and operators with adequate time to continue to address the issues of supportability, maintainability and training identified by the ACTD.

(U) Since program commencement in 1994, DUSD(AS&C) has initiated 99 unclassified ACTDs. Thirty-two of these have been completed as of the end of Fiscal Year 2001, resulting in 72 distinct products which have evolved as follows: (a) six entered engineering, and manufacturing development; (b) sixteen have transitioned to acquisition; (c) twenty-seven have integrated with current operational software systems, such as Global Command and Control System (GCCS) and Global Combat Support System (GCSS); and (d) twenty-three hardware-based solutions 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, greater than thirty ACTDs are deployed, or are preparing for deployment/accelerated development, in support of Operations Enduring Freedom and Noble Eagle, as well as for Homeland Security operations.

(U) Both the Science and Technology (S&T) and the warfighter communities submit candidate ACTDs for an annual review cycle. The candidates proposed by the S&T community reflect technological opportunities enabled by recently demonstrated technology. The candidates proposed by the warfighter community (Joint Chiefs of Staff (JCS), Unified Commanders in Chief (CINCs) and military Service and agency operational organizations) 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. Candidates are organized into the *Joint Vision 2020* operational concepts of Dominant Maneuver, Precision Engagement, Full Dimensional Protection and Focused Logistics.

(U) The maturity of the technology associated with the proposed capability is assessed by the DUSD (AS&C), with assistance of senior members of the Science and Technology community (known as the Breakfast Club). The Joint Requirements Oversight Council (JROC) establishes the priority of the ACTD candidates by military need. The principal management tools for the ACTD are the Implementation Directive and Management Plan. Each approved ACTD will be described in these top-level documents which provide details of the demonstration/evaluation, the main objectives, approach, critical events, measures of success, transition options, participants, schedule, and funding. Review of the candidates for FY 2002 ACTDs began in February 2001. Eighteen ACTD candidates were recommended and prioritized by the JROC. Based on funding availability, fifteen ACTD programs were subsequently selected to begin. Funding for new FY 2002 ACTDs is approximately $35 million.

(U) The typical timeline of one-to-four years for the operational demonstration phase of an ACTD is compressed compared to normal acquisition timelines for fielding an operational capability. 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 to either pursue an advanced technology demonstration to improve performance, or not pursue the technology any further at this time. In cases where the operational user is satisfied the prototype has significant 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.

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

(U) **FY 2001 Accomplishments**: All on-going ACTDs initiated in Fiscal Years 1995 through 2000 were reviewed for objectives, content and management. This includes in-depth review by the ACTD operational sponsors, usually the CINCs (such as United States Joint Forces Command (JFCOM)). Twelve ACTDs were completed in Fiscal Year 2001. The Unattended Ground Sensors and the Miniature Air-Launched Decoy each transitioned to acquisition. Ten ACTD software products were integrated within operational systems, such as Link-16 installation at the Combined Air Operation Center supporting Operation Allied Force. Also, eight hardware-based products were operationally deployed to Operations Allied Force and Southern Watch, as well as Enduring Freedom, Noble Eagle and for Homeland Security. Some ACTD products remained in theater as part of Kosovo peacekeeping operations. Thirty percent of all ACTDs participated in Operations Enduring Freedom and Noble Eagle, as well as Homeland Security operations. For example, Rapid Terrain Visualization ACTD sensors proved invaluable to the Federal Emergency Management Agency, providing detailed, airborne data at the World Trade Center. Fifteen new ACTDs were started in FY 2001 (see specific accomplishments below): Active Network Intrusion Defense, Adaptive Battlespace Awareness, Advanced Tactical Laser, Advanced Technology Ordnance Surveillance, Area Cruise Missile Defense, Coalition Combat Identification, Coalition Theater Logistics, Coastal Area Protection System, Hunter Standoff Killer Team, Joint Area Clearance, Loitering Electronic Warfare Killer, Network-Centric Collaborative Targeting, Personnel Recovery Extraction Survivability Aided by Smart Sensors, Tactical Missile System – Penetrator and Theater Integrated Planning System. The data call for FY 2002 ACTDs began in October 2000. Twenty-nine ACTD candidates, of the seventy received from the Unified Commands, the Services and Defense agencies, were considered for final selection. Candidates covered a broad range of technologies and needs, including counter-terrorism, force protection, homeland security, logistics, intelligence, reconnaissance, surveillance, information technology, ordinance development and disposal, communications and information assurance. These candidates were evaluated for technical maturity by the Breakfast Club and prioritized by each of the CINCs and Services. The JROC then completed final prioritization, validating military requirements for eighteen candidates, pending final ACTD selection based upon funding availability. FY 2001 funds were transferred to the executing services/agencies in the amount of $118.819 million.

(U) Other significant accomplishments for FY 2001 were:

FY 1995 Starts:

- Precision SIGINT Targeting System (PSTS): Concluded the interim capability support period and ended the ACTD.

FY 1996 Starts:

- Airbase/Port Biological Detection System: Continued residual maintenance of detector networks, provided depot repairs and spares, initiated upgrade of sampling system and maintained ongoing operator training at four sites in two theaters. Provided data and findings for engineering and manufacturing development (EMD) of ACTD elements. Continued the interim capability period.
- Joint Logistics: Transitioned Joint Logistics Decision Support tools to GCSS through the Advanced Information Technology Services (AITS) Joint Program Office (JPO) within the Defense Information Systems Agency (DISA). Continue the interim capability support period.

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- Miniature Air-Launched Decoy (MALD): Concluded the interim capability period to end the ACTD.
- Navigation Warfare (NavWar): Concluded the interim capability period to end the ACTD.
- Theater High Energy Laser (THEL): Commenced the interim capability support period.

FY 1997 Starts

- Counterproliferation II (CP II): Completed the Bomb Impact Assessment (BIA) system critical design review (CDR) and final research, development, test and evaluation (RDT&E), including the final data evaluation flights necessary to qualify for production. Conducted two sled tests of the BLU-116 A/B Advanced Unitary Penetrator. Continued Hard Target Smart Fuze (HTSF) EMD and completed several cannon, sled and shock tests. Continued RDT&E of Tactical Tomahawk Penetrator Variant (TTPV), completing the warhead design and demonstrating warhead lethality inside a hardened, simulated chemical production facility. Executed the first CP II ACTD operational demonstration, obtaining target response/collateral effects data of a Joint Air-to-Surface Standoff Missile (JASSM) against a simulated biological weapons facility.
- Extending the Littoral Battlespace (ELB): Conducted Major Systems Demonstration (MSD) II, followed by the military utility assessment. De-installed partial ELB configuration from the Amphibious Ready Group (ARG). Continued residual planning and transition planning efforts with Joint/Navy/USMC acquisition programs.
- Information Operations Planning Tool (IOPT): Finalized transition plans. IOPT supported Central Command (CENTCOM) and Central Air Forces (CENTAF) in INTERNAL LOOK 2001. Provided IOPT capability to other IO-related programs in various services. Concluded the interim capability period and ended the ACTD.
- Integrated Collection Management (ICM): Developed additional interfaces to collection platforms, collection nodes and data sources. Further enhanced and refined software. Developed systems integration and enhancements to processes in response to user feedback. Conducted military utility assessment demonstrations, delivered residual interim capability to JFCOM and began transition of technology for acquisition.
- Joint Advanced Health and Usage Monitoring System (JAHUMS): Conducted bench-level integration tests of technology modules and integrated technology modules on JAHUMS flight test aircraft. Installed baseline system on flight test aircraft and on aircraft from an operational squadron. Began flight testing of system.
- Military Operations in Urban Terrain (MOUT): Refurbished CD equipment and began the two-year interim capability/extended user evaluation (EUE) period. Provided user evaluation information to appropriate combat and materiel development communities to support transition of products and requirements. Extended the experimentation phase, focusing on partially met and unmet requirements.
- Rapid Terrain Visualization (RTV): Completed final version of rapid terrain data generation software (Build 5.0). Acquired and processed data over Continental United States (CONUS) sites and the Republic of Korea. Installed Build 5.0 software at XVIII and III Corps. Extended capabilities to units in Germany and Hawaii, and NIMA. Completed transition plan for operation of RTV sensors / aircraft. Initiated effort to transition sensors to unmanned aerial vehicle (UAV) platforms. Concluded the interim capability period to end the ACTD.

FY 1998 Starts:

- Adaptive Course of Action (ACOA): Continued multiple CINC, coalition and interagency-level software integration. Demonstrated military utility of the

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complete ACOA system during a joint exercise. Completed integration, hardening and transition into GCCS with delivery of the final version of ACOA. Delivered system includes improved versions of Web Planner, Odyssey, the Campaign Object server, Geospatial Force Planning Tool, Virtual Books, Intelligent Process Management, and Facilitate.com. Began interim capability support phase.

- C4I for Coalition Warfare (C4I for CW): Conducted a major demonstration of the coalition interoperability gained with ACTD message formatting and database replication, which included the United States, United Kingdom (UK), France, Germany, Italy and Canada as participants. This was in the form of a field exercise. The developed capability was fully integrated into the Maneuver Control System (MCS) for initial fielding during Fiscal Years 2001/2002.
- Information Assurance: Automated Intrusion Detection Environment (IA:AIDE): Installed AIDE workstations and corresponding suite of intrusion detection sensors at twelve CINC, Service, and Agency sites in support of the final demonstration and military utility assessment (MUA). The Operational Manager (OM) from STRATCOM provided a very positive MUA. In addition, the OM also validated the AIDE Concept of Operations (CONOPS) for initial operational capability. Continued upgrades and new releases of AIDE, incorporating improved and/or hardened correlation, visualization, and data mining tools, software licensing and hardware maintenance.
- Joint Biological Remote Early Warning System (JBREWS): Provided remote detection and warning of biological agents for a brigade-size assembly area for installation and support in theater. Concluded the interim capability support period to end the ACTD.
- Joint Continuous Strike Environment (JCSE): Conducted MUA in Fleet Battle Experiment India and Korean exercises. Completed software build four, began DII-COE compliance testing and build five with fully distributed processing. Conducted simulation-driven stress and interface test.
- Joint Modular Lighter System (JMLS): Concluded ACTD short of Military Utility Assessment due to system design shortfalls. Technologies developed as a part of the ACTD transitioned to the Navy's JMLS development program.
- Line-of-Sight Anti-Tank (LOSAT): Completed two early risk reduction missile flight tests utilizing residual inertial measurement unit (IMU) and guidance electronics hardware from earlier verification tests and a fire unit structurally representative of the final design. Completed design changes to fire unit and missile assembly designs as a result of the operational requirements document (ORD) and prepared for final program design review. Completed tool design and fabrication. Updated software requirement analyses and began detailed design updates to incorporate software modifications to reflect ORD updated requirements.
- Link-16: Continued operational support to the Combined Air Operations Center (CAOC) in Kosovo. Completed development of DoD Joint Data Network (JDN) multi-TADIL (Link 11 and Link 16) translation and data forward efforts. Conducted a Joint Service Certification of the Rosetta multi-TADIL (Link 11/Link 16) functionality. Conducted a Joint Service Certification of the Rosetta Link 16/JVMF Version 3.3.3. Successfully transitioned Rosetta technology to United States Joint Service Acquisition program. Completed integration efforts with Precision Targeting Identification ACTD, and conducted a demonstration. Planned commencement of Rosetta technology into the Loitering Electronic Warfare Killer (LEWK) ACTD as the communications node for the tactical UAV payload. Ended the ACTD.
- Migration Defense Intelligence Threat Data System (MDITDS): Completed design for interface of MDITDS and Joint Risk Assessment Management Program (JRAMP) and evaluated it and the deployable server. Conducted a Beta II/ Force Protection Demonstration in conjunction with a field training exercise.
- Precision Target Identification (PTI): Conducted laboratory test and operational deployment of the PTI remote surveillance systems. Conducted flight evaluation of the PTI Laser Radar (LADAR) system. Conducted negotiations for multi-year cooperation agreement with Ministry of Defense, UK for

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fighter-based LADAR. Completed Link-16 ROSETTA integration with PTI track correlation processor. Conducted C-130 roll-on/roll-off (RO/RO) prototype system deployment for the Air National Guard (ANG). Conducted operational demonstration of the RO/RO radar for the P-3 aircraft.

- Space Based Space Surveillance Operations (SBSSO): Transferred post-SBSSO ACTD dedicated sensor operations to Air Force Space Command. Transferred the space asset (MSX) from the Ballistic Missile Defense Organization (BMDO) to U.S. Space Command (USSPACECOM). Concluded the interim capability period to end the ACTD.
- Theater Precision Strike Operations (TPSO): Conducted the Transition-to-Reinforcement assessment, the third in series of user demonstrations/evaluations.
- Unattended Ground Sensor (UGS): Completed transition to acquisition. Concluded the interim capability period to end the ACTD.

FY 1999 Starts:

- Battle Damage Assessment in Joint Targeting Toolbox (BDA in JTT): Developed software architectural "backbone" with limited ground force models/algorithms. Integrated BDA software into JTT version 3. Conducted initial USCENTCOM functional review and capability demonstration.
- Coherent Analytical Computing Environment (CACE): Implemented data warehouse capabilities to provide status-on-demand-to-decision support tools and provided source data to the mission-sensitive aircraft resumes. Developed the user interface to provide the commander cross-functional planning tools. Integrated CACE tools and provided the integrated CACE architecture to Naval aviation community for extended evaluation. Developed Joint Strike Fighter Program Office impact assessment. Updated Transition Plan. Implemented group level functionality with deployment option.
- Common Spectral MASINT Exploitation (COSMEC): Demonstrated the utility of spectral data with operational assets. COSMEC ground stations were implemented in the European Command (EUCOM), as well as the support of tactical airborne sensors. Integrated the COSMEC system into the digital common ground station (DCGS) architecture and developed a COSMEC V2.0 for support of National Air Intelligence Center (NAIC) and operational users.
- Compact Environmental Anomaly Sensor II (CEASE II): Demonstrated mission support. Launched CEASE sensor aboard Defense Support Program satellite and performed system on-orbit calibration and user support. Developed operational concepts for distributing environmental data.
- Force Medical Protection/ Dosimeter (FMP/D): Tested four technology candidates. Developed concepts of operations for the use of real-time and non-real-time chemical and biological threat agent samplers and monitors for use by individuals. Conducted three field demonstration venues employing the Individual Passive Chemical Sampler (IPCS), the Lightweight Biological Aerosol Sampler/Analyzer (LBASA), the Individual Chemical Alarm System (ICAS), individual sampler surrogates and threat simulants.
- Human Intelligence (HUMINT) and Counterintelligence (CI) Support Tools (HICIST): Assessed CONOPS, equipment and architecture in Joint Warfighting exercises, real world support, and Army HUMINT and counter-intelligence exercises. Defense Intelligence Agency (DIA) committed to transition of HUMINT/CI Analytic Support Cell and Chem-Bio Intelligence Support Team. Two ACTD products approved for Army Rapid Acquisition Program. J2-X Concept of Operations and training module delivered to relevant organizations and CINCs.
- Joint Medical Operations – Telemedicine (JMO-T): Completed capstone demonstration of integrated JMO-T capabilities. Completed the initial military utility assessment. Demonstrated integrated modeling and simulation capabilities for deploying medical forces. Identified leave behind capabilities and deployment strategy.
- Joint Theater Logistics (JTL): Expanded capability to integrate in-theater distribution support planning and infrastructure assessment and compared alternative courses of action. Created temporal task identification and support force assignment. Assessed the impact of deviations and alternative support

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concepts upon future operations.

- Personnel Recovery Mission Software (PRMS): Completed integration and conducted operational assessment at CENTCOM's Internal Look 01 exercise. Completed lessons learned revisions from Internal Look 01 and began delivery of user leave-behinds. Initiated transition activity and ended the ACTD.
- Small Unit Logistics (SUL): Final demonstration conducted during Desert Knight. Received interim authority to operate until final fielding approved. Began the interim capability period for the ACTD.
- Theater Air and Missile Defense Interoperability (TAMDI): Conducted user assessment of the AEGIS/PATRIOT integrated air picture capability through a real-time, engage-on-remote demonstration. Collected Theater High Altitude Area Defense (THAAD)/Cooperative Engagement Capability (CEC) integration data and prepared integration approach and concept. Initiated single, integrated air-picture evaluation by integrating existing sensor systems in Korean theater of operations.

FY 2000 Starts:

- Coalition Aerial Surveillance and Reconnaissance (CAESAR): Participated in a live-fly exercise in Europe and evaluated the interchange format, registration algorithms, and moving target indicator (MTI) association, correlation and tracking algorithms. Continued development and integration of MTI-Synthetic Aperture Radar (SAR) cueing algorithms, the MTI-SAR common operational picture (COP), mission planning and tasking tools, CONOPS and tactics, techniques and procedures. Conducted simulation-driven laboratory test of tracking algorithms.
- CINC 21: Performed successful demonstration of key knowledge management, visualization, and collaboration technology in Kernel Blitz exercise in support of Pacific Command's (PACOM's) Joint Mission Force concept. Implemented CINC-to-Joint Task Force (JTF) and component dynamically-shared plans and situation awareness. Continued joint coalition development of interoperable knowledge sharing. Delivered spirals I and II of the CINC 21 hardware/software infrastructure and mission packages.
- Communication/Navigation Outage Forecasting System (C/NOFS): Initiated on-orbit sensor fabrication.
- Computerized Operational MASINT Weather (COMWx): Demonstrated and continued to validate algorithms to exploit Computerized Operational MASINT Weather products at theater level. Improved infrastructure for dissemination of data to theater. Began development of CONOPS for use of products in theater. Continued development of future sensor requirements.
- Content-Based Information Security (CBIS): Completed development and test of the Phase I (data-in-transit) module of the Security Card. Completed development of the cryptographic Key Management product with National Security Agency (NSA). Initiated design of the Phase II (data-at-rest) module of the CBIS security card. Formed a CONOPS working group.
- Global Monitoring of Space ISR Systems (GMSIS): Established architecture for data acquisition and processing and began planning for the demonstration phase. Collected sample data for capability development.
- Ground-To-Air Passive Surveillance (GAPS): Completed the analysis of FY 2000 environmental assessment measurements to derive guidance concerning demonstration system specification and future assessment testing of an airborne target tracking system compatible with counter drug/asymmetric warfare requirements. Conducted demonstrations of various sensors in support of asymmetric warfare in San Diego. Conducted a preliminary evaluation of an autonomous acoustic sensor system for counter drug/asymmetric warfare applications during the Fleet Battle Experiment – India.

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- Joint Intelligence, Surveillance and Reconnaissance (JISR): Established baseline capability with virtual/man-in-the-loop demonstrations. Integrated software on prototype hardware and participated in initial field demonstrations. Continued to demonstrate capabilities at both ARCENT's Lucky Sentinel Exercise and 1 Marine Expeditionary Force (1 MEF) Exercise (MEFEX).
- Multiple Link Antenna System (MLAS): Reduced scope of ACTD to accommodate approved funding level. Completed design refinements for radio frequency component elements. Initiated fabrication, lab tests and early interim assessments of improved elements. Initiated design of demonstration antenna system. Initiated design of antenna control system software and system integration. Continued systems engineering efforts leading to antenna configuration demonstrations and field tests. Conducted instrumented range tests to investigate true-time-delay and beam steering technical issues. Initiated CONOPS development and demonstration planning. Investigated potential transition opportunities.
- Quick Bolt: Continued design reviews, system integration and system testing of the components of the front-end guidance mechanisms.
- Restoration of Operations (RestOps): Completed Joint Chemical Field Trials and technology assessments. Developed and conducted the baselining exercise. Refined methodology for operational capability assessment and planned for technology transition.
- Tri-Band Antenna Signal Combiner (TASC): Completed fabrication and acceptance testing of antenna signal combiner. Began detailed planning for military utility assessment and field trials. Initiated planning for transition to acquisition.

FY 2001 Starts:

- Active Network Intrusion Defense (ANID): Developed agent framework for ANID system architecture, and determined collaborative interfaces for select ANID technologies. Collected and correlated user requirements. Developed software requirements specification and draft CONOPs. Determined the initial interfaces to exterior data sources such as sensors and firewalls. Installed and demonstrated a prototype ANID system on the Defense Information Systems Network-Leading Edge Services (DISN-LES), consisting of agent framework component, correlation of data, and dynamic constitution of a virtual organization.
- Adaptive Battlespace Awareness (ABA): Enhanced COP track data structures and developed improvements to track management tools and common operational picture (COP) synchronization tools. Prepared demonstration of these enhancements for demo sites to "tag" data structures with amplifying information, i.e., targeting status and other relevance indicators for specific situations, events or tasks.
- Advanced Tactical Laser (ATL): Designed laser assembly, fuel system, and optics to fit in a roll-on/roll-off package for the CV-22 aircraft. Validated current laser performance and stability.
- Advanced Technology Ordnance Surveillance (ATOS): Developed concept of operations, finalized system requirements, and released a request for proposal (RFP) for commercial-off-the-shelf radio frequency identification (RFID) and micro-electro-mechanical systems (MEMS) technologies to develop and demonstrate RFID/MEMS technology for monitoring ordnance inventory and environmental data.
- Area Cruise Missile Defense: Conducted Joint-Based Expeditionary Connectivity/Control Center (JBECC) demonstration #1 to baseline the JBECC prototypes. Completed system integration demonstration planning, execution and analysis.
- Coalition Combat Identification (CCID): Initiated Single Channel Ground and Airborne Radio System (SINCGARS)-based combat identification (SBCI) radio software upgrades. Initiated integration of improved SBCI waveform into Fire Support Team (FiST) system. Evaluated potential implementation of SBCI into allied digital radios including the UK Bowman radio. Coordinated Allied (France, UK, Germany) participation in the ACTD. Initiated

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development of Standard NATO Agreement (STANAG) 4579 compliant waveform. Defined dismounted soldier efforts with Allies.

- Coalition Theater Logistics (CTL): Commenced ACTD development efforts. Established program development organizations and working groups. Developed the ACTD management plan, project arrangement with Australia and defined technical and operational requirements. Conducted business process review to model coalition theater logistics concepts. Began CTL CONOPS development. Conducted a concept demonstration using Joint Logistics ACTD tools and demonstrated the Australian Logistics Encyclopedia.
- Coastal Area Protection System (CAPS): Demonstrated the feasibility of deploying technologies in the coastal/littoral areas for force protection. The system demonstrations consisted of technologies to support the surveillance , identification and exclusion of threats in the vicinity of ports and harbors. Concluded demonstrations to end the ACTD.
- Hunter Standoff Killer Team (HSKT)**:** Integrated cognitive decision aiding technologies into the Army Airborne Command and Control System (A2C2S) to develop Mobile Commander's Associate (MCA) capability and also into the Longbow Apache helicopter to develop Warfighter's Associate (WA) capability. Integrated manned and unmanned teaming algorithms and software into the MCA and WA systems. Developed Link 16 data terminal for the Joint Standoff Weapon (JSOW) to provide enroute targeting updates for weapons delivery. Conducted preliminary design of sensor package for integration into unmanned aerial vehicle.
- Joint Area Clearance (JAC): Obtained and prepared area clearance technologies. Developed draft tactics, techniques, and procedures (TTPs) for the technologies. A successful small-scale Red Force/Blue Force 30-day demonstration was conducted at Fort A.P. Hill with the CamCopter Change Detection technology. Integrated Product Teams (IPTs) were created to manage the four main IPTs (Technology, Assessment, CONOPs, and Transition IPTs).
- Loitering Electronic Warfare (EW) Killer (LEWK): Established Integrated Product Teams. Began preparation of the Functional Requirements Document (FRD). Awarded contract to finalize sub-systems and systems design, and began integration and testing.
- Network Centric Collaborative Targeting (NCCT): Initiated Phase I NCCT Core Technology (NCCT Network Controller and ISR Sensor Manager) development to rapidly synchronize multiple intelligence, surveillance, and reconnaissance (ISR) assets and sensors on time sensitive targets (TSTs), supporting actionable quality information for tactical commanders. Delivered initial NCCT Message Catalog and preliminary Interface Control Document to airborne platform and ground station participants.
- Personnel Recovery Extraction Survivability Aided by Smart Sensors (PRESS): Conducted studies to integrate Global Personnel Recovery System (GPRS) Public and Government segments, RF Tags, and Combat Survivor Evader Locator (CSEL) Radio systems. Participated in development of Analysis of Alternatives (AoA) with Space Command (SPACECOM) and Air Combat Command (ACC) on extraction survivability and situational awareness technologies.
- Tactical Missile System –Penetrator (TACMS-P): Began detailed engineering of the missile system .
- Theater Integrated Planning Subsystem (TIPS): Acquired and integrated available commercial-off-the-shelf (COTS) information technology (software and hardware) to provide first automated theater planning capability to support theater CINCs. Core functions and infrastructure to support the deliberate planning process for conventional weapons have been installed on the new theater-planning Systems Integration Laboratory suite.

(U) **FY 2002 Plans:** (U) Department ACTD goals in FY 2002 include initiation of additional ACTDs, restructuring OSD contributory funding for new ACTDs where necessary to encourage service/agency participation, and provision of additional funding for expanded user evaluations (EUEs) at the conclusion

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of successful ACTDs. OSD will continue the annual process of developing and structuring new candidate ACTDs to rapidly address user needs and address issues identified in *Joint Vision 2020*. In FY 2002, the ACTD nomination, screening and validation process will be accelerated to permit earlier Service planning for transition of successful ACTDs into acquisition programs. Some ACTDs will remain deployed in the Kosovo Theater as part of ongoing peacekeeping operations. A significant number of ACTDs have found operational employment in the war to counter terrorism. Several ACTDs will continue deployment in support of Operations Enduring Freedom and Noble Eagle, as well as Homeland Security activities. ACTD projects are continually screened for applications that should be accelerated to support time-sensitive warfighter requirements. Funding will continue for all ongoing ACTDs, including the new FY 2002 ACTDs, for a total of $157.762 million. In addition to appropriating funds for ACTDs, Congress added $3.5 million to FY02 funding to pursue demonstration of Syntroleum technology (Flexible JP-8 Pilot Plant) .

(U) Other significant plans for FY 2002 are:

FY 1996 Starts:

- Air Base/Port Biological Detection: Conclude the interim capability period and end the ACTD.
- Joint Logistics: Conclude the interim capability period and end the ACTD.
- Tactical High Energy Laser: Conclude the interim capability period and end the ACTD.

FY 1997 Starts:

- Counterproliferation II: Execute two operational demonstrations/military utility assessment (MUA) of AGM-86D CALCM penetrator against a hardened, simulated chemical production facility. Complete HTSF sled testing. Complete BLU-116 AUP sled testing and obtain target response data from tests of the AUP against hardened, simulated weapons of mass destruction (WMD) facility. Complete TTPV critical design review (CDR) and continue sled testing to verify penetration capability. Execute the second JASSM demonstration against a simulated biological weapons facility. Continue Chemical Combat Assessment System (CCAS) testing. Complete Integrated Target Planning Tool Set (ITPTS) version 1.0. Accelerate some elements for use in current, real-time operations.
- Extending the Littoral Battlespace: Complete military utility assessment. Refurbish and reinstall partial ELB ACTD-configuration TEMPALT to TARAWA ARG / 15th Marine Expeditionary Unit and Constellation Battle Group (CVBG) for 2nd Quarter FY 2003 deployment. Install ELB Tier 2 configuration to Theodore Roosevelt Battle Group for 3rd Quarter FY 2004 deployment, as part of IT21 Block I upgrade. Enter lessons learned and performance data into appropriate databases/finalize ELB technical documentation. Continue transition efforts with appropriate Joint/Navy/USMC/Army acquisition programs.
- Integrated Collection Management: Conclude the interim capability support period to end the ACTD.
- Joint Advanced Health and Usage Monitoring System: Complete flight test verification and begin operational demonstration. Provide aircrew training. Develop Joint Service/Industry health and usage monitoring system (HUMS) cost/benefit analysis model. Conduct Opens Systems Architecture assessment for the DOD Open Systems Joint Task Force.
- Military Operations in Urban Terrain: Continue to provide support to residual equipment in the extended user evaluation phase. Collect data for refinement

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of tactics, techniques, procedures and requirements. Continue limited experimentation, focusing on partially met and unmet requirements. Complete transition activities and end the ACTD.

FY 1998 Starts:

- Adaptive Course of Action: Complete final hardening and transition of the entire ACOA system to the Global Command and Control System. Complete transition of ACOA operations and maintenance responsibilities to Defense Information Systems Agency (DISA). Conclude interim capability support period to end the ACTD.
- C4I for Coalition Warfare: Participate in the Communications Interface Design (CID) Borealis demonstration. Conduct a demonstration of the database replication capability with the United States, Canada, Denmark, France, Germany, Italy, the Netherlands, Spain and the United Kingdom. A fielding decision on the database replication mechanism will be made based on the demonstration results. Conclude the interim capability support period to end the ACTD.
- Information Assurance: Automated Intrusion Detection Environment: Sustain AIDE residual system currently resident in twelve sites. Per operational requirements, begin transition of AIDE to other operational components, i.e., PACOM, EUCOM. Integrate web-based multimedia online training aids into the AIDE system. Continue with the transition planning, configuration and releasability control. Conclude the interim capability support period to end the ACTD.
- Joint Continuous Strike Environment: Conduct several military utility assessments in live exercises. Transition to relevant Service fire support systems and Joint Targeting Toolkit and provide technical support. Conclude the ACTD.
- Line-of-Site Anti-Tank: Conduct final design reviews for fire unit, missile, and training equipment, and begin fire unit and missile component fabrication. Conduct component qualification testing, begin sub-assembly of components, and prepare for final integration and assembly. Complete weapon system module and weapon system test-set software code and test, and finalize requirements for missile operational flight software.
- Migration Defense Intelligence Threat Data Systems: Conduct final military utility assessment of Joint Risk Assessment Management and deployable server. End the ACTD.
- Precision Targeting Identification**:** Complete negotiations with MoD UK for Joint US/UK fighter LADAR ID program and complete aircraft integration design/fabrication. Conduct utility assessment of the C-130 RO/RO system for ANG and complete operational system design.
- Theater Precision Strike Operations: Commence interim capability support period.

FY 1999 Starts:

- Battle Damage Assessment in Joint Targeting Toolbox (BDA in JTT): Continue development of software architecture, apply additional technology, increase functionality and expand fielded ground force models/algorithms.
- Coherent Analytical Computing Environment: Implement data warehouse data-mining capabilities to provide source data to the mission-sensitive aircraft resumes. Develop reasoners and agents which provide command-level decision support. Update the immersive user interface to provide the commander a

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unified view of the squadron operations and provide an interface to all planning tools. Integrate CACE tools and provide the integrated CACE architecture to USMC aviation community for extended evaluation. Update Joint Strike Fighter Program Office impact assessment. Update Transition Plan.

- Common Spectral MASINT Exploitation: Continue integration into the Digital Common Ground Station (DCGS) architecture.
- Compact Environmental Anomaly Sensor II: Conduct user and operational utility assessments.
- Force Medical Protection/ Dosimeter: Complete testing, demonstration venues and the Military Utility Assessment. Present final recommendations. Field and maintain residual capability with operational units. Implement plans to transition CONOPS and products with military utility in detecting and identifying chemical/biological threats for individuals or groups. End the ACTD.
- Human Intelligence and Counterintelligence Support Tools: Deliver products to Defense HUMINT Service, appropriate elements of the Services and other customers of ACTD transitions. Finalize Concepts of Operation and Impact Assessments. Support product participation in exercises and real-world operations.
- Joint Medical Operations-Telemedicine: Transition JMO-T capabilities for the CINC or designated component surgeon in accordance with selected deployment strategy; insert available Theater Medical Information Program (TMIP) capabilities to replace JMO-T placeholder capabilities; implement operations support systems; and continue assessment of JMO-T technologies capabilities.
- Joint Theater Logistics: Focus technology upon execution tracking processes and demonstrate initial Watchboard capabilities. Demonstrate capabilities in a joint environment and conduct preliminary military utility assessment. Staff and finalize transition plans to transfer JTL ACTD capabilities to GCSS through the AITS-JPO.
- Personnel Recovery Mission Software: Continue software refinements based on inputs from customer operational testing. Complete fielding and support of PRMS to end the ACTD.
- Theater Air and Missile Defense Interoperability: Report military utility assessment of the engage-on-remote aspects. Finish fabrication and installation of limited single integrated air-picture capability.

FY 2000 Starts:

- Coalition Aerial Surveillance and Reconnaissance: Conduct a military utility assessment in a live-fly European exercise and produce measures of performance/effectiveness analysis. Begin insertion of CAESAR functionality into participating country's ground stations. Produce and transition Concept of Operations and tactics, techniques and procedures to participating nations and SHAPE.
- CINC 21: Demonstrate in Tempo Brave exercise a highly visual, dynamically updated capability to develop and understand the CINC's theater situation, plans, and execution status during multiple, simultaneous crises involving joint, coalition, and humanitarian agencies based on shared knowledge and collaboration across secure and optimized networks. Deliver final development spiral to the implementation and operational teams for verification, validation and military utility assessment.
- Content-Based Information Security: Complete and demonstrate the Phase II (data-at-rest) module of the security card (separate from the data-in-transit security card). Finalize the development of the CBIS CONOPS and military utility assessment plan. Upgrade the CBIS Key Management product as needed.
- Communication/Navigation Outage Forecasting System: Construct satellite sensors and integrate system.
- Computerized Operational MASINT Weather: Complete dissemination architecture for dissemination of data to theater. Integrate validated algorithms into

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infrastructure. Validate products/CONOPS for use of products for warfighter support. Demonstrate capability to operational user and refine products/CONOPS. Further refine future sensor requirements.

- Content-Based Information Security: Demonstrate the Phase I (data-in-transit) module of the security card. Complete the development of the Phase II (data-at-rest) module of the security card. Continue development of the CBIS CONOPS and develop a draft of the military utility assessment plan. Complete development of a prototype CBIS Key Management product.
- Global Monitoring of ISR Space Systems: Demonstrate capability with deployed assets.
- Ground-To-Air Passive Surveillance: Acquire an advanced passive coherent location system (Silent Sentry III) and conduct initial validation testing. Conduct operational assessment of passive surveillance systems for counter drug /asymmetric warfare applications; specifically, passive coherent location for airborne targets and passive autonomous acoustic sensors for surface targets. The users will be trained on the system and participate in real-time inter-operation with the existing command and control functions.
- Joint Intelligence, Surveillance and Reconnaissance: Demonstrate baseline solution (based upon user defined TTP/CONOPS) at Lucky Sentinel 02, Marine Expeditionary Force Exercises (MEFEX) and brigade-level venues. Select, integrate, and conduct end-to-end demonstration of non-traditional sensor feed(s). Provide modeling and simulation support to Lucky Sentinel 02, MEFEX and brigade-level venues. At request of USCENTCOM, deploy to support current, real-time operations.
- Multiple Link Antenna System: Complete design of antenna control system software. Complete design, fabrication, integration, and lab tests of MLAS demonstration system. Continue CONOPS development and establish concept of demonstration. Initiate MLAS demonstration in lab and field environments. Refine options for transition to acquisition.
- Quick Bolt: Commence lab and field test demonstrations of a fully integrated Quick Bolt system.
- Restoration of Operations: Conduct preliminary demonstration and initial military utility assessment. Continue user training and limited system functional tests. Revise concept of operations. Conduct final technology selection.
- Tri-Band Antenna Signal Combiner: Conduct Military Utility Assessment (Millennium Challenge 02). Report on military utility of system. Conclude interim capability support period to end the ACTD. If warranted, transition to procurement.

FY 2001 ACTDs:

- Active Network Intrusion Defense: Continue gathering user requirements. Refine detection, correlation, and notification agents and collaborative interfaces. Provide automated support to convene experts, information, command-by-negation, and to build rapid coordinated responses via a distributed "virtual" cyber warfare organization. Demonstrate autonomic tracing by focusing initially on instrumentation of a portion of the Global Command and Control System (GCCS) global configuration with autonomic response and anomaly sensors. Exercise the virtual organization CONOPS.
- Adaptive Battlespace Awareness: Develop the necessary intelligence/operational interfaces and the supporting mission-specific, user-tailorable templates required to facilitate the display of information relevant to the task or area of interest. Demonstrate these capabilities in the EUCOM area of responsibility.
- Advanced Tactical Laser: Begin fabrication of high power laser system, fuel supply and optics train for integration into CV-22 aircraft. Evaluate fuel regeneration system and closed loop performance of laser.
- Advanced Technology Ordnance Surveillance: Develop the integrated radio frequency identification (RFID) and micro-electro-mechanical systems

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(MEMS) system. Develop an environmental and pre-processor database. Conduct component-level testing.

- Area Cruise Missile Defense: Conduct 'Cruise Missile Prosecution' demonstration #2 in conjunction with the JSCIET 02 Exercise. Exercise the entire cruise missile kill chain of events (find-fix-track-target-engage-assess). Completed JBECC CONOPs refinement. Commenced tactics, techniques and procedures development and JBECC deployment planning.
- Coalition Combat Identification: Continue SBCI radio software upgrades for U.S. exportable radios. Continue SBCI / FiST system integration. Continue NATO compliance development of International Interoperability Testbed. Initiate integration of SBCI with USMC Target Location and Data Handoff System (TLDHS). Initiate international initiative for combat ID for the individual soldier. Begin software model development for the Virtual Operational Exercise for all technologies and all countries. Participate in JCIET 02 with Allies.
- Coalition Theater Logistics: Develop security and network architecture to support coalition logistics data fusion. Continue CONOPs development. Assess and select applications from Joint Theater Logistics for use in the coalition task force environment. Identify coalition partner logistics information systems interfaces and applications. Demonstrate initial capabilities and measure performance against the CTL ACTD CONOPS. Develop transition plans to GCSS.
- Hunter Standoff Killer Team: Continue software builds and simulation tests for MCA and WA. Conduct hardware in the loop integration tests. Install remote target sensor (TOPART) into unmanned aerial vehicle. Integrate fully functional Link 16 data link, antenna and guidance software into the F/A-18 Joint Standoff Weapons (JSOW) system. Integrate F/A-18 Advanced Technology Forward Looking Infrared Radar (ATFLIR).
- Joint Area Clearance (JAC): Conducted a technical demonstration and progressed into two-training/rehearsal demonstrations. Conducted first service demonstration. Data from these exercises will form the basis of an interim military utility assessment in mid-FY 2003.
- Lethal Electronic Warfare Killer: Finalize the Functional Requirements Document. Begin preparation of the transition plan. Continue sub-systems and systems integration and testing. Begin initial flight testing of the vehicle without payloads.
- Network-Centric Collaborative Targeting: Continue NCCT Core Technology development by migrating NCCT capability into the NCCT System Integration Laboratory (SIL). Initiate Participant Integration Module (PIM) development by airborne platform and ground station prime contractors. Integrate NCCT Communications Equipment (NCE) required for Phase II demonstration into NCCT design. Conduct Phase I demonstration to baseline and collect data for time-sensitive target (TST) collaborative cross-cueing timelines and performance using existing datalinks and current Tactics, Training, and Procedures (TTPs).
- Personnel Recovery Extraction Survivability Aided by Smart Sensors: Design GPRS space hardware for integration on GPS Block III in FY04. Develop initial prototype design of miniature GPRS user device. Demonstrate integration and interoperability of GRPS, CSEL and PRMS as part of Millennium Challenge/JEFX 2002. Conduct military utility assessment of Phase I survivor / evader systems. Based on priorities determined by WALEX, begin coordination, design, and integration of aircraft technologies on HH-60G Pavehawk. Technologies being evaluated include CDA, IRCM, millimeter wave imaging, obstacle avoidance, and non-lethal weapon subsystems.
- Tactical Missile System – Penetrator: Continue fabrication and ground testing of missile system components.
- Theater Integrated Planning System: Deploy and operate conventional planning capability. Develop, integrate and deploy nuclear planning capability. Integrate a software workflow manager into both the conventional and nuclear environments. Initial analysis will begin on the migration of theater planning tools to support a deployable configuration of TIPS.

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FY2002 ACTDs:

- Active Denial System (ADS): Upgrade the system-zero device capability with a higher efficiency level source. Demonstrate frontal exposures of human subjects at full weapons parameters.
- Advanced Notices: Classified content only.
- Agile Transportation (AT): Establish an initial collaboration environment for receiving and scheduling Defense Transportation System (DTS) requirements. Establish requirements for a DTS virtual data environment.
- Contamination Avoidance at Seaports of Debarkation (CASPOD): Finalize initial system design and integration. Prepare for preliminary demonstrations.
- Coalition Information Assurance Common Operational Picture (CIA COP): Prepare for initial demonstrations with U.S. Space Command.
- Expendable Unmanned Aerial Vehicle (XUAV): Complete integration design and fabrication of prototype vehicle and avionics. Demonstrate initial capability.
- Homeland Security Command and Control (HLS C2): Demonstrate new concepts for C2 and early warning, as well as coordination of escalating security actions for the U.S. against unconventional threats. These actions will be constrained to a single response team simulated over the DISN with the DoD and other federal, state and local agencies.
- Hyperspectral Collection and Analysis System (HYCAS): Demonstrate the taggant sensor capability. Develop exploitation algorithms and a tactical hyperspectral sensor.
- Joint Explosive Ordnance Disposal (JEOD): Complete architecture development. Conduct baseline exercises. Develop JEOD Mission Support Center.
- LASER Language Translator (LASER): Identify foreign language translation requirements, survey technologies and correlate requirements and technologies. Design projects and initiate development, integration and modification.
- Micro Air Vehicle (MAV): Fabricate and deliver 25 Phase I battery-electric systems (one user interface and three air vehicles per system). Commence Phase I field evaluations.
- Pathfinder: Conduct initial technology search and evaluation of component technologies immediately available for application to sensors, UAVs/UGVs, adaptive networks, communications, data fusion and displays. Commence limited objective experiments (LOEs) on component technologies.
- Signals Intelligence (SIGINT) Processing: Classified content only.
- Space-Based Moving Target Indicator (SBMTI): Develop and integrate MTI signal processing software and tasking software.
- Thermobarics (TB): Conduct payload development program.

(U) **FY 2003 Plans:** Continue the process of transitioning and initiating ACTDs. Numerous demonstrations will be conducted for those ACTDs initiated in previous years. Funding will continue for active ACTDs initiated in Fiscal Years 1997 through 2002 ($159.580 million) that have not been completed or transitioned to acquisition programs. Funding available for initiating new FY 2003 ACTDs, after subtracting for previous years ACTDs, will be approximately $40 million. ($199,580 million).

FY 1997 ACTDs:

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- Counterproliferation II ACTD: Execute final two ACTD operational demonstrations using a hardened, cut-and-cover simulated chemical production and storage facility and the TTPV, CCAS and ITPTS Version 2 ACTD products. Perform MUAs on the TTPV, CCAS and ITPTS. Produce four CCAS ACTD-residual modification kits. Transition TTPV to EMD. Complete the interim capability support phase and end the ACTD.
- Extending the Littoral Battlespace: Complete refurbishment and installation of partial ELB ACTD-configuration to TARAWA ARG / 15th MEU and Constellation Battle Group (CVBG) for deployment. Complete installation of ELB Tier 2 configuration to Theodore Roosevelt Battle Group for 3rd Quarter FY 2004 deployment, as part of IT21 Block I upgrade. Continue transition efforts with appropriate Joint Navy / USMC / Army acquisition programs.
- Joint Advanced Health and Usage Monitoring System: Install additional systems and support operational demonstration. Collect operational data for health and usage monitoring system (HUMS) technology assessment and cost/benefit analysis.

FY 1998 ACTDs:

- Line-of-Sight Anti-Tank: Complete Fire Unit and Missile Prototype hardware fabrication and assembly. Complete Fire Unit and Missile Software system level test and certification. Conduct missile flight tests, and Fire Unit qualification testing. Conduct limited objective user experiments for air transportability and force-on-force survivability to support assessment of military utility.
- Precision Targeting Identification: Commence interim capability support phase.
- Theater Precision Strike Operations: Conclude the interim capability support phase to end the ACTD.

FY 1999 ACTDs:

- Battle Damage Assessment in the Joint Targeting Toolbox: Conclude interim capability support phase to end the ACTD.
- Common Spectral MASINT Exploitation: Commence interim capability support period.
- Human Intelligence and Counterintelligence Support Tools: Complete ACTD transitions and support their use in exercises and real world operations. Conclude the ACTD.
- Joint Medical Operations-Telemedicine: Refine logistical support concepts and operational TTPs; finalize transition documentation; compete extended user evaluation and MUA.
- Joint Theater Logistics: The DARPA/DISA AITS-JPO will fund and manage transition of the JTL ACTD to DISA GCSS. The JPO will maintain Pilot Services designed to permit the war fighter to use the products until the products are fully integrated into GCSS.
- Theater Air and Missile Defense Interoperability: Conclude interim capability support phase to end the ACTD.

FY 2000 ACTDs:

- CINC 21: Work with PACOM's J6 as well as the GCCS and NMCI program offices to begin technology transition activities for CINC 21 products. Support and sustain residual leave behind capabilities in PACOM and STRATCOM commands. Begin drafting final reports.
- Coalition Aerial Surveillance and Reconnaissance: Begin transition of CAESAR products to the participating nations, NATO and SHAPE. Products include: Tools, e.g. trackers and coalition testbed; Operational Concepts for interoperability (TTPs, MOEs, MOPs) and; Architecture and design (interfaces, ICDs and Standard NATO Agreements (STANAGs)).

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- Coherent Analytical Computing Environment: Determine military utility and complete demonstration of planning and maintenance tools. Develop final architecture report and transition plan. Refine the CACE leave behind tools.
- Communication/Navigation Outage Forecast System: Conduct payload test, spacecraft integration and launch.
- Computerized Operational MASINT Weather: Implement suggested improvements to algorithms/infrastructure as a result of operational demos in FY02. Coordinate/forward CONOPS and future sensor requirements to appropriate parties. Operations and maintenance for ACTD infrastructure developed.
- Content-Based Information Security: Perform the MUA of CBIS technology and CONOPs. Work with JFCOM's J6, the Navy's DD21 program office, and NSA and NRL to begin technology transition activities for CBIS multi-level security products. Support and sustain residual leave behind capabilities. End the ACTD.
- Global Monitoring of ISR Systems: Complete system development and demonstrate military utility of interim system.
- Ground-To-Air Passive Surveillance: Complete operational assessment of passive coherent location (PCL) technology. The assessment will include operational user training and support. Finish the demonstration and assessment of passive autonomous acoustic sensors. Provide final assessment reports.
- Joint Intelligence, Surveillance and Reconnaissance (JISR): Refine and Enhance JISR interfaces to source systems based upon user defined TTP/CONOPS (Lucky Sentinel 03, MEFEX 03, Ulchi Focus Lens 03). Integrate fielded JISR prototype into Army Brigade evaluation. Continue 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. Plan and execute additional formal assessment by Joint Interoperability Test Center (JITC), Joint C4ISR Battle Center and warfighter assessments by CENTCOM and I MEF.
- Loitering EW Killer: Continue systems integration and vehicle fabrication. Continue flight testing.
- Multiple Link Antenna System: Complete proof of concept demonstration. Refine and update CONOPS. Pursue follow-on Joint Warfighter Exercise opportunities and prepare for transition to acquisition. Prepare demonstration analyses and findings and deliver final reports to end the ACTD.
- Quick Bolt: Complete captive and live-fire flight testing.
- Restoration of Operations: Conduct final demonstrations and utility assessments. Enhance RestOps capabilities from the baseline systems and based on findings from preliminary demonstrations.

FY 2001 ACTDs:

- Active Network Intrusion Defense: Demonstrate and assess for military utility the detection, correlation, and notification capabilities of the agents; the collaborative interfaces; the automated capability to convene a distributed "virtual" cyber warfare organization of experts; and a rapid coordinated response capability. Demonstrate autonomic tracing on instrumentation of a portion of the Global Command and Control System (GCCS) global configuration with autonomic response and anomaly sensors. Exercise the virtual organization CONOPS.
- Adaptive Battlespace Awareness: Develop task-driven, automated, relevance-based information profiles for smart "push/pull" relevance-based dissemination in time-critical decision making. Demonstrate further enhancements in EUCOM area of responsibility. Perform final military utility assessment.
- Advanced Tactical Laser: Continue fabrication of laser package. Identify final air platform. Modify platform and laser package for integration. Continue to participate in military exercises and evolve operational employment concepts. Ground test laser package.

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- Advanced Technology Ordnance Surveillance: Produce 3,500 tags, with associated readers, for operational demonstrations and military utility assessments.
- Area Cruise Missile Defense: Conduct the JBECC – Rapid Deployment Demonstration (#3). Serves as the MUA venue. Demonstrate JBECC capability to deploy and provide an integrated air picture to a NORAD air defense sector anywhere within the CONUS.
- Coalition Combat Identification (CCID): Complete SBCI Coalition Combat Identification: improvements for U.S. and exportable radios. Complete FiST and TLDHS integration with SBCI and Tactical Internet. Finalize STANAG compliance efforts in US, Germany, UK and France using International Interoperability Testbed. Analyze JCIET 02 data to assess the current architecture. Assess the integration of SBCI into UK Bowman radio. Coordinate Allied CCID exercises. Execute Virtual / Simulation Operational Exercise with CCID technologies and Allies.
- Coalition Theater Logistics: Demonstrate the second objective (plan and execute supply and sustainment) during Team Challenge 03. Continue to refine first objective of CTL ACTD (plan and execute strategic deployment and redeployment). Continue Military Utility Assessment. Prepare for final Military Utility Assessment in FY 2004. Refine transition plans to GCSS.
- Hunter Standoff Killer Team: Complete software builds and simulation tests for MCA and WA. Complete hardware in the loop integration tests of the MCA A2C2S and the WA Longbow Apache systems. Integrate pre-production Joint Stand-Off Weapon (JSOW) data terminal, antenna, guidance and test system with the F/A-18 and the Longbow Apache. Initiate HSKT connectivity testing and preliminary user evaluation in relevant warfighter tactical environment.
- Joint Area Clearance: Conduct Joint and Service demonstrations.
- Network-Centric Collaborative Targeting: Conduct additional Phase I demonstration to integrate precision targeting capabilities using existing datalinks and current TTPs. Initiate Phase II by integrating Phase I demonstration residuals into NCCT Core Technology Prototype development. Continue to develop Participant Integration Modules (PIM) for airborne platforms and ground stations. Continue to integrate NCCT Communications Equipment into the NCCT Prototype design.
- Personnel Recovery Extraction Survivability Aided by Smart Sensors: Complete space hardware and miniature GPRS design, fabrication and testing. Conduct fabrication, build-up, integration and preliminary testing of HH-60G Pavehawk extraction survivability sensors and suite. Develop Phase II demonstration and MUA plan.
- Tactical Missile System - Penetrator: Complete and evaluate initial flight testing.
- Theater Integrated Planning System: Migrate nuclear and conventional planning tools to the Theater Planning Response Cells (TPRC) to support a deployable configuration. Begin work on crisis action and immediate planning capabilities.

FY2002 ACTDs:

- Active Denial System (ADS): Design a high-mobility, multi-purpose wheeled vehicle (HMMWV)-based configuration system.
- Advanced Notices: Classified content only.
- Agile Transportation (AT): Determine final structure of Mode Determination Broker (MDB), the first of the Scheduling Decisikon Support Tools to be implemented.
- Contamination Avoidance at Seaports of Debarkation (CASPOD): Conduct preliminary demonstrations. Incorporate initial results from FY02 baselining activities toward an upgraded CASPOD system.

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- Coalition Information Assurance Common Operational Picture (CIA COP): Conduct initial demonstrations with U.S. Space Command. Prepare for additional demonstrations with U.S. European Command and U.S. Joint Forces Command
- Expendable Unmanned Aerial Vehicle (XUAV): Upgrade ground control station for multi-configuration and multi-vehicle operation. Finalize vehicle/avionics design and produce residual units. Develop CONOPS and commence military utility assessment.
- Homeland Security Command and Control (HLS C2): Demonstrate key technologies that will assure the integrity of C2 and situational awareness, interagency CONOPS and a coordinated multi-crisis response.
- Hyperspectral Collection and Analysis System (HYCAS): Demonstrate the tactical hyperspectral sensor and a Global Hawk hyperspectral sensor.
- Joint Explosive Ordnance Disposal (JEOD): Develop and exercise reachback capability. Integrate robotics with digital x-ray capability. Perform initial; military utility assessment.
- LASER Language Translator (LASER): Conduct laboratory and CONUS testing of text-to-text and speech-to-speech translation projects. Define architecture and integration approach. Conduct project-level military utility assessments, including document exploitation. Transition at project level as appropriate.
- Micro Air Vehicle (MAV): Conclude Phase I field evaluations. Integrate feedback into fabrication of 25 Phase 2 diesel systems. Begin Phase II field evaluations.
- Pathfinder: Continue technology search to complement components technology for subsystem and system technology. Continue appropriate limited objective experiments. Based on results, begin transition of successful technology evaluations into system.
- Signals Intelligence (SIGINT) Processing: Classified content only.
- Space-Based Moving Target Indicator (SBMTI): Test signal processing and tasking software.
- Thermobarics (TB): Conduct full-scale validation tests. Downselect explosive fill material. Select warhead and integrate explosive. Produce test assets and conduct weapons systems qualification tests. Develop weapon effectiveness models for planning tool.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3	R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D8Z

(U) ACQUISITION STRATEGY: Not Applicable

(U) B. Program Change Summary	FY2001	FY 2002	FY 2003	Total Cost
President's FY 2001 Budget Submission	116.425	118.917	121.516	Continuing
Delta	2.319	30.000	30.600	
FY 02 Amended President's Budget Submission	118.744	148.917	152.116	
Appropriated Value	119.925	159.417		Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed undistributed reduction	0.000	(1.655)	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(1.106)	0.000	0.000	
c. Other	0.000	0.000	47.464	Continuing
Current President's Budget	118.819	157.762	199.580	Continuing

Change Summary Explanation:

(U) Funding: **FY 2002** Amended budget provides additional resources to start 15 new ACTDs.
FY 2003 Funding increase provides additional resources to sustain the ongoing projects, start a minimum of 15 new ACTDs, increase OSD/AS&C overall participation in funding ACTDs, provides more "up-front" funding of the program to better match Service POM cycles, and begins to address transition funding challenges.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

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

(U) D. Schedule Profile: Not Applicable

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(U) A: Acquisition strategy: Not Applicable

(U) E. PE Funding for FY 1996 ACTDs

ACTD	FY 2001	FY 2002
Airbase/Port Biological Detection**	1.200	.700
Battlefield Awareness and Data Dissemination*	0	0
Combat Identification*	0	0
Combat Vehicle Survivability*	0	0
Counterproliferation I*	0	0
Counter Sniper*	0	0
Joint Logistics**	0	0
Joint Readiness Extension to Advanced Joint Planning *	0	0
Low Life Cycle Cost, Medium Lift Helicopter*	0	0
Miniature Air Launched Decoy*	3.600	0
Navigation Warfare*	0	0
Semi-Automated IMINT Processing*	0	0
Tactical UAV*	0	0
Theater High Energy Laser**	0	0

*Completed

** Completed the demonstration phase of the ACTD

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(U) E. PE Funding for FY 1997 ACTDs

ACTD	FY 2001	FY 2002	FY 2003
Chemical Add-On to Biological Detection*	0	0	0
Consequence Management*	0	0	0
Counterproliferation II	3.300	0	0
Extending the Littoral Battlespace** (Note 1)	6.000	15.607	17.500
Information Operations Planning Tool*	1.800	0	0
Integrated Collection Management**	1.300	0	0
Joint Advanced Health and Usage Monitoring System	2.700	1.700	0
Military Operations in Urban Terrain	6.200	0	0
Rapid Terrain Visualization*	5.400	0	0

* Completed

** Completed the demonstration phase of the ACTD.

Note 1: Includes the JTF Warnet project.

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(U) E. PE Funding for FY 1998 ACTDs

ACTD	FY 2001	FY 2002	FY 2003
Adaptive Course of Action**	1.700	0	0
C4I for Coalition Warfare	2.000	1.000	0
High Powered Microwave*	0	0	0
Information Assurance: AIDE**	1.700	1.300	0
Joint Bio Remote Early Warning System*	.200	0	0
Joint Continuous Strike Environment**	2.300	3.100	0
Joint Modular Lighter System*	.400	0	0
Line-of-Sight Anti-Tank (Note 1)	0	4.000	0
Link 16*	1.800	0	0
Migration Defense Intelligence Threat Data System	1.200	1.300	0
Precision Targeting Identification**	2.200	0	0
Space Based Space Surveillance Operations*	.800	0	0
Theater Precision Strike Operations**	4.800	0	0
Unattended Ground Sensors*	.900	0	0

*Completed

** Completed the demonstration phase of the ACTD

Note (1): In FY-01, LOSAT was funded using FY-00 resources.

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(U) E. PE Funding for FY 1999 ACTDs

ACTD	FY 2001	FY 2002	FY 2003
Battle Damage Assessment in the Joint Targeting Toolbox	0	.300	.4 00
Coherent Analytical Computing Environment	1.500	.300	0
Common Spectral MASINT Exploitation Capability**	1.200	.100	0
Compact Environment Anomaly Sensor	0	.100	0
Force Medical Protection	.100	.100	0
Human Intelligence and Counterintelligence Support Tools**	2.900	.500	.300
Joint Medical Operations Telemedicine	.800	1.300	0
Joint Theater Logistics	0	0	0
Personnel Recovery Mission Software *	.600	0	0
Small Unit Logistics *	0	0	0
Theater Air and Missile Defense Interoperability	4.800	1.900	.600

*Completed
** Completed the demonstration phase of the ACTD

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(U) E. PE Funding for FY 2000 ACTDs

ACTD	FY 2001	FY2002	FY 2003
CINC 21	9.969	10.600	4.280
Coalition Aerial Surveillance and Reconnaissance	1.900	2.600	2.000
Communication/Navigation Outage Forecasting System	1.900	1.500	1.000
Computerized Operational MASINT Weather	2.500	1.400	1.000
Content-Based Information Security	2.000	.300	0
Global Monitoring of ISR Space Systems	.600	.400	.400
Ground-To-Air Passive Surveillance	1.100	2.000	1.400
Joint Intelligence, Surveillance and Reconnaissance	5.800	2.700	0
Multiple Link Antenna System	.500	1.300	1.300
Quick Bolt	5.500	8.100	7.000
Restoration of Operations	2.400	3.600	2.100
Tri-Band Antenna Signal Combiner	.800	0	0

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(U) E. PE Funding for FY 2001 ACTDs

ACTD	FY 2001	FY2002	FY 2003
Active Network Intrusion Defense	1.300	2.000	2.100
Adaptive Battlespace Awareness	1.800	3.400	3.700
Advanced Tactical Laser (Note 1)	2.000	14.00	7.000
Advanced Technology Ordnance Surveillance	0	1.300	.900
Area Cruise Missile Defense	0	0	1.500
Coalition Combat Identification	0	0	6.300
Coalition Theater Logistics	1.500	2.700	2.800
Coastal Area Protection System*	1.350	0	0
Hunter Standoff Killer Team	0	0	9.600
Joint Area Clearance	2.000	3.100	1.400
Loitering Electronic Warfare Killer	1.000	6.700	1.400
Network-Centric Collaborative Targeting	3.000	6.700	7.000
Personnel Recovery Extraction Survivability Aided by Smart Sensors	1.000	3.400	4.200
Tactical Missile System Penetrator	4.300	7.700	8.400
Theater Integrated Planning Subsystem	1.200	.800	.800

Note (1): ATL FY-02 total includes a $7M congressional plus-up.
*Completed

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(U) E. PE Funding for FY 2002 ACTDs

ACTD	FY 2002	FY 2003
Active Denial System	.450	1.800
Agile Transportation	2.720	3.800
Coalition Information Assurance Common Operational Picture	2.430	3.800
Contamination Avoidance at Seaports of Debarkation	1.800	2.500
Expendable Unmanned Aerial Vehicle	2.925	4.800
Homeland Security Command and Control	3.780	5.100
Hyperspectral Collection and Analysis	3.000	4.200
Joint Explosive Ordnance Disposal	1.800	5.100
Advance Notices	4.500	3.800
Language and Speech Exploitation Resources	2.700	5.100
Micro Air Vehicle	.900	4.400
Pathfinder	.900	3.800
Signals Intelligence Processing	.500	0
Space-Based Moving Target Indicator (MTI)	4.900	5.500
Thermobarics	1.350	3.200

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COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	171.727	183.524	188.642	189.073	190.266	196.949	199.306	Continuing	Continuing
HPCM/P507	171.727	183.524	188.642	189.073	190.266	196.949	199.306	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U)The Department of Defense (DoD) High Performance Computing (HPC) Modernization Program (HPCMP) 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 than any potential adversary threatening national security. The results of these efforts feed directly into the acquisition process by improving weapons system designs through 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, high performance computing (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.

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(U)The HPCMP has established and supports four major shared resource supercomputing centers as well as several smaller, special-purpose distributed supercomputing centers. These centers directly support the DoD S&T and T&E laboratories and centers and are accessible to local and remote scientists and engineers via high-speed network access. 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, is an integral part of the program. 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.

(U) The HPCMP user base includes approximately 5,000 computational scientists and engineers and over 60 DoD laboratories and test and evaluation facilities. The integrated HPCM program consists of Shared Resource Centers - four large Major Shared Resources Centers (MSRCs) and seventeen Distributed Centers (DCs); 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 DT&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 HPCMP 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 DT&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 through the Common HPC Software Support Initiative (CHSSI). In addition to CHSSI, software activities build technology transition activities with academic institutions, train users, and build collaborative through Programming Environment and Training (PET). Also technology is being developed to protect high value HPC application codes through a Software Protection effort.

(U) 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 HPCMP are to:

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- 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.

(U) Four major contracts to support each of the MSRCs were competitively awarded during FY 1996. These contracts provide comprehensive support services for up to eight years. The four MSRCs and their location are:

• Aeronautical Systems Center (ASC), Wright-Patterson Air Force Base, OH
• Corps of Engineers Research and Development Center (ERDC), Vicksburg, MS
• Army Research Laboratory (ARL), Aberdeen Proving Ground, MD
• Naval Oceanographic Office (NAVO), Stennis Space Center, MS

(U) Computer Science Corporation of Huntsville, AL was awarded contracts to support both the ASC and ERDC MSRCs. Logicon of Herndon, VA was awarded the contract to support the NAVO MSRC. Finally, Raytheon E-Systems of Garland, TX was awarded the contract to support the ARL MSRC

(U) There are currently 17 distributed centers. In FY 2001 three existing centers were upgraded. Currently funding exists in the 2002 budget to upgrade or establish approximately five distributed centers. Currently identified distributed centers and their locations are as follows:

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- Air Armaments Center (AAC), Eglin AFB, FL
- Air Force Flight Test Center (AFFTC), Edwards AFB, CA
- Air Force Research Laboratory/ Information Directorate (AFRL/SN), Rome, NY
- Air Force Research Laboratory/ Sensors Directorate (AFRL/IF), Wright-Patterson AFB, OH
- Army High Performance Computing Research Center (AHPCRC), Minneapolis, MN
- Arnold Engineering Development Center (AEDC), Arnold AFB, TN
- Arctic Region Supercomputing Center (ARSC), Fairbanks, AK
- Joint National Test Facility (JNTF), Schriever AFB, CO
- Maui High Performance Computing Center (MHPCC), Maui, HI
- Naval Air Warfare Center - Aircraft Division (NAWC-AD), Patuxent River NAS, MD
- Naval Air Warfare Center - Weapons Division (NAWC-WD), China Lake, CA
- Naval Research Laboratory (NRL-DC), Washington, DC
- Redstone Technical Test Center (RTTC), Huntsville, AL
- Space and Missile Defense Command (SMDC), Huntsville, AL
- Space and Naval Warfare Systems Center (SSCSD), San Diego, CA
- Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI
- White Sands Missile Range (WSMR), NM

(U)The Defense Research and Engineering Network (DREN) provides wide area network (WAN) connectivity among the Department's High Performance Computing resources (high performance computing systems and the HPC user base of scientist and engineers in the research, development test and evaluation community). The DREN is implemented through the DREN Intersite Services Contract (DISC) awarded to American Telephone and Telegraph (AT&T) in FY 1996. This contract allows the government to purchase high-speed network service to anywhere in the United States at bandwidths ranging from 3.0 megabits per second to 622 megabits per second (OC-12), with upgrade potential to 2.4 gigabits per second (OC-48). A follow-on contract will be awarded in FY2002.

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(U) Given the international availability of high performance computer hardware, the protection of DoD software investments has become increasingly critical. Beginning in FY 2002 and continuing into the out-years, technologies and methodologies will be developed to protect and limit end-use of software while minimizing the burden on an authorized end-user. New PET contracts have been awarded to Mississippi State University, Mississippi State, MS and High performance Technologies, Inc., Arlington, VA.

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	171.727	183.524	188.642	189.073	190.266	196.949	199.306	Continuing	Continuing
HPCM/P507	171.727	183.524	188.642	189.073	190.266	196.949	199.306	Continuing	Continuing

(U) Project Number and Title: P507 HPCM

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Congressional adds as follows: ($9.300 million)
High Performance Visualization Center ($3.0 million)
MHPCC Operations ($1.6 million)
Multi Threat Architecture System ($2 million)
SMDC Simulation Center Upgrade ($2.7 million)

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(U) Shared Resource Centers: The program sustained the existing capability and continued the modernization process by acquiring additional HPC systems, storage, and scientific visualization capabilities to populate and upgrade the established MSRCs to fulfill the FY2001 HPC requirements of the laboratories and R&D centers. The program identified evaluated and prioritized HPC requirements for DCs, began acquisition of an updated system at the Arctic Region Supercomputing Center and upgraded systems at the Naval Research Laboratory DC. Additionally upgrades were accomplished at the Army High Performance Computing Research Center and the Space and Missile Defense Command DCs. The PET aspect of the program was re-competed and transitioned to Software Applications Support for FY 2002 execution.

(U) MSRC Sustainment: The program sustained and supported the integration, operation and use of HPC computational resources at the MSRCs. Partial year sustainment and operations for systems purchased and deployed in FY 2001 and cost saving resulting in the retirement of older HPC systems are included in the total FY 2001 funding requested. Funding was provided to support scientific visualization efforts. ($ 88.231 million)

(U) Distributed Center Sustainment: The program funded sustainment and operations at the Maui High Performance Computing Center and the Arctic Region Supercomputer Center in FY 2001. Acquisition of a Multi Threat Architecture System for the Naval Research Laboratory and system upgrades for the Space and Missile Defense Command were provided. 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 (except for the Maui High Performance Computing Center and the Arctic Region Supercomputer Center) with HPCMP procurement funding. In return for the HPCMP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCMP equipment located at the site. The support to the Maui High Performance Computing Center and the Arctic Region Supercomputer Center in FY 2001 was made possible by a DoD decision to provide additional funding in FY 2001.
($ 27.146 million)

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(U) DREN: Planned upgraded services to increase bandwidth were accomplished at selected HPCMP sites. Low end users continued to be connected at 3 Mbps, mid range users at 155 Mbps and high range users at 622 Mbps. Operation of security systems and enhancements continued as planned. Collaborative work continued with the Federal networking community and standards associations to assure DREN remains compatible with future technology changes. A follow-on DREN commercial services contract is in acquisition with an award date expected by 2nd Quarter FY 2002. ($ 34.481 million)

(U) Software Applications Support: 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 supporting software to exploit scalable HPC assets. The Programming Environments and Training element of the program, currently contained within the MSRC support initiative was recompeted and realigned under the Software Applications Support Initiative area for FY 2002 execution. ($ 21.869 million)

(U) FY 2002 Plans:

(U) Shared Resource Centers: The program will sustain the existing capability and continue modernizing HPC systems, storage, and scientific visualization capabilities to fulfill a significant portion of the projected the R&D & laboratory and center HPC requirements. Acquisition activities will begin for follow-on support at the MSRCs.

(U) MSRC Sustainment: The program will sustain and support the integration, operation and use of HPC computational resources at the four MSRCs. FY 2002 funding reductions will delay program wide initiatives and operations tempo at each of the four centers. ($ 74.968 million)

(U) 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 HPCMP procurement funding. In return for the HPCMP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCMP equipment located at the site. There are two exceptions. The program has budgeted $8M each for the Maui High Performance Computing Center and the Arctic Region Supercomputer Center in FY 2002. (16.846 million)

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(U) DREN: Network services provided under DISC will transition to the follow-on service provider. 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. FY 2002 funding reductions will delay implementation of VPN technology. ($ 31.245 million)

(U) Software Applications Support: Development efforts in the CHSSI program will continue to mature as some CHSSI projects are completed, and others are begun. The CHSSI projects will continue developing shared scalable applications supporting software 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. A program will be 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 2002 funding reductions will delay software development and protection efforts. ($ 60.465 million)

(U) FY 2003 Plans:

(U) Shared Resource Centers: The program will sustain the existing capability and continue modernizing HPC systems, storage, and scientific visualization capabilities to fulfill a significant portion of the projected the R&D & laboratory and center HPC requirements.

(U) MSRC Sustainment: The program will sustain and support the integration, operation and use of HPC computational resources at the four MSRCs. ($ 78.504 million)

(U) 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 HPCMP procurement funding. In return for the HPCMP investment, the DC organization agrees to appropriately fund the sustainment and operations of the HPCMP equipment located at the site. There are two exceptions. The program has budgeted for sustainment and operations at the Maui High Performance Computing Center and the Arctic Region Supercomputer Center. ($ 22.461 million)

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(U) Networking: 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.
($ 32.912 million)

(U) Software Applications Support: Development efforts in the CHSSI program will continue to mature as some CHSSI projects are completed, and others are begun. The CHSSI projects will continue developing shared scalable applications supporting software 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. ($ 54.765 million)

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(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003
Previous President's Budget Submission	164.027	137.988	162.290
Delta	7.700	50.388	0.000
FY 2002 Amended President's Budget Submission	171.727	188.376	162.290
Appropriated Value	173.327	185.600	0.000
Adjustments to Appropriated Value			
a. Congressionally Directed Undistributed Reduction	0.000	-2.076	0.000
b. Rescission/BTR, Inflation Adj	-1.600	0.000	0.000
c. Other	0.000	0.000	26.352
Current FY 2003 Budget Submission	171.727	183.524	188.642

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** High Performance Computing Modernization **PE 0603755D8Z**

Change Summary Explanation:

(U) Funding: FY 2001 and FY 2002 reductions reflect congressional adjustments and program budget decisions. Adjustments for FY 2003 are due to program budget decisions

(U) Schedule: N/A

(U) Technical: N/A

(U) C. Other Program Funding Summary Cost

FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY2007
95.376	79.418	75.311	49.457	50.421	51.917	53.060	54.161

To Complete Total Cost
Continuing Continuing

MILESTONE SCHEDULE:Fiscal Years
Milestone II Decision Review1Q 1996
Awards for MSRC Contracts (Performance Level 1) 2Q, 3Q, 4Q 1996
Award for DREN (DISC) 4Q 1996
MSRC Performance Level 1 Capability Installed 1Q 1997 - 4Q 1997
In-Process Review 3Q 1997
MSRC Performance Level 2 Capability Installed 2Q 1997 - 3Q 1998
DREN Initial Performance Capability 3Q 1997
IDREN to DREN Transition Complete 4Q 1998

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE High Performance Computing Modernization **PE 0603755D8Z**

MSRC Performance Level 3 Capability Installed 2Q 1999 - 3Q 2000
Program Review 2000 3Q 2000
Establish Basic Purchase Agreement With Major Vendors Through GSA Contract) 1Q - 2Q 2001
PET Follow-on Contract(s) (Recompete) 3Q 2001
DREN Follow-on Contract (Recompete) 2Q 2002
MSRC Technology Insertion-01 Capability Installed 2Q 2001 - 1Q 2002
MSRC Technology Insertion-02 Capability Installed 2Q 2002 - 1Q 2003
Program Review 2002 3Q 2002

(U) D. Acquisition Strategy:

(U) Program Environments and Training (PET): A full and open competition has been completed for follow-on PET activity in FY 2002.

(U) Defense Research and Engineering Network (DREN): A full and open competition is ongoing for the follow-on to DREN. A contract extension has been negotiated to allow for a 12 - 18 month transition. Award of the new contract is planned for the no later than the end of the 2nd quarter FY 2002.

(U) Major Shared Resource Centers: Technology Insertion – 2002 is ongoing. Each year the program collect benchmark performance information in the form of DoD relevant application benchmarks and specific performance-based quotes from the HPC vendors in order to formulate specific procurement plans.

(U) E. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Advanced Distributed Learning (ADL) **PE 0603769D8Z**			
COST *(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0.000	0.000	14.000	14.000	14.000	14.000	14.000	Continuing	Continuing
ADL / P769		0.000	0.000	14.000	14.000	14.000	14.000	14.000	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This program supports development of common specifications, guidelines, and software for Advanced Distributed Learning (ADL) as well as proof of principle demonstrations. The Advanced Distributed Learning/Job Performance Technology Initiative makes learning and performance support available anytime, anywhere. The ADL design concept encompasses the following elements: reusability of sharable content objects, tailoring instruction to the learner, interoperability of learning content and management systems, and the ability of content to migrate to different hardware and software applications through the development of consensus standards. Proof of principle demonstrations will provide data on the technical feasibility and the utility of applying the commercial ADL specifications to content, learner interface, and repository applications. The demonstrations will also support assessments of the impact of ADL on human performance and research that evaluates the proof of design concept for advanced distributed learning.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Advanced Distributed Learning (ADL) **PE 0603769D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	0.000	14.000	14.000	14.000	14.000	14.000	Continuing	Continuing
ADL/P769	0.000	0.000	14.000	14.000	14.000	14.000	14.000	Continuing	Continuing

(U) Project Number and Title: P769 ADL

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2002 Plans:

(U) None

(U) FY 2003 Plans:

(U) The Advanced Distributed Learning program will conduct research in the following areas: demonstrations of cross-cutting ADL educational technology, experiments to define and establish the science base for distributed learning system acquisitions and key ADL technologies. These technologies include: adaptable and dynamic learning management systems, automated tutors, visual communications and cognitive capabilities. ($14.000 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Advanced Distributed Learning (ADL) **PE 0603769D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	0.000	0.000	0.000	
Delta	0.000	0.000	14.000	Continuing
FY 2002 President's Budget Submission	0.000	0.000	14.000	Continuing
Appropriated Value	0.000	0.000	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current FY 2003 Budget Submission	0.000	0.000	14.000	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Advanced Distributed Learning (ADL) **PE 0603769D8Z**

(U) **Funding** : This is a new start in FY 2003 that provides research in the areas of reusability of shareable content objects, tailoring instruction, interoperability of management systems/learning content and ability to migrate to different hardware and software applications.

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

(U) **Technical**

(U) **C.** **OTHER PROGRAM FUNDING SUMMARY COST**: N/A

(U) **D.** **ACQUISITION STRATEGY**: N/A

(U) **E.** **SCHEDULE PROFILE**: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE FEBRUARY 2002		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Software Engineering Institute **PE 0603781D8Z**		
COST(In Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	21.876	22.983	23.020	23.088	23.831	23.901	Continuing	Continuing
Project 781/SEI	0.000	19.393	20.433	20.435	20.459	21.152	21.174	Continuing	Continuing
Project 782/ Software Intensive Systems	0.000	2.483	2.550	2.585	2.629	2.679	2.727	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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 for use 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, industry, and academia to: (1) improve current software engineering activities from both management and engineering 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Software Engineering Institute **PE 0603781D8Z**

(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 2002 focus areas are: Technical Engineering Practices (including Survivable Systems practices, Architecture-centered Software Engineering, and Commercial Off-The-Shelf (COTS)-Based Software Engineering); Enhanced Software Management Capabilities (including personal and team software development processes and Capability Maturity Model Integration (CMMI)); and accelerating Adoption of High Payoff Software Technologies.

(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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Software Engineering Institute **PE 0603781D8Z**

COST*(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	21.876	22.983	23.020	23.088	23.831	23.901	Continuing	Continuing
Project 781/SEI	0.000	19.393	20.433	20.435	20.459	21.152	21.174	Continuing	Continuing
Project 782/ Software Intensive Systems	0.000	2.483	2.550	2.585	2.629	2.679	2.727	Continuing	Continuing

(U) Project Number and Title: Project 781/SEI

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2002 Plans

(U) Software Engineering Technical Practices. ($ 10.743 million)

- A new survivable routing emergent algorithm is being demonstrated and published.
- Specification methods for survivable systems are being developed, including the definition of a mission lifecycle process for survivable systems.
- The Product Line Technical Probe, a method for evaluating an organization's readiness to develop a software product line, is leading to a product line development effort within at least two organizations, with cost, schedule, and quality improvements typical of those experienced by commercial organizations.
- Software architecture is being documented by at least one DoD organization using SEI-recommended documentation and analysis practices.
- Tutorials on acquisition practices relating to improving the performance of DoD systems are being developed and presented to acquisition organizations, improving their insight into system performance issues.
- Two DoD organizations are routinely using a COTS risk evaluation method as part of their standard program review criteria.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Software Engineering Institute **PE 0603781D8Z**

(U) Software Engineering Management Practices ($ 4.200 million)
- A CMMI lead appraiser program is being established and authorized transition partners are conducting CMMI appraisals.
- Organizations engaged in software process improvement efforts are using the software engineering-oriented version of the CMMI Product Suite.
- The transition of the Team Software Process (TSP) into practice is accelerating, with at least four DoD organizations licensed to coach TSP teams.

(U) Adoption of Software Technologies. ($ 3.700 million)
- Software engineering technology transition planning practices are in use by at least one DoD S&T organization, who is accurately estimating and measuring the speed and cost associated with introducing software engineering innovations.

(U) Acquisition Pilots (SEI). ($ .750 million)
- Provide direct technical support to prove the utility of new and improved software engineering practices and technology in strategically important acquisition programs.
- Document lessons learned from successful acquisition pilots and facilitate their rapid and broad dissemination and use.

(U) OUSD (AT&L) Software Intensive Systems Office (non-SEI). ($2.483 million)
- Support DoD implementation of the recommendations of FY01 Defense Science Board Task Force on Defense Software.
- Conduct Independent Expert Reviews of major software intensive system acquisitions.

(U) FY 2003 Plans:

(U) Software Engineering Technical Practices (SEI). ($ 10.933 million)
- Demonstrate use of emergent algorithms for intrusion-aware software design in a critical infrastructure application.
- Demonstrate architecture-centered engineering design methods for survivability and security analysis of networked systems.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Software Engineering Institute **PE 0603781D8Z**

- Update and pilot use of an engineering framework to guide software reuse across families of similar systems.
- Refine and transition risk management techniques focused on survivability.
- Initiate engineering studies on use of proven survivability methods for mobile code and wireless systems
- Publish lessons learned and guidance documents for the migration and upgrade of legacy software systems.
- Update and demonstrate acquisition guidance for contracting for, documenting, and verifying software architectures.
- Provide tutorials and workshops on software architecture reconstruction, representation, and analysis practices
- Update and transition to DAU courses for executives and program managers on acquisition of COTS-based software systems.
- Develop research-enabled prototype methods to predict and verify system properties from constituent software components.
- Develop and transition acquisition guidelines for evaluating potential software performance problems in systems.

(U) Software Engineering Management Practices (SEI). ($ 3.800 million)
- Update and transition integrated engineering process (e.g., CMM Integration) framework, assessment methods, courses and case studies
- Support the DoD and the DoD industry base migration from the CMM for Software to the CMM Integration Framework.
- Extend proven software development team training methods to provide “mission rehearsal” capability for acquisition teams.
- Continually update the SEI’s on-line best practice repository with data from the DoD and the industry base (DoD and commercial).
- Update and demonstrate software risk management practices based on rapidly evolving technology and lessons learned
- Update and demonstrate measurement guidance to support the application of statistical process control in software organizations. .

(U) Accelerated Adoption of Software Technologies (SEI). ($ 3.500 million)
- Tailor and package proven software engineering technology transition planning practices for use in technology readiness planning by DoD S&T organizations.
- Create and demonstrate knowledge-based methods to accelerate the adoption of evolutionary development and acquisition practices for software intensive systems.

(U) Acquisition Pilots (SEI). ($2.200 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Software Engineering Institute **PE 0603781D8Z**

- Provide direct technical support to prove the utility of new and improved software engineering practices and technology in strategically important acquisition programs.
- Document lessons learned from successful acquisition pilots and facilitate their rapid and broad dissemination and use.

(U) OUSD (AT&L) Software Intensive Systems Office (non-SEI). ($2.550 million)
- Support DoD implementation of the recommendations of FY01 Defense Science Board Task Force on Defense Software.
- Conduct Independent Expert Reviews of major software intensive system acquisitions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Software Engineering Institute **PE 0603781D8Z**

(U) B. Program Change Summary	**FY2001**	**FY2002**	**FY2003**	**Total Cost**
Previous President's Budget Submit	0.000	0.000	18.296	
Delta	0.000	21.091	0.000	
FY 2002 Amended President's Budget Submit	0.000	21.091	18.296	
Appropriated Value	0.000	22.091	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.215	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other	0.000	0.000	4.687	
Current President's Budget	0.000	21.876	22.983	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Software Engineering Institute **PE 0603781D8Z**

(U) **Funding**: Beginning in FY 2002, SEI PE 0602301E currently funded in DARPA has been transferred to PE 0603781D8Z to align the funding authority with the management responsibility. FY 2003 increases support the Department's focus on decreasing software defects and increasing the reuse of software. Increases in FY 2003 also reflect the start of a number of additional pilot programs.

(U) **Schedule**:

(U) **Technical**:

(U) **C.** **Other Program Funding Summary Cost**:

(U) **D.** **Acquisition Strategy**:

(U) **E.** **Schedule Profile**:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE FEBRUARY 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3							R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP) **PE 0603826D8Z**			
COST *(In Millions)*		FY2001	FY2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0.000	0.000	25,430	75,673	101,400	102,394	103,425	Continuing	Continuing
QRSP		0.000	0.000	25,430	75,673	101,400	102,394	103,425	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) The Quick Reaction Special Projects (QRSP) program will be used to initiate high-priority or high-leverage science and technology projects in the execution year. Projects would be initiated at the direction of the USD (AT&L) or Director, Defense Research and Engineering (DDR&E). QRSP projects would be conducted by a military department or defense agency with active S&T programs, awarded competitively. Examples of the types of projects that are envisioned include; accelerating promising research that will enable transformation or will fill critical technology gaps in DoD acquisition programs.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Quick Reaction Special Projects (QRSP) **PE 0603826D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		0.000	0.000	25,430	75,673	101,400	102,394	103,425	Continuing	Continuing
QRSP		0.000	0.000	25,430	75,673	101,400	102,394	103,425	Continuing	Continuing

(U) Project Number and Title: Quick Reaction Special Projects

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2003 Plans:

(U) Establishing a "Quick Reaction Special Projects" (QRSP) provides the flexibility to respond to emergent DoD issues and address technology surprises and needs in real time. These funds would be used to develop technology options in those technology areas with rapid maturity; such as the information technologies. In addition, critical technology in support of acquisition programs could be focused to reduce the cycle time. The QRSP program would be used to initiate high-priority or high-leverage science and technology projects in the execution year. Projects would be initiated at the direction of the USD (AT&L). The program funds would be managed by the Director, Defense Research and Engineering. QRSP projects would be conducted by a military department or defense agency with currently active S&T programs and awarded competitively. No specific organization or program area will receive the majority of funding. Continue to initiate high-priority or high-leverage science and technology projects consistent with the needs of the Department. The program would target quick hitting technology opportunities and take advantage of rapid commercial maturation. Special S&T Studies supporting SECDEF priorities would also be conducted as required. The program would continue to be managed by the Director, Defense Research and Engineering and projects will be conducted by the military departments or defense agencies. ($25.430 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP) **PE 0603826D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
FY 01 President's Budget	0.000	0.000	0.000	
FY 02 Amended Budget	0.000	25.000	25.500	
Appropriated Value	0.000	0.000	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other	0.000	0.000	-0.070	
Current President's Budget	0.000	0.000	25.430	Continuing

Change Summary Explanation:.

(U) Funding: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Joint Wargaming Simulation Management Office **PE 0603832D8Z**

COST *(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		62.390	46.104	49.929	46.623	47.951	47.617	48.313	Continuing	Continuing
JSM/P476		62.390	46.104	49.929	46.623	47.951	47.617	48.313	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

The Defense Modeling and Simulation Office has corporate-level responsibility for the cooperation and synergism of modeling and simulation (M&S) activities within the Department of Defense. M&S has demonstrated the capability to revolutionize the way in which the Department makes decisions and conducts its operations. Working as a system of systems, M&S can support a full range of applications (e.g. joint training, doctrine development, formulation and assessment of operational plans, mission rehearsal, force structuring and the acquisition of new systems). To ensure effective and efficient use of M&S, the Department has developed a strategy fostering interoperability and re-use, embodied in the Department of Defense Modeling and Simulation Master Plan, which serves as the basis for execution of this program. The major element of the strategy is development of a common technical framework (CTF) for M&S consisting of three components: the High Level Architecture; Functional Descriptions of the Mission Space (FDMS); and Data Standardization. Supporting these is a broad range of shared common services which include environmental representations; human and organizational behavioral representation; verification, validation and accreditation of simulations; a modeling and simulation resource repository; a modeling and simulation information analysis center; and outreach and education initiatives to ensure standardized and timely implementation of the plan. All aspects of these efforts are focused on the Warfighters of today and tomorrow through a rigorous and ongoing process of capturing and addressing Warfighting customer needs and requirements. As a result of this effort, the Department will be able to lead, integrate and leverage M&S technologies for the Warfighter and thus improve readiness, enhance mission rehearsal, optimize investment decisions, and achieve cost-effective acquisitions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Joint Wargaming Simulation Management Office **PE 0603832D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		62.390	46.104	49.929	46.623	47.951	47.617	48.313	Continuing	Continuing
JSM/P476		62.390	46.104	49.929	46.623	47.951	47.617	48.313	Continuing	Continuing

(U) FY 2001 Accomplishments:

(U) The High Level Architecture (HLA) for simulation program implemented software enhancements to Runtime Infrastructure (RTI) 1.3 Next Generation (NG), current version, based on testing with the Joint Simulation System (JSIMS) program and Millennium Challenge 2002 (MC02). Development and testing of a new Institute of Electrical and Electronics Engineers (IEEE) 1516 Runtime Infrastructure (RTI) commenced. Critical HLA Tools, including the Object Model Development Tool, Federation Execution Planner`s Workbook Tool, Federation Verification Tool, Federation Management Tool and Data Collection Tool are in the process of being upgraded to the new IEEE specification. Experimentation with and performance of the RTI is being performed and measured in consonance with the technical requirements of major joint efforts.

(U) Created the Military Domain Representation Framework (MDRF, version 1.0) by integrating the OSD developed Functional Descriptions of the Mission Space, the ASD/C3I C4ISR Architecture Framework, and the DOT&E Vulnerability/Lethality Taxonomy. MDRF was formally adopted by the US Army OneSAF and Combat XXI programs and is under consideration by PM Objective Force (Army) and PM C2ISR Enterprise (Air Force). The FDMS Library was integrated into the M&S Resource Repository and deployed at the US Army's Simulation Training and Instrumentation Command (STRICOM). The Unit Order of Battle (UOB) Toolset has been adopted by the Joint Training Information Management System (JTIMS) for use by all Joint exercises under the Joint Training System, by the Training and Operational Data Synchronization (TODS) program (Army Battle Control System 6.2), and by the JSIMS Common Component Workstation. Continued to provide Functional Data Administration for M&S in accordance with DoDD 8320.1.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office **PE 0603832D8Z**

(U) Completed environmental interchange mechanism definition and full technical documentation, to include advancing six standards based on Synthetic Environment Data Representation and Interchange Specification (SEDRIS) technologies under the International Standards Organization and the International Electro-technical Commission to Advanced Working Drafts (versions 4/5). Expanded software tools for SEDRIS transmittal generation, verification, and consumption through two public releases of SEDRIS core and application software. Completed initial atmosphere, ocean and space environmental data model. Expanded existing atmospheric and terrain scenario generation and archiving capabilities. Initiated development of a conceptual architecture and the key technical components of an INE Authoritative Representation Process to facilitate the scenario composition and generation of physically consistent environmental representations. Expanded operational capability for the Master Environmental Library with both Internet and SIPRNET made available to the DoD user community. Developed prototype data sets to support user system test events, experiments and exercises (JWARS, JSIMS/WARSIM, Global Wargame 2001). Completed end-to-end experiments/demonstrations to assess and validate the progress of technical development including demonstration of generation and use of robust environmental representation in key runtime federations.

(U) Conducted research into performance moderator functions and their application to operations other than war modeling and simulation. Completed initial maritime scenario development for decision modeling challenge problem in partnership with US Naval Space and Warfare Systems Command (SPAWAR). Completed Icarus HLA federation of cognitive models and air traffic control scenario in partnership with the Air Force Research Laboratory (AFRL) and Office of Naval Research (ONR). Fielded Intelligent Mission Controller Node (automated air tasking order generator for exercises and wargames) in partnership with AFRL and the Naval Air Warfare Center, Training Systems Division (NAWC-TSD).

(U) Completed development of Build 2 of the web-based M&S Verification, Validation & Accreditation Recommended Practices Guide (RPG) that focuses on VV&A of legacy simulations. The RPG addresses the VV&A issue at multiple levels of detail and provides the user with dynamic and interactive capabilities. Initiated Verification, Validation and Accreditation (VV&A) applications for fidelity, specifications for reuse, and conceptual framework model coverage. Performed technical analysis of human behavior models with respect to VV&A practices and methods.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office **PE 0603832D8Z**

(U) Completed an initial design of a Joint Theater Level Simulation-Joint Conflict and Tactical Simulation (JTLS-JCATS) interface that will allow mixed-resolution simulation play during joint training exercises. In cooperation with TRANSCOM, completed an initial interface between the MIDAS and ELIST logistics models that provides an automated interface between these models, allowing faster logistics processing and Time Phased Force Deployment Data (TPFDD) development. Performed integration and testing of the HLA Runtime Infrastructure within the Joint Training Confederation (JTC) and, in conjunction with the USFK/ROK, evaluated the potential inclusion of the ROK Chang Jo 21 model within the JTC. Assessed the utility of linking the JSIMS and Joint Warfare System (JWARS) models for applications involving joint training and analysis.

(U) Initiated ground breaking M&S Science and Technology initiative projects in partnership with the services focusing on modeling and simulating Operations Other Than War (OOTW). Completed first round of M&S Science and Technology initiative projects in partnership with the Services. The result of these projects will advance the state-of-the-art in M&S technology and will be transitioned to Service labs, Advanced Concept Technology Demonstrations (ACTDs) and used in key exercises and experiments.

(U) Fielded an application that allows for the rapid initialization of the Naval Simulation System (NSS) using data available in the Global Command and Control System (GCCS) for the purposes of executing course of action (COA) analysis. Completed testing of a GCCS-Pegasus interface that identified issues involving the interaction of faster than real-time analysis simulations with real-time command and control systems. Documented an initial set of requirements for M&S applications to be integrated into the DII COE. Investigated inclusion of the HLA RTI within the DII COE. Enhanced the Army's Eagle-ABCS interface that utilized the RTI to connect to the Joint Common Database (JCDB).

(U) Analyzed alternatives for a Weapons of Mass Destruction (WMD) Attack-Effects-Response Assessment capability at USJFCOM. Completed development of Operational Requirements, Concept of Operations, and Technical Design documents.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office **PE 0603832D8Z**

(U) Developed a Synthetic Range technical architecture and software framework for implementation at the Pacific Missile Range Facility to expand the capabilities of test and evaluation as well as reduce associated costs inherent in large-scale or platform driven events. Built a useable, limited prototype using the Synthetic Range software framework. Developed metrics to quantify the value added benefit of Synthetic Range.
($62.390 million)

(U) FY 2002 Plans:

(U) Continue as Development Agent for the High Level Architecture (HLA) Runtime Infrastructure (RTI) for JSIMS multi-service simulation training program. Continue RTI performance assessment and testing within the JSIMS program, increase RTI optimization performance to meet warfighter needs as part of multi-service advanced distributed simulation exercises including Millennium Challenge, Olympic Challenge, and Ulchi-Focus Lens. Continue refinement of HLA RTI prototype software to address security gateways among different levels of classified simulations. Continue experimentation with specifications to ensure distributed simulation architecture is buildable in a standardized fashion and demonstrate it meets user requirements. Complete HLA RTI performance benchmarks and supporting software for RTI 1.3 Next Generation (NG). Continue work to transition HLA RTI for sustainment by the commercial sector in support of distributed simulation.

(U) Continue experimentation that addresses the flexibility and military utility of the new DDM 1516 specification for complex applications and the scalability of the architecture, advanced time management algorithms of distributed simulations with different time scaling factors and the use of the HLA in communication enviroiments other than networks (e.g. shared memory, multi-process, parallel-process, handling video/voice).

(U) Continue experimentation devoted to new implementation approaches available by applying emerging commercial advanced information technologies to the implementation of HLA. Applications would include: designs and implementations of advanced time management techniques, use of HLA in next generation internet, implementation within mobile computing environments (e.g., Network Centric Warfare environments), in high performance computing platforms, and the use of intelligent agent technologies to support implementation within evolving warfighter requirements.

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(U) Develop tool sets to be upgraded to Institute for Electrical and Electronics Engineers (IEEE) 1516 standard. This will include the tool sets available for system developers. The tool sets include the Object Model Development Tool (OMDT), Federation Verification Tool (FVT), Federation Management Tool (FMT), Data Collection Tool (DCT), and Object Model Resource Center (ORMC) and will support the transition of the HLA simulation architecture and tool sets to the commercial marketplace. Initiate development of a certification process for software applicable to DoD interoperability requirements for simulation to ensure promulgation of a reliable standard for live, virtual, and constructive simulation.

(U) Initiate feasibility to interweave the specifications, rules, and object models from the Advanced Distributed Learning (ADL) initiative's Sharable Content Object Reference Model (SCORM) with those from the modeling and simulation community's High Level Architecture. This new technology complements the current ADL framework by extending the simulation object models of military platforms (interactions, attributes, and parameters) to a broader audience of military learners and equipment users.

(U) Develop initial experimentataion to test interoperability between existing and planned digital knowledge repositories of both learning objects and simulation objects, allowing an expansion of the training capabilities in HLA and a strengthening of the simulation and gaming capabilities of ADL. Utilitze wideband fiber optic distributed classroom testbed already in existence to test the limits of interoperability of interactive simulation and modeling initiatives.

(U) Begin banyan integration research. Develop and deploy the Military Domain Representation Framework (MDRF) version 2.0 to add initial system-of-systems representation. Adapt the knowledge acquisition tools to support selected Joint Modeling and Simulation System (JMASS) representation requirements. Develop and deploy FDMS Model Library version 7.0 to provide initial capability for distributed data repositories and round trip data exchange with MDRF version 1.0 knowledge exchange representation. Employ paired comparison test procedures with NPS to collect quantitative, business case metrics using selected C4ISR-AF and Transformation of the Army knowledge products. Begin Scenario Generation For Common Operating Environment (SGCOE) for four to six Defense Planning Guidance (DPG) Illustrative Planning Scenarios (IPS). Continue to develop JWARS, JSIMS, DPG IPS's, UTL and METL, and C4ISR-AF military operations knowledge bases for Internet and SIPRnet. Extend hosting of Transformation of the Army and JMASS military operations knowledge bases. Begin to host selected USAF and USMC military

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operations knowledge bases.

(U) Begin Materiel Configuration Toolset (MCT) development. Begin Electronic Order of Battle (EOB) Toolset and Task Organization Toolset (TOTL) development by deploying version 1.0 of each toolset. Continue integration the Data, Integrated Natural Environment (INE), Human Behavior Representation (HBR), and MSRR programs, the OSD/PA&E Joint Deployment System, the JFCOM Joint Integrated Data Provisioning System with DoD Service, Component, and Agency data provisioning activities to define Joint Model + Data Provisioning System (JM+DPS) version 2.0. Initiate Joint Munitions Effectiveness Manual (JMEM) transition to Joint Munitions Effectiveness (JMET) Toolset Collaborate ICW the Joint Technical Coordinating Group, Munitions Effectiveness. Develop Data Verification Interactive Editor (DAVIE) and deploying version 2.0. Employ paired-comparison test procedures with Service PME schools and the Aircraft Evaluation Test Facility (ACETEF) to collect quantitative, business case metrics using the OSD/PA&E JDS and the JFCOM JIDPS. Transition ADS Library to MSRR. Begin to host selected Electronic Order of Battle (EOB) and Task Organization Toolset (TOTL) data sets. Distribute JM+DPS selected data sets.

(U) Complete Synthetic Environment Data Representation and Interchange Specification (SEDRIS) standardization and guidance product development through ISO/IEC process. Expand user-defined interchange experiments. Initiate transition of SEDRIS standards and software tools to industry consortium. Implement initial Integrated Natural Environment Authoritative Representation Program (INEARP) infrastructure resulting from the baseline conceptual architecture design incorporating key enabling techonoligies. Continue to expand library services capabilities including review of compliance with evolving international meta-data standards. Continue a series of periodic end-to-end experiments/demonstrations to assess and validate the progress of synthetic environment technical development. Prototype, document and provide to user sample warfighting simulation components that illustrate appropriate use of environmental representations in runtime distributed simulations.

(U) Develop Human Behavior Representation (HBR) requirements process and integrated road map for HBR research and development. Conduct experiments and advanced demonstrations on HBR challenge areas using emerging technologies, such as Bayesian networks and neural networks, to meet evolving requirements for major simulation systems. Develop additional testbeds and scenarios for HBR Challenge Problem and incorporate performance moderators. Conduct research into agent-based simulations as applied to HBR. Initiate development of Common Human Behavior Representation Interchange System (CHRIS).

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(U) Complete Verification, Validation and Accreditation (VV&A) applications for fidelity, specifications for reuse, and conceptual framework model coverage. Perform VV&A experiments regarding human and organizational behavior models to assess VV&A practices and methods.

(U) Complete Science and Technology initiative projects in partnership with the services focusing on OOTW. Transition the products of the initiatives to Service labs, ACTDs and for use in key exercises and experiments. Identify and initiate additional science and technology initiative projects in partnership with the services focusing on a high priority problem area. Identify and initiate science and technology projects with universities, ACTDs, industry, and FFRDCs as appropriate.

(U) Extend the current NSS-GCCS COA initialization capability to the Integrated Theater Engagement Model (ITEM) for use in USFK exercises in 2002. Include M&S segments in the Defense Information Infrastructure (DII) Common Operating Environment (COE) that have broad applicability across all of DoD.

(U) In conjunction with USFK, integrate the ROK Chang Jo 21model with the Joint Training Confederation (JTC). Support to USJFCOM and focus on the continuing development of JTLS-JCATS**.**
($46.104 million)

(U) FY 2003 Plans:

(U) Continue as Development Agent for Runtime Infrastructure (RTI) for JSIMS multi-service simulation training program. Continue RTI performance assessment and testing within the JSIMS program, increase HLA RTI optimization performance to meet warfighter needs as part of multi-service advanced distributed simulation exercises including Olympic Challenge, and Ulchi-Focus Lens. Further develop RTI prototype software to address security gateways among different levels of classified simulations. Integrate experimentation results and develop tools to ensure distributed simulation architecture is buildable in a standardized fashion and demonstrate it meets user requirements. Complete transition of the HLA RTI for sustainment by the commercial sector in support of distributed simulation.

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(U) Continue experimentation to exploit the flexibility and military utility of the new Data Distribution Management (DDM) 1516 specification for complex applications and the scalability of the architecture, development of new data types to ensure all data forms are able to managed by the HLA RTI, advanced time management algorithms of distributed simulations with different time scaling factors and the use of the HLA in communication environments other than networks (e.g. shared memory, multi-process, parallel-process, handling video/voice).

(U) Conduct further experimentation devoted to new implementation approaches available by applying emerging commercial advanced information technologies to the implementation of HLA. Applications would include: designs and implementations of advanced time management techniques, use of HLA in next generation internet, implementation within mobile computing environments (e.g., Network Centric Warfare environments), in high performance computing platforms, and the use of intelligent agent technologies to support implementation within evolving warfighter requirements.

(U) Expand development of tool sets to be upgraded to IEEE 1516 standard with a view toward commercialization. This will include the tool sets available for system developers. The tool sets include Object Model Development Tool (OMDT), Federation Verification Tool (FVT), Federation Management Tool (FMT), Data Collection Tool (DCT), and Object Model Resource Center (ORMC) and will support the transition of the HLA simulation architecture and tool sets to the commercial marketplace. Complete certification process development for software applicable to DoD interoperability requirements for simulation to ensure promulgation of a reliable standard for live, virtual, and constructive simulation.

(U) Conduct experiments and demonstrations of the capability to interweave the specifications, rules, and object models from the Advanced Distributed Learning (ADL) initiative's Sharable Content Object Reference Model (SCORM) with those from the modeling and simulation community's High Level Architecture (HLA). This new technology complements the current ADL framework by extending the simulation object models of military platforms (interactions, attributes, and parameters) to a broader audience of military learners and equipment users.

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(U) Complete banyan research integration. Develop and deploy MDRF version 3 to complete system of system representation. Adapt the knowledge acquisition tools to support selected JMASS, USN, and DIA representation requirements. Develop and deploy FDMS Model Library version 8.0 to provide additional distributed knowledge management capability and round trip data exchange with MDRF version 2 knowledge exchange representation. Employ paired comparison test procedures with NPS to collect quantitative, business case metrics using selected JMASS knowledge products. Begin distributed knowledge management of JWARS, JSIMS, DPG IPS's, UTL and METL, C4ISR-AF, Transformation of the Army, and selected JMASS, USAF, and USMC military operations knowledge databases on Internet and SIPRnet. Extend hosting of Transformation of the Army and JMASS military operations knowledge bases. Begin collaborative knowledge management of selected USN and DIA military operations knowledge bases.

(U) Continue Electronic Order of Battle (EOB) Toolset and Task Organization Toolset (TOTL) development by deploying version 2.0 of each toolset. Continue MCT development by deploying version 1.0. Continue integration the DMSO Data, INE, HBR, and MSRR programs, the OSD/PA&E JDS, the JFCOM JIDPS with DoD Service, Component, and Agency data provisioning activities to define JM+DPS version 3. Begin development of the System Characteristics and Performance Toolset (SCP Toolset). Employ paired-comparison test procedures with Service PME schools and the Aircraft Evaluation Test Facility (ACETEF) to collect quantitative, business case metrics using the JMET. Continue distributed JM+DPS management of ADS, UOB, EOB, TOTL, DPG-IPS, INE, and JMET data sets on Internet and SIPRnet. Begin distributed JM+DPS management of MCT data sets.

(U) Complete formal establishment of a management consortium for SEDRIS technologies. Initiate investigation in the use and expansion of the SEDRIS data representation model in supporting dynamic changes in the physical environment. Investigate very-high-resolution database designs that incorporate computer-added design files, and microclimate environmental information for use in dynamic fly-throughs in an integrated urban environment. Continue to reduce integrated database generation timelines to meet evolving operational mission planning and mission rehearsal timeline requirements. Continue Integrated Natural Environment Authoritative Representation Program (INEARP) implementation development by demonstrating production and use of operational resources. Demonstrate use of measures of database consistency to assess interoperability potential and tailor database design, generation and/or modification activities in establishing simulation federations and conducting exercise scenarios. Fully link the Master Environmental Library (MEL) system with the National Spatial Data Infrastructure and appropriate international systems to ensure a robust capability to support U.S. DoD needs thus establishing a "one stop shop" capability for all environmental information

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needs. Continue a series of periodic end-to-end experiments/demonstrations to assess and validate the progress of technical development. Continue to incorporate environmental representation into the chosen warfighting simulations in order to exercise them. Modify warfighting simulations as needed to react appropriately to environmental factors. Increase level of participation of robust environmental representations in user test, experiments and exercises.

(U) Continue additional scenarios for the HBR Challenge Problem. Initiate toolkit. Conduct further research into agent-based simulations. Continue development of CHRIS.

(U) Complete Verification, Validation, and Accreditation (VV&A) applications for fidelity, specifications for reuse, and conceptual framework model coverage. Perform VV&A experiments regarding human and organizational behavior models to assess VV&A practices and methods.

(U) Develop a plan for future interoperability with Master Environmental Library, to be executed in the following year. Begin incorporation of tools capable of delivering model ready data, directly to simulations or simulation centers, via established databases. Upgrade controlled vocabulary.

(U) Complete Science and Technology initiative projects in partnership with the services focusing on high interest problem area. Transition the results of the initiatives to service labs, ACTDs and for use in experiments and exercises. Identify and initiate additional science and technology intiative projects in partnership with the services focusing on a high priority problem area. Identify and initiate science and technology projects with universities, ACTDs, industry, and FFRDCs as appropriate.

(U) Extend COA capabilities by focusing on new C4I systems and data sources that can be used to initialize analysis simulations used for COA analysis and planning. Also, the program will begin to look at ways to integrate tools such as the Unit Order of Battle (UOB) tool with the current COA initialization capabilities. Finally, new M&S segments will be added to the DII COE, as appropriate.

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(U) The CINC/Service program will support fielding of the JTLS-JCATS interface during appropriate JFCOM exercises during FY03. The program will also support fielding of the CJ21-JTC interface during UFL03. Finally, the program will continue to support CINC/Service M&S needs and initiatives, as appropriate.

(U) Working closely with DoD and federal intelligence, homeland security, law-enforcement, transportation, and emergency response organizations; create a taxonomy, functional description of the mission space FDMS), and validated models for the range of terrorist and other unconventional actions that use unlawful or inhumane Rules of Engagement (ROEs) (e.g., targeting civilians, economic centers, information systems, and religious/symbolic icons). Similarly, develop a taxonomy, FDMS, and validated models for mitigating the consequences of such actions, including the utilization of recent advances in modeling and simulation (M&S) of weapons of mass destruction and their effects. Develop military tactical and non-military M&S which can incorporate unconventional and novel ROEs to respond to these threats, as well as approaches for planning, rehearsal, and training for emergency responses to successful threat actions. Within a synthetic environment, demonstrate the analytical and tactical development utility of such M&S in both military tactical and civilian non-tactical scenarios.
($49.929 million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office **PE 0603832D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget Submit	56.971	59.286	45.067	Continuing
Delta	5.419	-14.221	0.000	
FY 2002 Amended PB Submission	62.390	45.065	45.067	
Appropriated Value	62.971	46.565	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.461	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.581	0.000	0.000	
c. Other	0.000	0.000	-4.862	
Current FY 2003 Budget Submission	62.390	46.104	49.929	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office **PE 0603832D8Z**

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2003 increase was the result of adjusted priorities and programmatic decisions.

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

(U) **Technical:** N/A.

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

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** High Energy Laser Advanced Development **PE 0603924D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	15.842	13.567	11.133	8.723	6.331	3.950	Continuing	Continuing
High Energy Laser/P924	0.000	15.842	13.567	11.133	8.723	6.331	3.950	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

U) This program element funds High Energy Laser (HEL) advanced technology development aimed at translating technology solutions for broadly defined military problems into demonstrated performance pay-offs, increased capabilities, increased supportability, or increased affordability. HEL weapons systems have many potential advantages, including speed-of-light time-to-target, high precision, nearly unlimited magazine depth, low cost per kill, and reduced logistics requirements because of no need for stocks of munitions or warheads. As a result, HELs have the potential to perform a wide variety of military missions, including some that are impossible, or nearly so, for conventional weapons. These include interception of ballistic missiles in boost phase, defeat of high-speed, maneuvering anti-ship and anti-aircraft missiles, and the ultra-precision negation of targets in urban environments with no collateral damage. Research conducted under this program element develops and demonstrates the technology necessary to enable these and other HEL missions.

(U) This program element is part of an overall DOD initiative in HEL science and technology being conducted by the HEL Joint Technology Office (JTO). The goals of this HEL JTO-funded research are to provide the technology to make HEL systems more effective and also to make them lighter, smaller, cheaper, and more easily supportable on the battlefield. In general, efforts funded under this program element are chosen for their potential to have major impact on multiple HEL systems and on multiple Service missions. As a result of this focus and of close coordination with the military departments and defense agencies, this program element complements other DOD HEL programs that are directed at more specific Service and agency needs.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** High Energy Laser Advanced Development **PE 0603924D8Z**

(U) A broad range of technologies are addressed in key areas such as chemical lasers, solid-state lasers, beam control, optics, propagation, and free-electron lasers. Under this program element these technologies are integrated and tested in sub-scale demonstration systems or sub-systems. Research is conducted by Government laboratories and industry, often teamed together. The program element funds integrated theoretical, computational, and experimental investigations. These integrated investigations are structured to convincingly demonstrate the piercing of technology barriers that currently prevent HELs from being fielded as viable weapon systems. In addition, they are structured to permit rapid technology transition. As results become available, DOD will transmit them to appropriate military-department, defense-agency, and industry programs for technology transition, where appropriate.

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COST*(In Millions)*	FY 2001	FY 2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	15.842	13.567	11.133	8.723	6.331	3.950	Continuing	Continuing
High Energy Laser/P924	0.000	15.842	13.567	11.133	8.723	6.331	3.950	Continuing	Continuing

(U) Project Number and Title: P924 High Energy Laser

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) None, this initiative is new as of FY 2002.

(U) FY 2002 Plans:

(U) Pursuant to Congressional direction the DOD is developing a comprehensive, prioritized investment plan for HEL science and technology. This investment plan is being developed by the HEL JTO, in coordination with the military departments and the defense agencies. The plan, which will be completed by the end of FY01, will form the basis for the work to be conducted under this program element in FY02 and beyond, as well as the work to be conducted under companion basic-research and applied-research elements. Although the plan is not yet completed, the broad outlines of plan are becoming clear. Efforts to be included in the HEL advanced technology development funded by this program element will largely involve the extension or combination of particularly successful efforts funded under the HEL applied research program in FY01. It is anticipated that efforts under this program element will include one or more of the following:

- Solid-state-laser demonstration. Assemble successful pieces from individual applied-research projects (e.g., reliable pump diode lasers, diode-laser drivers, thin-disk amplifiers, phase-conjugate mirrors, mist cooling) into a demonstration sub-system scalable to weapons power levels.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE High Energy Laser Advanced Development **PE 0603924D8Z**

- Free-electron-laser (FEL) demonstration. Begin to develop a scalable FEL that can be operated on a military platform (e.g., a ship).
- Tactical beam-control demonstration. Using successful pieces from individual applied-research projects (e.g., deformable mirrors, wavefront sensors, advanced tracking and compensation algorithms) begin to develop a fieldable, sub-scale tactical beam-control system.

(U) FY 2003 Plans

(U) The program element will fund HEL advanced technology development as part of a comprehensive, prioritized investment plan for HEL science and technology. Efforts to be included in the HEL advanced technology development funded by this program element will largely involve the extension or combination of particularly successful efforts funded under the HEL applied research program in FY02. Particular attention will be given to efforts that are multi-service in nature and funds will be used to plan, prepare for, and run demonstrations that promise to greatly aid in the maturation of critical HEL technologies, especially if that maturation process requires integrated demonstrations. It is expected that the military departments and agencies will fund specific demonstrations of interest to them; this program element can be thought of in part as providing seed funding for such demonstrations. It is anticipated that efforts under this program element will include one or more of the following:

- Solid-state-laser demonstration. Assemble successful pieces from individual appalied-research projects (e.g., reliable pump diode lasers, diode-laser drivers, thin-disk amplifiers, phase-conjugate mirrors, mist cooling) into a demonstration sub-system scalable to weapons power levels.
- Free-electron-laser (FEL) demonstration. Begin designing and planning tests of a scalable FEL that can be operated on a military platform (e.g., a ship).
- Chemical laser demonstration. Begin development of integrated closed-cycle chemical-laser device of high power, to include realistic capability to regenerate spent laser fuels.
- Solid-state-laser demonstration. Assemble successful pieces from individual applied-research projects (e.g., reliable pump diode lasers, diode-laser drivers thin-disk amplifiers, phase-conjugate mirrors, mist cooling) into a demonstration sub-system scalable to weapons power levels.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE High Energy Laser Advanced Development **PE 0603924D8Z**

- Free-electron-laser (FEL) demonstration. Begin to develop a scalable FEL that can be operated on a military platform (e.g., a ship).
- Tactical beam-control demonstration. Using successful pieces from individual applied-research projects (e.g., deformable mirrors, wavefront sensors, advanced tracking and compensation algorithms) begin to develop a fieldable, sub-scale tactical beam-control system.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE High Energy Laser Advanced Development **PE 0603924D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submission	0.000	0.000	1.006	Continuing
Delta	0.000	16.005	0.000	Continuing
FY 2002 Amended President's Budget Submission	0.000	16.005	1.006	Continuing
Appropriated Value	0.000	16.005	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.163	0.000	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	Continuing
c. Other	0.000	0.000	12.561	Continuing
Current FY 2003 Budget Submission	0.000	15.842	13.567	Continuing

Change Summary Explanation:

(U) **Funding**: The FY03 funding increases are the result of prorammatic and priority needs.

(U) **Schedule**:

(U) **Technical**:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Nuclear Matters **PE 0605160D8Z**

COST *(In Millions)*		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		1.470	1.764	1.806	1.919	2.027	2.064	2.103	Continuing	Continuing
Nuclear Matters/P476		1.470	1.764	1.806	1.919	2.027	2.064	2.103	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(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 receive special consideration within the Office of the Secretary of Defense 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. Consequently, senior level OSD officials give the highest attention and priority to nuclear weapons issues. The Nuclear Matters Program provides the capability to conduct technical assessments and to develop policy recommendations the for Assistant to Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD (NCB)), the Under Secretary of Defense for Acquisition, Technology and Logistics (USD (AT&L) and the Secretary of Defense on complex and vital national issues. The implementation of Quadrennial Defense Review (QDR) and the Nuclear Posture Review (NPR) recommendations necessitate in-depth assessments to support our national Strategic Policy of nuclear deterrence and for the resolution of issues pertaining to the sustainment of the nuclear weapons stockpile. The Office of the Deputy Assistant Secretary to the Secretary of Defense for Nuclear Matters executes this program element in collaboration and in coordination with the National Security Council, Office of the Undersecretary of Defense for Policy, the Joint Staff, the Military Services, U.S. Strategic Command, U.S European Command, the Department of Energy and the National Nuclear Security Administration, the Congress, and with NATO, and Allied governments to provide guidance for - and oversight of - a wide variety of nuclear weapons activities. For these responsibilities, 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	**R-1 ITEM NOMENCLATURE** Nuclear Matters **PE 0605160D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		1.470	1.764	1.806	1.919	2.027	2.064	2.103	Continuing	Continuing
Nuclear Matters/P476		1.470	1.764	1.806	1.919	2.027	2.064	2.103	Continuing	Continuing

(U) Project Number and Title: P476 Nuclear Matters

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) Recurring Obligations: Analyses and assessments 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 annual Nuclear Weapons Deployment Request to the President was executed. The actions of the Congressionally directed Panel to Assess the Safety, Reliability, and Security of the United States Nuclear Stockpile were facilitated 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). ($ 0.420 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(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), the Nuclear Weapons Requirements Planning Group (NWRWG) and the Action Officer Group. Implemented NWC Revitalization Plan. Conducted research and framed technical issues for the NWC members and staff concerning the evolution of the nuclear weapons complex and infrastructure. These analyses facilitated decisions on the refurbishment of the TRIDENT missile system, cruise missile weapon systems and strategic bombs under the NWC Procedural Guideline for the Phase 6.X Process. Initiated feasibility study on Hard and Deeply Buried Targets. Monitored activities of weapon system Project Officer Groups (POG) ($ 0.300 million)

(U) DoD-NNSA Nuclear Weapons Requirements Process: Provided contractor Requirements Team to conduct 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 decisions in a requirement-rich and resource-constrained environment. An Initial Prioritized List of DoD requirements was developed and provided to the NNSA. A protocol was established for the process that also broadened the scope of requirements to include NNSA requirements for DoD. A Joint DoD-NNSA Nuclear Weapon-Related Requirements List (JNWRRL) was produced. A concept for the prioritization of requirements was developed, which included the enhancement and maintenance of a requirements database, quantities and schedules associated with requirements, and the conduct of tradeoff assessments. Support and coordination were provided to the NNSA in preparation of an NNSA report to the Congress on the requirements process. ($0.300 million).

(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. Provided OSD oversight for the development of the second edition of the Nuclear Mission Management Plan (NMMP) for the sustainment of DoD nuclear weapon delivery systems and its harmonization with the NNSA Stockpile Stewardship Plan. Sponsored JAC assessment on DoD/DOE Physical Security of Nuclear Weapons. Conducted nuclear weapon accident response staff exercises. Completed and published updated DoD Instruction 5030.55, Joint AEC-DoD Nuclear Weapons Development Procedures. Completed update to DoD Directive 3150.1, Joint Nuclear Weapons Development Studies and Engineering Projects ($ 0.310 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(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 Congressionally approved technical exchanges with foreign nations such as WSSX (Russia) and STOCKTAKE (UK). WSSX activities included exchange meetings in Vienna and California, the coordination of U.S. proposals for projects and the development of a master project list. 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**.** ($ 0.140 million)

(U) FY 2002 Plans:

(U) Recurring Obligations: 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 DoD-DOE Annual 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. ($ 0.543 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(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. Studies will continue on Hard and Deeply Buried Targets to meet congressional requirements. DoD and NNSA safety and security standards will be assessed. Following survey, Memoranda of Agreement between the DOE and DoD requiring update will be identified and update actions will be initiated. 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 assessed and implementation actions will be initiated. Monitor activities of weapon system Project Officer Groups (POG) ($ 0.322 million)

(U) DoD-NNSA Nuclear Weapons Requirements Process: Provide contractor Requirements Team to conduct 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, and the development/update of the Joint DoD-NNSA Nuclear Weapon-Related Requirements List (JNWRRL). The requirements process and prioritization guidelines will be formalized, coordinated and approved by the NWC. A First Production Unit (FPU) schedule for stockpile life extension programs will be developed as a tool for measuring NNSA activities in stockpile stewardship. ($0.300 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(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. Update handbooks on Nuclear Weapons Surety, Stockpile Management Information, and the Nuclear Matters Executive Overview to sustain core expertise. 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 and the MOU for "safe havens" of NNSA nuclear weapon movements on DoD installations. Coordinate and publish update to DoD Directive 3150.1, Joint Nuclear Weapons Development Studies and Engineering Projects. Initiate update to DoD Directive 3150.3, Nuclear Forces Security and Survivability in view of 9-11 event. Provide OSD oversight for the development of the third edition of the Nuclear Mission Management Plan (NMMP) for the sustainment of DoD nuclear weapon delivery systems and its harmonization with the NNSA Stockpile Stewardship Plan. ($ 0.430 Million)

(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. Initiate ATSD (NCB) participation in NATO Defense Proliferation Group. 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 and Joint Steering Committee meetings in the U.S. and Russia, and plan and participate 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. Review 100 Russian proposed projects, update list of projects and approve WSSX project proposals. Initiate update of DoD Directive 5030.14 to affirm responsibilities of Joint Atomic Information Exchange Group (JAIEG) ($ 0.169 Million)

(U) FY 2003 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(U) Recurring Obligations: 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 DoD-DOE Annual 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). ($ 0.500 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. Life extension programs for the enduring stockpile will be closely managed into the successive phases to sustain the viability of the stockpile. The development of the NNSA capability to produce and certify nuclear pits will be analyzed. The ongoing effort on Hard and Deeply Buried Targets 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. 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 ($ 0.312 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(U) DoD-NNSA Nuclear Weapons Requirements Process: Provide contractor Requirements Team to conduct 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, and the update of the Joint DoD-NNSA Nuclear Weapon-Related Requirements List (JNWRRL). 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. The First Production Unit (FPU) schedule for stockpile life extension programs will be maintained as a tool for measuring NNSA activities in stockpile stewardship. Major changes in a NNSA schedule for a warhead will be assessed for its impact on the overall requirements reflected in the JNWRRL. ($0.495 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 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. Complete MOU for “safe havens” of NNSA nuclear weapon movements on DoD installations. Initiate update to DoD Directive 3150.2 and DoD-M 3150.2, Nuclear Weapon Systems Safety and to 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. Provide OSD oversight for the development of the third edition of the Nuclear Mission Management Plan (NMMP) for the sustainment of DoD nuclear weapon delivery systems and its harmonization with the NNSA Stockpile Stewardship Plan. 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 in view of Nuclear Posture Review. 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. ($ 0.330 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(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 meetings in the U.S. and Russia, and plan and participate in WSSX technical interchange meetings on nuclear weapons safety and security issues. Review Russian proposed projects for counter-terrorism projects, update list of projects and approve WSSX project proposals. Initiate update of overall 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). ($ 0.169 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
President's FY 2001 Budget Submission	1.483	1.471	1.467	Continuing
Delta	-0.013	0.310	0.613	
FY 02 Amended President's Budget Submission	1.470	1.781	2.080	Continuing
Appropriated Value	1.483	1.781	0.000	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.017	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.013	0.000	0.000	
c. Other	0.000	0.000	-0.274	
Current FY 2003 Budget Submission	1.470	1.764	1.806	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Nuclear Matters **PE 0605160D8Z**

(U) Funding: When the Nuclear Matters funding line was created in FY1997 for the Office of the Deputy Assistant Secretary for Nuclear Matters within the Office of Assistant Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD(NCB)), it was placed for administrative purposes under a Counterproliferation Program program element already existing under the ATSD(NCB). Through the Defense Reform Initiative (DRI), the Counterproliferation Program and its program element were moved to the Defense Threat Reduction Agency, while the Office of Nuclear Matters was moved to the Director, Defense Research and Engineering. As a result, funds for Nuclear Matters were transferred from PE0605160D8Z to PE0605160BR in FY1999. Under an agreement with Washington Headquarters Services, these funds were transferred to PE065160D8Z in OSD in FY2000 to continue the efforts of the Nuclear Matters Program.

(U) C. Other Program Funding Summary

(U) NA

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 4					R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Joint Electromagnetic Technology (JET) Program** **PE 0303191D8Z**				
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost			5.085	6.468	6.828	6.954	7.087	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: The JET Program supports the Defense Community in general with a particular emphasis on the requirements of Special Forces and Intelligence in their Weapons of Mass Destruction (WMD), Deep Underground (DUG), and Transnational Threat (TNT) missions. This is in the form of basic research and applied RDT&E in HF/VLF/ELF communications and signaling, advanced forms of optical communications, underground imaging and advancing our understanding of the propagation of all forms of RF communication. This program is funded under Budget Activity 4, Demonstration and Validation because it supports early user demonstrations and field evaluations in operationally relevant environments.

Program Accomplishments and Plans:

FY 2002 Plans: **N/A**

FY 2003 Plans: ($5.085 million)

- Program planning and support.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE Program Element (PE) PE 0303191D8Z **Joint Electromagnetic Technology (JET) Program**

B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction				
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment			5.098	Continuing
c. Other			-.013	
Current President's Budget			5.085	Continuing

Change Summary Explanation:

FY 2002: Increase to support JET program.
FY 2003: Non-pay purchase inflation adjustments -.013

C. Other Program Funding Summary Cost: N/A

D. Schedule Profile: N/A

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2002	
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 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
Total PE Cost	25.866	39.313	33.553	34.244	35.468	36.332	37.005	Continuing
HALT	0.976	0.000	0.000	0.000	0.000	0.000	0.000	Continuing
CROWS	0.350	0.280	0.400	0.200	0.000	0.000	0.000	Continuing
Delay/Denial D/D	0.114	0.900	0.900	0.900	0.900	0.900	0.900	Continuing
Product Development/Qualification	0.960	0.925	0.925	0.925	0.903	0.925	0.925	Continuing
Advanced Technology Program	0.266	0.948	0.948	0.908	0.931	0.948	0.948	Continuing
Product Testing & Support	0.634	0.975	0.930	0.925	0.975	0.975	0.975	Continuing
Smart Gate	0.000	0.775	0.775	0.775	0.775	0.775	0.775	Continuing
COTS	4.091	7.143	4.202	5.092	5.385	5.326	5.474	Continuing
Technology Base	3.500	3.384	6.256	6.000	6.467	5.250	5.486	Continuing
TASS	2.965	4.397	4.597	4.033	3.564	4.397	4.822	Continuing
WSS	2.482	3.633	2.621	2.902	3.000	2.900	2.966	Continuing
EDE	2.531	7.834	3.918	4.208	4.250	4.100	4.218	Continuing
Locks, Safes, Vaults	1.187	1.750	1.415	1.716	1.750	1.650	1.516	Continuing
MDARS-E	3.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing
HVISS	0.460	3.500	2.500	3.000	2.500	3.186	3.000	Continuing
PEWD II	0.500	1.369	1.166	1.160	2.568	3.000	2.500	Continuing
ETF	1.850	1.500	2.000	1.500	1.500	2.000	2.500	Continuing

A. Mission Description and Budget Item Justification. This program is a budget activity level 4 based on the concept/technology development activities ongoing within the program. The purpose of this program is to develop physical security equipment (PSE) systems for 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 prompted the FY89 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 exploratory development 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 the Khobar Towers terrorist attack in 1996, this PE funded Force Protection Commercial-Off-The-Shelf (FP COTS) evaluation and testing. With the war on terrorism, FP COTS received renewed emphasis. The FP COTS testing applies to all available technologies, which are considered effective
for DoD use.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

(U) FY 2001 Accomplishments

HINDER ADVERSARIES WITH LESS THAN LETHAL TECHNOLOGY (HALT) (0.976 million)

- Completed a successful EMD Phase. Final Operational Test and Evaluation will begin FY 02.

COMMON REMOTELY OPERATED WEAPON SYSTEM (CROWS) (0.350 million)

- Continued FY00 efforts for proof of concept demonstration leading up to EMD award, Dec 00.
- Inserted Air Force requirements into this Army effort. Ensured Air Force requirements are met.

DELAY/DENIAL (D/D) DEVELOPMENT/QUALIFICATION (0.114 million)

- Continued working with the Joint Non-lethal Weapons Directorate (JNLWD) and other Services to develop planning for active denial technology.

PRODUCT DEVELOPMENT/QUALIFICATION (0.960 million)

- Performed the research and planning for future Foreign Comparative Test (FCT) Programs. Conducted and completed two FCT projects. Other FCT funded programs are in various stages and being worked.
- Did the planning for and initiated two new COTS Working Group (CWG) efforts, completed two CWG tests, and continued work on three more.
- Planned for, put on contract, and successfully completed a feasibility study of a new program to develop a long-range, all weather, 360 degree sensor. Awarded a follow-on phase to build two prototypes.
- Initiated the "Integration of Smart Sensors" Project.
- Teamed with DOE to design and build a brassboard of a Personal Identification Credential System (PICS).

ADVANCED TECHNOLOGY PROGRAM (0.266 million)

- Identified technological advances at DoD, DoE, University Labs, DARPA programs, etc., with PSE utility. These led to the initiation of some of the projects identified above.
- Responded to and researched FP Battlelab requests for information (e.g., UAVs, access control systems, remote aircraft protection systems).
- Prepared operational systems improvement plans.
- Developed technology roadmap.
- Updated system architecture.

PRODUCT TESTING AND SUPPORT (0.634 million)

- Supported all testing of PSE products (COTS, NDI, Developmental) and systems testing.
- Provided Logistical and Cost Estimating support to on-going programs.

(U) FY 2002 Plans

COMMON REMOTELY OPERATED WEAPON SYSTEM (CROWS) (0.280 million)

- Continue with EMD Phase by providing Engineering, Logistics, and Cost Estimating support to the Army.

- Receive two prototypes for testing.

DELAY/DENIAL (D/D) DEVELOPMENT/QUALIFICATION (0.900 million)
- Continue to manage D/D product developments.
- Continue to evaluate D/D COTS products.
- Continue to recommend new D/D technologies.
- Develop new/better methods to delay intruders intent on entering secured internal/external areas.

PRODUCT DEVELOPMENT/QUALIFICATION (0.925 million)
- Perform follow-on work on the "Integration of Smart Sensors" Project.
- Conduct a follow-on phase of the Personal Identification Credential System (PICS) project to build form-fit-function prototypes.
- Continue to manage sensor, access control, and assessment product developments.
- Continue to evaluate sensor, access control, and assessment COTS products.
- Continue to recommend new sensor, access control, and assessment technologies.

ADVANCED TECHNOLOGY PROGRAM (0.948 million)
- Continue to identify technological advances at DoD, DoE, University Labs, DARPA programs, etc., with PSE utility.
- Continue to respond/research FP Battlelab requests for information.
- Continue to prepare operational systems improvement plans. Develop technology roadmap. Update system architecture.

PRODUCT TESTING AND SUPPORT (0.975 million)
- Support all testing of PSE products (COTS, NDI, Developmental) and systems testing.
- Provide Logistical and Cost Estimating support to on-going programs.

SMART GATE (0.775 million)
- Test, develop, and integrate equipment to improve security and access to facilities.
- Conduct a follow-on phase of the Personal Identification Credential System (PICS) project to build form-fit-function prototypes.

(U) FY 2003 Plans

COMMON REMOTELY OPERATED WEAPON SYSTEM (CROWS) (0.400 million)
- Continue with EMD Phase by providing Engineering, Logistics, and Cost Estimating support to the Army.
- Efforts focus on design considerations for supportability, reliability, and maintainability.
- Correct any problems discovered during prototype testing.

DELAY/DENIAL (D/D) DEVELOPMENT/QUALIFICATION (0.900 million)
- Continue to manage D/D product developments.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

- Continue to evaluate D/D COTS products.
- Continue to recommend new D/D technologies.

PRODUCT DEVELOPMENT/QUALIFICATION (0.925 million)
- Continue to manage sensor, access control, and assessment product developments.
- Continue to evaluate sensor, access control, and assessment COTS products.
- Continue to recommend new sensor, access control, and assessment technologies.

ADVANCED TECHNOLOGY PROGRAM (0.948 million)
- Continue to identify technological advances at DoD, DoE, University Labs, DARPA programs, etc., with PSE utility.
- Continue to respond/research FP Battlelab requests for information.
- Continue to prepare operational systems improvement plans. Develop technology roadmap. Update system architecture.

PRODUCT TESTING AND SUPPORT (0.930 million)
- Continue to support all testing of PSE products (COTS, NDI, Developmental) and systems testing.
- Continue to provide Logistical and Cost Estimating support to on-going programs.

SMART GATE (0.775 million)
- Continue to test, develop, and integrate equipment to improve security and access to facilities.

B. Program Change Summary ($ million)

	FY2001	FY2002	FY2003
Previous President's Budget	35.108	33.543	33.644
Appropriated Value	26.107	40.043	
Adjustments to Appropriated Value			
a. Congressionally Directed			
Appropriation Reduction/Increase	(9.001)	6.500	
b. Congressionally Directed			
Undistributed Reduction		(0.730)	
c. OSD Directed			
Program Reduction/Increase	(0.241)		(0.091)
Current Budget Submit/President's Budget	25.866	39.313	33.553

Change Summary Explanation:
Funding: Adjustments reflect inflation savings, below threshhold reprogrammings and the Government-wide rescission
Schedule: N/A

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

Technical: N/A

C. Other Program Funding Summary

		FY2001	FY2002	FY2003
Procurement Line P-1 No(s)	USAF	2.992	5.594	5.917
Milcon Project No(s)	N/A			
Related RDT&E:	N/A			

D. Execution

Not Applicable.

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER COMMERCIAL-OFF-THE-SHELF (COTS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
COTS	4.091	7.143	4.202	5.092	5.385	5.326	5.474	Continuing

A. Mission Description and Budget Item Justification. The DoD Force Protection Commercial-Off-The-Shelf (COTS) evaluation and integration project identifies and evaluates commercial systems and equipment that have potential for solving critical Force Protection problems. Equipment is tested in laboratory and operational settings to determine its suitability for a wide range of Force Protection applications. These include applications in nuclear, aircraft flight line, personnel facilities and resource protection security. Products that are identified as having military value are made available for use by incorporating them into existing or new programs. Current emphasis is on products that provide day/night all-weather detection/surveillance, sniper location, non-lethal defensive capability, barriers, large vehicle explosives detection, water-side security systems, and personal and tactical security systems.

(U) FY 2001 Accomplishments
- Published a Maritime Force Protection Guide.
- Conducted the third Force Protection Equipment Demonstration (FPED III).
- Performed scheduled FY 2001 evaluations and test of selected COTS equipment/systems.
- Published appropriate reports.
- Updated the User's Guide of Commercially available Non-Developmental Items for Force Protection users.

(U) FY 2002 Plans
- Procure and deliver COTS Force Protection Equipment in support of DoD urgent and compelling requirements for evaluation and testing.
- Update methodology and publish evaluation and test schedule for FY 2002.
- Perform scheduled FY 2002 test and evaluations of selected COTS equipment/systems.
- Procure, evaluate, test, architecturally modify, and deploy robotic platforms to support force protection and security requirements

(U) FY 2003 Plans
- Procure and deliver COTS Force Protection Equipment in support of DoD urgent and compelling requirements for evaluation and testing.
- Publish appropriate reports.
- Update the User's Guide of Commercially available Non Developmental Items for Force Protection users.
- Update methodology and publish test and evaluation schedule for FY 2002.
- Conduct Force Protection Equipment Demonstration IV.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					COTS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development												
Ancilliary Hardware Development												
Systems Engineering			0.130	0.130		0.130		0.300				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.130	0.130		0.130		0.300				
Remarks:												
Development Support												
Software Development												
Training Development			0.250	0.250		0.300		0.500				
Integrated Logistics Support			0.800	0.700		0.800		1.000				
Configuration Management			0.100	0.100		0.100		0.122				
Technical Data			0.160	0.160		0.160		0.160				
GFE												
Subtotal Support			1.310	1.210		1.360		1.782				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					COTS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E			1.666	3.540		1.727		1.975				
Subtotal T&E			1.666	3.540		1.727		1.975				
Remarks:												
Contractor Engineering Support			0.785	1.663		0.785		0.785				
Government Engineering Support												
Program Management Support			0.200	0.600		0.200		0.250				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.985	2.263		0.985		1.035				
Remarks:												
Total Cost			4.091	7.143		4.202		5.092				
Remarks:												

Exhibit R-2a, RDT&E Project Justification — Date: February 2002

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT/THRUST NAME AND NUMBER
RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PE 0603228D8Z	TECHNOLOGY BASE

Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
TECHNOLOGY BASE	3.500	3.384	6.256	6.000	6.467	5.250	5.486	Continuing

A. Mission Description and Budget Item Justification. The Defense Threat Reduction Agency (DTRA) is responsible for coordinating technology base efforts that feed into the advanced development projects within the Physical Security Equipment (PSE) Program. DTRA performs the exploratory development on technologies that are nominated and prioritized by the Services and the Physical Security Equipment Action Group (PSEAG). This annual process determines which technologies have potential to meet Service interests in fulfilling eventual Joint Service and Service-unique requirements.

(U) FY 2001 Accomplishments

- Completed and demonstrated prototype hardware for the miniaturized radio frequency tags, acoustic detection and classification sensor, nuclear quadrupole resonance sensor, photo-neutron probe for the detection of explosives, tactical security sensor internetting system, an advanced user interface system, and the weather vulnerability assessment tool.
- Continued the detection on the move (exterior) project, security vehicle with acoustic guidance, and the fluorescence detection of explosive projects.
- Continued researching the Video Forward Looking Infrared (FLIR) Imager, the Remote Detection & Tracking Sensor, the Target Classifying Sensor, and the Blue Rose fiber optic cable sensor projects.

(U) FY 2002 Plans

- Initiate new projects for the Force Protection Selector; the Wireless Security Sensor Networks; the Non-Lethal Swimmer Interdiction Device; the Shoreline Intruder Detection System; the Personal Identification Credential System; and the Low Probability of Interception/Low Probability of Detection (LPI/LPD) Communications.

(U) FY 2003 Plans

- Initiate new projects for the Extended Line-of-Sight (ELOS) Communications project; the Multi-Beam Antennae for Active Microwave and Passive Infrared Sensors; the Long Range Intelligent Infrared Fence; Radio-Frequency Emissions Locator; Mission Payload Prototype; Use of Deception for Base Defense; and the Long Range, Single-Ended, Laser Break Beam Line Sensor
- Continue the Video FLIR Imager project; the Wireless Network Security Sensors project; the Force Protection Sensor Selector project; the Non-Lethal Swimmer Interdiction Device project; the Shoreline Intruder Detection System project; the Personal Identification Credential System; and the Low Probability of Interception/Low Probability of Detection (LPI/LPD) Communications project.

B. Other Program Funding Summary

Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					TECH BASE					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.800	0.800		1.700		1.700				
Ancilliary Hardware Development												
Systems Engineering			0.362	0.432		0.662		0.606				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			1.162	1.232		2.362		2.306				
Remarks:												
Development Support			0.060	0.060		0.060		0.060				
Software Development			0.352	0.412		0.760		0.760				
Training Development			0.015	0.015		0.015		0.015				
Integrated Logistics Support												
Configuration Management			0.090	0.170		0.270		0.270				
Technical Data			0.052	0.100		0.100		0.100				
GFE			0.049	0.049		0.049		0.049				
Subtotal Support			0.618	0.806		1.254		1.254				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					TECH BASE					
BUDGET ACTIVITY 4		PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.746	0.641		1.400		1.200				
IOT&E												
Subtotal T&E			0.746	0.641		1.400		1.200				
Remarks:												
Contractor Engineering Support			0.674	0.325		0.860		0.860				
Government Engineering Support												
Program Management Support			0.300	0.380		0.380		0.380				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.974	0.705		1.240		1.240				
Remarks:												
Total Cost			3.500	3.384		6.256		6.000				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER TACTICAL AUTOMATED SECURITY SYSTEM (TASS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
TASS	2.965	4.397	4.597	4.033	3.564	4.397	4.822	Continuing

A. Mission Description and Budget Item Justification. The Tactical Automated Security System (TASS), a DoD funded R&D program and an Air Force funded procurement, is an ongoing effort to develop an integrated, portable, relocatable security system to provide Force Protection capability for personnel, dispersed assets, fixed base facilities and Air Base Ground Defense applications. The system includes remote sensing, alarm monitoring through fiber optic and wireless data communications, remote assessment through the use of day/night all weather Thermal Imaging and CCTV systems. The system employs a PC-based annunciator and relies on an internal power and recharging system.

(U) FY 2001 Accomplishments

- Made significant progress towards the completion of the upgrade to the data communications system to meet Air Force requirements, to include reduced component size, added encryption capability, and GPS.
- Conducted testing of COTS technology to add capabilities to the TASS suite of products.
- Awarded and performed technology enhancement ECPs to improve/provide new capabilities. Included was: (1) annunciator software upgrade IV that leverages current market technology to increase capability while decreasing procurement costs; (2) an upgrade of power system components including battery modules and solar panels; (3) develop new sensors to increase performance while decreasing NAR/FAR (Nuisance Alarm Rates/False Alarm Rates).
- Conducted testing of COTS products to add capabilities to the TASS suite of products. This included testing short-range thermal imagers and new tactical sensors.
- Improved training by providing the field with CDs that include video clips and voiceovers.

(U) FY 2002 Plans

- Complete and test the upgrade to the data communications system to meet Air Force requirements, to include reduced component size, added encryption capability, and GPS.
- Conduct testing of COTS technology to add capabilities to the TASS suite of products.
- Award and perform technology enhancement ECPs to improve/provide new capabilities. Included will be: (1) developing an upgraded assessment network that greatly increases the situational awareness of the operator; (2) developing and incorporating sensor systems; (3) upgrading the annunciator software system to increase user capabilities for nuclear safeguarding applications; (4) upgrading the system to provide for a tactical entry control capability; and (5) increasing data communications capability.

(U) FY 2003 Plans

- Conduct testing of COTS products to add capabilities to the TASS suite of products.
- Award and perform technology enhancement ECPs to improve/provide new capabilities.
- Continue the miniaturization efforts to produce a system that is small, lightweight, and durable.

- Continue Annunciator efforts to provide a man-portable annunciation capability.
- Continue data communications efforts to increase capability and harden/secure data communications.
- Integrate entry control and annunciation capabilities.
- Continue efforts that increase the situational awareness for the operators.

B. Other Program Funding Summary

	2001	2002	2003
Procurement	23.156	20.000	19.000

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					TASS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.450	0.845		0.775		0.450				
Ancilliary Hardware Development												
Systems Engineering			0.160	0.782		0.725		0.725				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.610	1.627		1.500		1.175				
Remarks:												
Development Support			0.064	0.162		0.162		0.162				
Software Development			0.096	0.369		0.700		0.869				
Training Development			0.019	0.040		0.040		0.040				
Integrated Logistics Support			0.075	0.130		0.530		0.130				
Configuration Management			0.080	0.100		0.100		0.100				
Technical Data			0.062	0.102		0.102		0.102				
GFE			0.020	0.140		0.240		0.140				
Subtotal Support			0.416	1.043		1.874		1.543				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					TASS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.766	0.916		0.516		0.652				
IOT&E			0.598	0.191		0.332		0.288				
Subtotal T&E			1.364	1.107		0.848		0.940				
Remarks:												
Contractor Engineering Support			0.486	0.451		0.286		0.286				
Government Engineering Support												
Program Management Support			0.089	0.169		0.089		0.089				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.575	0.620		0.375		0.375				
Remarks:												
Total Cost			2.965	4.397		4.597		4.033				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER WATERSIDE SECURITY SYSTEM (WSS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
WSS	2.482	3.633	2.621	2.902	3.000	2.900	2.966	Continuing

A. Mission Description and Budget Item Justification. The Space and Naval Warfare Center (SPAWARCEN), San Diego is the Center of Excellence for waterfront security. Responsibilities include fixed and transportable waterfront security systems, swimmer detection sonars, and commercial-off-the-shelf (COTS) equipment test and evaluation, which focuses on waterfront force protection. The program is under the sponsorship and direction of CNO (N34).

(U) FY 2001 Accomplishments

- Managed the Waterside Security System and Shipboard Physical Security programs.
- Evaluated and tested COTS technologies for the waterfront environment.
- Conducted Joint US/UK Test of sonar technology at Naval Submarine Base (SUBASE), Bangor, ME.
- Initiated action for the development of new generation WQX-2 Sonar jointly with the UK.
- Supported installation WSS systems at operational sites.
- Continued work on the Diver Imaging Technology.
- Completed a Non-lethal swimmer neutralization report.
- Brought on-line the Force Protection/Anti-Terrorism (FP/AT) Knowledge Management Portal (https://dodpse.spawar.navy.mil).

(U) FY 2002 Plans

- Evaluate, test, and integrate emerging technologies into the waterfront security program.
- Test and evaluate COTS sonar technology for swimmer detection.
- Expand anti-swimmer coverage at SUBASE Bangor.
- Evaluate and integrate swimmer assessment capabilities into the WSS.
- Investigate robotics for detection and assessment of hostile swimmers.
- Begin work on the Joint US/UK sonar upgrade project.
- Develop an automated means to quantitatively assess risk to Waterside/Landside personnel and resources.
- Coordinate Knowledge Management efforts with other federal agencies and integrate collaboration tools.

(U) FY 2003 Plans

- Continue T&E of COTS technology at the 5000 Mike Pier integration facility.
- Support WSS operational sites.
- Complete work on the Joint US/UK Sonar RDT&E Project.
- Deploy new sonar technology at a US and UK operational site.
- Integrate teleconferencing into the KM Portal.
- Evaluate new waterside barrier technologies.

- Evaluate communications technologies for shipboard and waterfront applications.

B. Other Program Funding Summary
Not Applicable

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Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					WSS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.500	0.400		0.400		0.420				
Ancilliary Hardware Development												
Systems Engineering			0.162	0.140		0.150		0.160				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.662	0.540		0.550		0.580				
Remarks:												
Development Support			0.043	0.034		0.034		0.064				
Software Development			0.099	0.893		0.096		0.096				
Training Development			0.015	0.019		0.019		0.019				
Integrated Logistics Support			0.052	0.051		0.051		0.076				
Configuration Management			0.090	0.070		0.080		0.080				
Technical Data			0.052	0.052		0.062		0.062				
GFE			0.049	0.020		0.020		0.020				
Subtotal Support			0.400	1.139		0.362		0.417				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					WSS					
BUDGET ACTIVITY 4		PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.206	0.716		0.716		0.732				
IOT&E			0.240	0.463		0.463		0.598				
Subtotal T&E			0.446	1.179		1.179		1.330				
Remarks:												
Contractor Engineering Support			0.674	0.486		0.441		0.486				
Government Engineering Support												
Program Management Support			0.300	0.289		0.089		0.089				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.974	0.775		0.530		0.575				
Remarks:												
Total Cost			2.482	3.633		2.621		2.902				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER EXPLOSIVE DETECTION EQUIPMENT (EDE)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
EDE	2.531	7.834	3.918	4.208	4.250	4.100	4.218	Continuing

A. Mission Description and Budget Item Justification. While the EDE Program occasionally addresses requirements to develop explosive detection equipment, its primary focus is to evaluate Commercial Off-the-Shelf (COTS) explosive detection products. Assessments of systems at Department of Defense (DoD) locations are a critical component of the effort, as is ensuring the results of such demonstrations or testing are readily available to the military services' decision-makers. Attempts to leverage previous independent testing and evaluation and supplementing other government investments in development of explosives screening systems are made. A limited amount of funding is earmarked for low-risk emerging technologies that may assist in increasing the likelihood of detecting improvised explosive devices, large vehicle bombs, etc.

(U) FY 2001 Accomplishments

- Engaged the Federal Aviation Administration to develop a user's guide for the selection of EDE for use in mailroom screening.
- Performed comparative laboratory performance/capabilities evaluations of various COTS handheld explosive trace detection equipment/systems.
- Provided low-cost vehicle inspection kits to a number of DoD organizations for deployment and evaluation.
- Developed logistic support plans, logistic support summaries, safety plans and operational manuals (Quick Reference Cards) for selected COTS products.
- Updated and maintain the EDE web site.
- Continued/transitioned the development of a photoneutron-based probe that enhances the capabilities of high-energy radiographic inspection for explosives.

(U) FY 2002 Plans

- Perform comparative evaluations of various COTS equipment/systems. Specifically, examine desktop EDE as well as portals that examine explosives, aircraft cargo screening equipment, as well as new/improved hand-held EDE.
- Conduct extensive evaluations of EDE equipment that uses "backscatter" x-ray imaging technology.
- Continue to develop logistic support plans, logistic support summaries, safety plans, Quick Reference Cards of COTS products.
- Update and maintain the EDE web site.
- Assess the threat to DoD from IEDs.
- Develop appropriate tactics, techniques, and procedures to optimize the capabilities of existing and developmental EDE.
- Develop a Remote/Standoff Explosive Detection System (R/SEDS).

(U) FY 2003 Plans

- Conduct market surveys and investigations for COTS and developmental EDE to be further evaluated.
- Conduct laboratory and operational testing of several EDE technologies.
- Integrate COTS and developmental systems for the detection and identification of IEDs.

- Examine the most suitable combinations of EDE technologies, such as imaging and trace, to determine the most effective combination for the detection of explosives.
- Update the threat to DoD from IEDs.
- Continue to develop logistic support plans, summaries, operational manuals for selected COTS products.
- Update and maintain the EDE web site.
- Develop spiral upgrades to the Remote/Standoff Explosive Detection System (R/SEDS).

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					EDE					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.500	4.650		1.300		1.400				
Ancilliary Hardware Development												
Systems Engineering			0.184	0.420		0.600		0.160				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.684	5.070		1.900		1.560				
Remarks:												
Development Support			0.043	0.034		0.049		0.064				
Software Development			0.099	0.093		0.350		0.500				
Training Development			0.018	0.066		0.078		0.090				
Integrated Logistics Support			0.052	0.051		0.064		0.076				
Configuration Management			0.090	0.075		0.090		0.200				
Technical Data			0.069	0.074		0.102		0.052				
GFE			0.049	0.045		0.073		0.128				
Subtotal Support			0.420	0.438		0.806		1.110				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					EDE					
BUDGET ACTIVITY 4		PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.206	0.716		0.416		0.636				
IOT&E			0.240	0.783		0.321		0.247				
Subtotal T&E			0.446	1.499		0.737		0.883				
Remarks:												
Contractor Engineering Support			0.681	0.736		0.386		0.576				
Government Engineering Support												
Program Management Support			0.300	0.091		0.089		0.079				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.981	0.827		0.475		0.655				
Remarks:												
Total Cost			2.531	7.834		3.918		4.208				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER DoD LOCKS, SAFES, VAULTS			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
DoD LOCKS, SAFES, VAULTS	1.187	1.750	1.415	1.716	1.750	1.650	1.516	Continuing

A. Mission Description and Budget Item Justification. The DoD Lock, Safes and Vaults Program identifies, tests and evaluates commercial hardware for suitability and compliance with security requirements, and tools and technology that may reduce the delay time afforded by present day security systems mandated by current regulations. The program also provides users with up-to-date security technology information by means of CD-ROM distribution. Other valuable services provided include testing security seals, analysis of alternative high security locking systems for Arms, Ammunition & Explosive (AA&E) applications, and evaluation of entry systems for "locked out" high security magazine doors.

(U) FY 2001 Accomplishments

- Received OSD approval for Internal Locking Device (ILD) as a High Security Locking System.
- Completed lock cylinder & key replacement and system evaluation of 10 ILDs in Germany.
- Conducted 5th Security Seal Symposium.
- Established Security Seals Working Group and identified alternative to lead seals.
- Completed update and developed web-patch capability for future updates of National Security Information (NSI) Destruction Guidance CD-ROM.
- Published three Lock Program Newsletters.
- Completed update and published tech Data sheet (TDS-2078-SHR) on Pre-Engineered Explosive Magazines.
- Received direction from OASD to evaluate physical security and forced entry protection characteristics of specific weapon storage structures, doors, and construction standards.

(U) FY 2002 Plans

- Update and publish guide specifications for security equipment (as needed).
- Develop and publish four Lock Program Newsletters.
- Approve lead seal alternatives.
- Conduct evaluation and specify seals for computer systems and combination locks.
- Evaluate structure construction standards and door systems for the protection of AA&E.
- Incorporate design recommendations/enhancements into and finalize ILD User Data Package.
- Test commercially available attack tools.
- Monitor, evaluate, and track problems and vulnerabilities associated with security equipment.

Exhibit R-2a, RDT&E Project Justification | Date: February 2002

(U) FY 2003 Plans

- Update and publish guide specifications for security equipment (as needed).
- Develop and publish specification for label seals.
- Develop and implement testing/qualification procedures for label seals.
- Publish four Lock Program Newsletters.
- Test and evaluate forced entry resistance of selected weapon storage and magazine door systems.
- Support DoD locking system/security hardware procurement and troubleshooting requirements.
- Monitor, evaluate, and track problems and vulnerabilities associated with approved security equipment.
- Develop and publish cost effective methods to upgrade attack resistance of AA&E magazine door systems.
- Test and evaluate commercially available forced entry attack tools.

B. Other Program Funding Summary

Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					LOCKS, SAFES, VAULTS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.250	0.350		0.230		0.350				
Ancilliary Hardware Development												
Systems Engineering			0.100	0.100		0.100		0.100				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.350	0.450		0.330		0.450				
Remarks:												
Development Support			0.033	0.033		0.033		0.033				
Software Development			0.025	0.025		0.017		0.025				
Training Development			0.015	0.015		0.015		0.015				
Integrated Logistics Support			0.033	0.033		0.028		0.028				
Configuration Management			0.042	0.051		0.033		0.037				
Technical Data			0.052	0.052		0.044		0.037				
GFE			0.018	0.018		0.018		0.018				
Subtotal Support			0.218	0.227		0.188		0.193				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					LOCKS, SAFES, VAULTS					
BUDGET ACTIVITY 4		PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.121	0.275		0.250		0.275				
IOT&E			0.150	0.450		0.300		0.450				
Subtotal T&E			0.271	0.725		0.550		0.725				
Remarks:												
Contractor Engineering Support			0.258	0.258		0.257		0.258				
Government Engineering Support												
Program Management Support			0.090	0.090		0.090		0.090				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.348	0.348		0.347		0.348				
Remarks:												
Total Cost			1.187	1.750		1.415		1.716				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 5	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM – EXTERIOR (MDARS-E)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
MDARS-E	3.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing

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, including barrier assessment and theft detection functions. MDARS-E can be used in a variety of applications: general storage yards; depots; Arms, Ammunition and Explosives (AA&E) storage areas; air fields; railyards; and port facilities. The MDARS-E will autonomously conduct surveillance activities checking for intruders, conducting lock interrogations, and assessing the status of facility barriers, such as doors of AA&E storage bunkers. Uses include the detection of unauthorized personnel, verification of barrier and product status, and the remote investigation of an alarm source. The MDARS-E program will transition to the Joint Robotics Program's 6.4 line in FY 2002.

(U) FY 2001 Accomplishments
- Completed Program Definition and Risk Reduction (PDRR) phase.
- Conducted Milestone I/II In Process Review (IPR).
- Prepared contract requirements package for the System Development and Demonstration (SDD) phase.

(U) FY 2002 Plans
- No funding from this Program Element.

(U) FY 2003 Plans
- No funding from this Program Element.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					MDARS-E					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			1.800									
Ancilliary Hardware Development												
Systems Engineering			0.400									
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			2.200									
Remarks:												
Development Support												
Software Development			0.200									
Training Development			0.200									
Integrated Logistics Support			0.100									
Configuration Management			0.100									
Technical Data												
GFE												
Subtotal Support			0.600									
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					MDARS-E					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Subtotal T&E			0.000									
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support			0.106									
Program Management Personnel			0.072									
Travel			0.022									
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.200									
Remarks:												
Total Cost			3.000									
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE,, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER HIGH VALUE ITEM SECURITY SYSTEM (HVISS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
HVISS	0.460	3.500	2.500	3.000	2.500	3.186	3.000	Continuing

A. Mission Description and Budget Item Justification. The High Value Item Security System (HVISS) Phase II, a DoD funded R&D program and an Army funded procurement, will provide Commanders a system to locate and recover high value items in both garrison and field environments. The HVISS will increase readiness and sustainability by ensuring the unit maintains on-hand equipment accountability of highly pilferable, sensitive items such as Night Vision Devices (NVDs) and global positioning devices, etc. The HVISS Phase II will be applicable for other high value, high technology items now fielded or soon to be fielded.

(U) FY 2001 Accomplishments
- Continued with Concept Exploration.
- Conducted Proof of Concept Demonstration.
- Continued to Coordinate Radio Frequency Identification (RFID) Requirements.
- Revised HVISS Project Plan.
- Continued to Coordinate Requirement with RF Tag Vendors.
- Presented Extended Range Prototype Development Project to the Technical Support Working Group (TSWG).

(U) FY 2002 Plans
- Continue development of TSWG prototype RFID system.
- Award Prototype Contract with TSWG.

(U) FY 2003 Plans
- Conduct Preliminary Design Review.
- Conduct Critical Design Review.
- Deliver Prototype and conduct End User Appraisal.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)								Date:	February 2002				
DEFENSE-WIDE			Program Element					HVISS					
BUDGET ACTIVITY 4			PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location		Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.100	0.650		0.450		0.550				
Ancilliary Hardware Development					0.300		0.400		0.400				
Systems Engineering				0.090	0.720		0.220		0.220				
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development				0.190	1.670		1.070		1.170				
Remarks:													
Development Support				0.020	0.034		0.034		0.034				
Software Development					0.093		0.093		0.093				
Training Development					0.066		0.066		0.066				
Integrated Logistics Support					0.052		0.052		0.052				
Configuration Management				0.030	0.075		0.075		0.075				
Technical Data				0.030	0.074		0.074		0.074				
GFE					0.045		0.045		0.045				
Subtotal Support				0.080	0.439		0.439		0.439				
Remarks:													

Exhibit R-3 Cost Analysis (page 2)								Date:	February 2002				
DEFENSE-WIDE			Program Element					HVISS					
BUDGET ACTIVITY 4			PE 0603228D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location		Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT					0.600		0.300		0.500				
IOT&E													
Subtotal T&E					0.600		0.300		0.500				
Remarks:													
Contractor Engineering Support				0.100	0.700		0.600		0.800				
Government Engineering Support													
Program Management Support				0.090	0.091		0.091		0.091				
Program Management Personnel													
Travel													
Labor (Research Personnel)													
Miscellaneous													
Subtotal Management				0.190	0.791		0.691		0.891				
Remarks:													
Total Cost				0.460	3.500		2.500		3.000				
Remarks:													

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER PLATOON EARLY WARNING DEVICE II (PEWD II)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
PEWD II	0.500	1.369	1.166	1.160	2.568	3.000	2.500	Continuing

A. Mission Description and Budget Item Justification. The Platoon Early Warning Device II (PEWD II), an Army funded procurement and DoD funded R&D program, will provide a replacement Tactical Sensor System for the Platoon Early Warning System (PEWS). The system requires the capability for early detection of vehicles and personnel to enhance soldier survivability during defensive and ambush type operations. By providing early detection of an enemy threat, this capability will enhance time available to determine the appropriate tactical response. The envisioned system would be organic to appropriate tactical units and available under Common Table and Allowances (CTA) to other forces to meet contingency missions. Emphasis should be placed on ease of deployment, operation, and recovery.

(U) FY 2001 Accomplishments
- Awarded Hand Held Monitor development contract to L3Comm.
- Continued US Army/US Air Force Joint Development Effort.
- Continued to re-staff the Operational Requirements Document.
- Obtained procurement funding for 138 units for the Interim Brigade Combat Teams (IBCT).
- Conducted Critical Design Review.

(U) FY 2002 Plans
- Initiate PEWD II Hand Held Monitor (HHM) Modification Effort.
- Initiate HHM Procurement for IBCT.
- Initiate PEWD II Sensor Procurement for IBCT.
- Prepare Statement of Work for HHM Modification.
- Conduct System Design Review for Modified HHM.
- Field 69 Candidate HHM's to IBCT.
- Deliver PEWD II Sensors.

(U) FY 2003 Plans
- Refine acquisition strategy.
- Continue to field HHM to IBCT.
- Field PEWD II Sensor packages to IBCT.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					PEWD II					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.100	0.250		0.150		0.150				
Ancilliary Hardware Development												
Systems Engineering			0.100	0.124		0.124		0.124				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.200	0.374		0.274		0.274				
Remarks:												
Development Support			0.030	0.033		0.033		0.033				
Software Development				0.065		0.065		0.065				
Training Development				0.015		0.015		0.015				
Integrated Logistics Support				0.033		0.030		0.030				
Configuration Management			0.040	0.051		0.051		0.051				
Technical Data			0.040	0.052		0.052		0.052				
GFE				0.018		0.018		0.018				
Subtotal Support			0.110	0.267		0.264		0.264				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					PEWD II					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT				0.230		0.230		0.230				
IOT&E				0.150		0.150		0.150				
Subtotal T&E				0.380		0.380		0.380				
Remarks:												
Contractor Engineering Support			0.100	0.258		0.158		0.152				
Government Engineering Support												
Program Management Support			0.090	0.090		0.090		0.090				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.190	0.348		0.248		0.242				
Remarks:												
Total Cost			0.500	1.369		1.166		1.160				
Remarks:												

Exhibit R-2a, RDT&E Project Justification					Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603228D8Z				PROJECT/THRUST NAME AND NUMBER ELECTRONIC TRIP FLARE (ETF)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
ETF	1.850	1.500	2.000	1.500	1.500	2.000	2.500	Continuing

A. Mission Description and Budget Item Justification. The Electronic Trip Flare (ETF), a DoD funded R&D program and an Army funded procurement, is an effort to develop a lightweight, man-portable, easily emplaced and recoverable, motion-activated device designed to provide early warning and illumination to individuals and small units. This capability will provide commanders with an increase in time to effectively determine the most appropriate tactical response. The ETF will be used as an independent/individually employed early warning device or as a part of a security concept layer.

(U) FY 2001 Accomplishments
- ETF prototype development contract awarded to Ocean Atmospheric Science, Inc.
- Conducted Preliminary Design Review in December 2000.
- Conducted Critical Design Review in June 2001.
- Conducted Acceptance Test in July 2001.

(U) FY 2002 Plans
- Release Final Report and Deliver Five Systems.
- Conduct Early User Appraisal to determine operational suitability and modification requirements.
- Prepare draft Request for Proposal (RFP) package.

(U) FY 2003 Plans
- Award System Development and Demonstration (SDD) contract.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					ETF					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.400	0.300		0.300		0.300				
Ancilliary Hardware Development												
Systems Engineering			0.100	0.100		0.100		0.100				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.500	0.400		0.400		0.400				
Remarks:												
Development Support			0.033	0.033		0.033		0.033				
Software Development			0.100	0.100		0.200		0.100				
Training Development			0.015	0.015		0.015		0.015				
Integrated Logistics Support			0.233	0.133		0.433		0.133				
Configuration Management			0.042	0.092		0.092		0.092				
Technical Data			0.052	0.052		0.052		0.052				
GFE			0.018	0.018		0.018		0.018				
Subtotal Support			0.493	0.443		0.843		0.443				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603228D8Z					ETF					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.284	0.234		0.284		0.234				
IOT&E			0.225	0.125		0.125		0.125				
Subtotal T&E			0.509	0.359		0.409		0.359				
Remarks:												
Contractor Engineering Support			0.258	0.158		0.208		0.158				
Government Engineering Support												
Program Management Support			0.090	0.140		0.140		0.140				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.348	0.298		0.348		0.298				
Remarks:												
Total Cost			1.850	1.500		2.000		1.500				
Remarks:												

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4					R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z			
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
Total PE Cost	13.667	12.558	11.305	11.714	12.015	12.192	12.452	Continuing
JAUGS	0.600	0.800	0.900	0.900	0.900	1.235	1.508	Continuing
BUGS	0.900	0.900	0.000	0.000	0.000	0.000	0.000	Continuing
JOINT SERVICE EOD ROBOTICS	0.000	0.800	0.760	0.800	0.819	0.807	0.804	Continuing
FTUV	3.167	0.000	0.000	0.000	0.000	0.000	0.000	Continuing
MPRS	0.000	3.458	3.325	3.450	3.540	3.490	3.480	Continuing
MOBILITY ENHANCEMENTS	5.200	1.400	1.340	1.394	1.430	1.420	1.410	Continuing
RACS	3.800	5.200	4.980	5.170	5.326	5.240	5.250	Continuing

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 will demonstrate maturity of robotics technologies for their application to the formal acquisition process of land systems and subsystems. Emphasis is on the development of robotic technologies that: are amenable to multi-service applications; provide capability in high hazard environments; provide improved battlefield efficiency using supervised autonomous operational capability; reduce or enhance force manpower and support; and are affordable. This PE consolidates the DoD robotics program for Unmanned Ground Vehicles (UGV) into two activities: (1) advancement of UGV concepts into Advanced Development (AD) acquisition programs and (2) the enhancement and exploitation of critical robotic technologies for present and future UGV acquisition requirements. Categories under this PE are: (1) the Basic Unexploded Ordnance System (BUGS) – a Joint Service EOD effort to locate and dispose of surface unexploded ordnance; (2) the Robotics for Agile Combat Support (RACS) – a USAF effort to advance the robotic state-of-the-art capability for counter-terrorism and force protection technologies. RACS platforms include the following: All-purpose Remote Transport System (ARTS), Autonomous Mobility Research and Development System (AMRADS), and the Automated Ordnance Excavator (AOE). This technology has been applied to formerly used defense sites and active range clearance for cleanup/disposal. (3) Joint Service EOD Robotics consolidates all EOD robotic activities under one program line to include the BUGS program, improvements to fielded EOD robotic systems and exploration of a smaller man-portable EOD robotic system. (4) The Mobility Enhancements program is a research and development program aimed at improving the mobility of small, man portable unmanned vehicle systems in support of urban warfare, engineering, physical security/force protection missions. (5) The Family of Tactical Unmanned Vehicles (FTUV) is a joint Army/Marine Corps effort to provide commanders a family of reconnaissance, surveillance and target acquisition UGV's that are properly sized to operate in a variety of tactical situations. Requirements are emerging for small and medium unmanned systems that improve warfighters' situational awareness in scout, mechanized and infantry operations in urban terrain. The success and lessons learned from FTUV has led to the decision to create two separate program lines: MPRS and Gladiator. (6) Man Portable Robotic Systems (MPRS) – is an effort to develop smaller (10-40 lb. Class) UGV's to conduct operation in urban terrain and tunnel reconnaissance. Gladiator is an effort to develop a light ($\leq$ 1000 lbs) unmanned system for the USMC to conduct surveillance, reconnaissance and other selected missions. The Office of Naval Research will provide FY 2002 funding for Gladiator to conduct concept development and explore existing technology. The JRP will seek Gladiator funding in the out years. (7) The Joint Architecture for Unmanned Ground Systems (JAUGS) is an approach to standardizing software component interfaces and component behaviors of all anticipated DoD unmanned systems.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z

(U) FY 2001 Accomplishments

JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.600 million)

- Continued to update JAUGS based on technology improvements, Joint Technical Architecture (JTA) standards established by DoD, and mission requirements.
- Coordinated JAUGS activities closely with JRP development activities.
- Continued compliance process on JAUGS.
- Updated and improved documentation that described the UGV domain and set performance specifications.
- Incorporated JAUGS into the Robotic Combat Support System (RCSS) contract package.
- Conducted configuration management functions and activities.
- Revised JAUGS Working Group procedures and processes to initiate a National Standards Body's processes.

BASIC UXO GATHERING SYSTEM (BUGS) (0.900 million)

- Expanded both test systems (random search and direct search) to ten vehicles each.
- Initiated testing of ten vehicle systems.
- In FY 2002, the Joint Service EOD program will consolidate BUGS under Joint Service EOD Robotics which will encompass other EOD Robotic activities.

(U) FY 2002 Plans

JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.800 million)

- Evolve, refine, and update to achieve greater autonomous mobility, weapons, recon and manipulation. Inputs will be received primarily from user appraisals, fielded systems feedback, and industry/Tech Base development efforts.
- Implement JAUGS throughout the Joint Robotics Program.
- Begin development of the JAUGS compliance suite.
- Continue to improve JAUGS documentation.

(U) FY 2003 Plans

JOINT ARCHITECTURE FOR UNMANNED GROUND SYSTEMS (JAUGS) DEVELOPMENT (0.900 million)

- Evolve, refine, and update to achieve greater autonomous capability. Inputs will be received primarily from user appraisals, fielded systems feedback, and industry/Tech Base development efforts.
- Complete development of the JAUGS compliance suite.
- Continue to improve JAUGS documentation.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z

B. Program Change Summary ($ million)

	FY2001	FY2002	FY2003
Previous President's Budget	10.294	11.302	11.305
Appropriated Value	13.974	12.802	
Adjustments to Appropriated Value			
a. Congressionally Directed Appropriation Reduction			
b. Congressionally Directed Undistributed Reduction	(0.096)	(0.244)	
c. OSD Directed Program Reduction/Increase	(0.211)		
Current Budget Submit/President's Budget	13.667	12.558	11.305

Change Summary Explanation:
Funding: N/A
Schedule: N/A
Technical: N/A

C. Other Program Funding Summary
Not Applicable.

D. Execution
Not Applicable.

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603709D8Z				PROJECT/THRUST NAME AND NUMBER JOINT SERVICE EOD ROBOTICS			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
JOINT SERVICE EOD ROBOTICS	0.000	0.800	0.760	0.800	0.819	0.807	0.804	Continuing

A. Mission Description and Budget Item Justification. The Joint Service EOD Robotics program is a Joint program under the Joint Service EOD – Program Management Office at Indian Head, Maryland. This program office is responsible for lifecycle management of EOD equipment for all the services. This particular program will conduct Concept and Technology Development efforts to determine maturity of existing technology and exploration of new concepts to meet EOD requirements. This effort will continue work done on the Basic UXO Gathering System (BUGS), a prototype system of small semiautonomous platforms operating as teams that can search large areas and detect, pick-up and carry away multiple UXO's. The EOD community has another 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 having difficulty entering and operating. The program will invest effort in product improvements to its Remote Ordnance Neutralization System (RONS) based on needs identified by EOD technicians in the field.

(U) FY 2001 Accomplishments
Not Applicable.

(U) FY 2002 Plans
- Complete prototype development of Basic UXO Gathering System (BUGS) for both random search and direct search utilizing ten vehicles each.
- Conclude BUGS testing and experimentation for both systems in user-developed scenarios.
- Collect data for input to the Submunition Clearance Analysis of Alternatives (AoA) study.
- Initiate Submunition Clearance Analysis of Alternatives study for unexploded submunition clearance.
- Initiate program for the EOD Man Transportable Robotic System.

(U) FY 2003 Plans
- Conclude Submunition Clearance Analysis of Alternatives study for unexploded submunition clearance.
- Develop acquisition strategy and initiate BUGS acquisition program if appropriate.
- Test EOD Man Transportable Robotic Systems.
- Develop and test concepts for improved capabilities for the Remote Ordnance Neutralization System.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)								Date:	February 2002				
DEFENSE-WIDE			Program Element					JOINT SERVICE EOD ROBOTICS					
BUDGET ACTIVITY 4			PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract	
Primary Hardware Development				0.178		0.212		0.295					
Ancilliary Hardware Development													
Systems Engineering				0.089		0.043		0.050					
Licenses													
Tooling													
GFE													
Award Fees													
Subtotal Product Development				0.267		0.255		0.345					
Remarks:													
Development Support						0.050							
Software Development				0.133		0.050		0.085					
Training Development						0.045							
Integrated Logistics Support													
Configuration Management													
Technical Data													
GFE													
Subtotal Support				0.133		0.145		0.085					
Remarks:													

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603709D8Z					JOINT SERVICE EOD ROBOTICS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
DT												
IOT&E												
User Appraisal				0.133		0.090		0.120				
Subtotal T&E				0.133		0.090		0.120				
Remarks:												
Contractor Engineering Support				0.089		0.090		0.050				
Government Engineering Support				0.089		0.090		0.100				
Program Management Support				0.089		0.090		0.100				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.267		0.270		0.250				
Remarks:												
Total Cost				0.800		0.760		0.800				
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603709D8Z				PROJECT/THRUST NAME AND NUMBER FAMILY OF TACTICAL UNMANNED VEHICLES (FTUV)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
FTUV	3.167	0.000	0.000	0.000	0.000	0.000	0.000	Continuing
MPRS	0.000	3.458	3.325	3.450	3.540	3.490	3.480	Continuing

A. Mission Description and Budget Item Justification. Man-Portable Robotic Systems (MPRS) is an Army program involving the U.S. Army Maneuver Support Center (MANSCEN), U.S. Army Infantry Center (USAIC), and the U.S. Army Special Operations Command (SOCOM). A Joint Operational Requirements Document (ORD) is being developed to provide small, man-portable, unmanned ground vehicles to support mission needs in the following areas: Building Reconnaissance, Route Reconnaissance, Vehicle Inspection, Forward Observation/Listening Post, Trip Wire/Booby Trap Detection, Remote Resupply, Move/Carry Equipment, Personnel Evacuation, and Door/Wall Breaching. These mission needs will be typical during Military Operations in Urban Terrain (MOUT). MPRS is a low risk acquisition program which leverages existing UGV technologies as an integral part of the development process to mitigate performance risk. Small unmanned ground vehicles have been provided to the National Guard to support the Civil Support Teams (CST) as contingency assets. The CSTs are first responders during weapons of mass destruction threats.

(U) FY 2001 Accomplishments
- Conducted radio and electronic upgrade on the MATILDA system to support emerging CST requirements.
- Conducted baseline testing of the URBOT system to include radio range testing and mobility testing.
- Conducted a design upgrade program on the URBOT to include new sprockets, tracks, battery packs, and selected software upgrades.
- Supported the deployment of MATILDA systems to the 4th, 5th, and 6th CSTs.
- Provided URBOT system to Cybernet to support a Phase II SBIR on a Wearable Operator Control Unit.
- Developed a 5th URBOT system with enhanced capabilities, to include GPS, higher speed motors, and radio amplifiers.

(U) FY 2002 Plans
- Conduct characterization of small UGVs at Ft. Benning Characterization Course.
- Support the Cybernet Phase II SBIR on a Wearable Operator Control Unit.
- Continue to support the deployment of MATILDA systems to CSTs.
- Integrate Tactical Mobile Robot (TMR) program technologies in the 5th URBOT system.
- Aid the MANSCEN, USAIC, and SOCOM in developing the Joint ORD.
- Provide acquisition guidance in the ORD development process.
- Finalize the fiber optic dispenser technology for small UGVs.

(U) FY 2003 Plans
- Prepare MPRS Milestone documentation.
- Initiate Request for Proposal to start the Concept and Technology Development phase for MPRS.
- Conduct development testing.

Exhibit R-2a, RDT&E Project Justification	Date: February 2002

- Complete user requirements determination.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)								Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4			Program Element PE 0603709D8Z					MPRS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				1.440		1.480		1.376				
Ancilliary Hardware Development												
Systems Engineering				0.864		0.348		0.375				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.000	2.304		1.828		1.751				
Remarks:												
Development Support				0.288		0.150		0.200				
Software Development				0.144		0.150		0.092				
Training Development						0.150		0.310				
Integrated Logistics Support				0.288		0.115		0.100				
Configuration Management				0.144		0.115		0.100				
Technical Data				0.144								
GFE												
Subtotal Support			0.000	1.008		0.680		0.802				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE BUDGET ACTIVITY 4		Program Element PE 0603709D8Z					MPRS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT								0.288				
IOT&E												
User Appraisal						0.230						
Subtotal T&E			0.000	0.000		0.230		0.288				
Remarks:												
Contractor Engineering Support				0.146		0.207		0.203				
Government Engineering Support						0.200		0.203				
Program Management Support						0.180		0.203				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.000	0.146		0.587		0.609				
Remarks:												
Total Cost			0.000	3.458		3.325		3.450				
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603709D8Z				PROJECT/THRUST NAME AND NUMBER MOBILITY ENHANCEMENTS			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
MOBILITY ENHANCEMENTS	5.200	1.400	1.340	1.394	1.430	1.420	1.410	Continuing

A. Mission Description and Budget Item Justification. The Mobility Enhancements program is an effort under the U.S. Army Tank-Automotive Research Development and Engineering Center (TARDEC) Intelligent Mobility (IM) Program. Mobility Enhancement will improve the mobility of small unmanned ground vehicles (UGV's) 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. The Intelligent Mobility program has worked closely with the Center for Self-Organizing and Intelligent Systems (CSOIS) at Utah State University to develop a family of omni-directional vehicles where steering, speed and height of each wheel can be controlled independently maximizing vehicle stability and negotiation of obstacles.

(V) FY 2002 Plans

- Participate in the Engineer school (Ft. Leonard Wood) Concept Experimentation Program.
- Begin Omni-Directional Inspection System (ODIS) function outline and concept of use for physical security and anti-terrorism scenario's and/or applications.
- Conduct baseline testing of the ODIS prototype vehicles, and demonstrate the system to DOJ, CDC, and other agencies for physical security applications.

(U) FY 2003 Plans

- Test ODIS systems.
- Produce Tele-operated ODIS vehicles for User evaluation.
- Marsupial Deployment of ODIS from an MDARS system.
- Deliver a Teleoperated ODIS system to PM-PSE for evaluation in counter-terrorism activities.

(U) FY 2004 Plans

- Further work on Marsupial deployment.
- Enhance sensor and supervised Tele-operation of ODIS, and work on semi-autonomy.
- Continue producing limited quantities of current ODIS version as demand requires.

B. Other Program Funding Summary

Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE		Program Element					MOBILITY ENHANCEMENTS					
BUDGET ACTIVITY 4		PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			1.600	0.420		0.315		0.147				
Ancilliary Hardware Development			0.300	0.047		0.063		0.049				
Systems Engineering			0.400	0.070		0.063		0.033				
Licenses												
Tooling								0.033				
GFE												
Award Fees												
Subtotal Product Development			2.300	0.537		0.441		0.262				
Remarks:												
Development Support			0.500	0.140		0.063		0.065				
Software Development			0.700	0.187		0.189		0.196				
Training Development			0.100	0.047		0.062		0.033				
Integrated Logistics Support			0.100	0.033		0.032		0.033				
Configuration Management			0.100	0.033		0.032		0.065				
Technical Data			0.150			0.032		0.131				
GFE												
Subtotal Support			1.650	0.440		0.409		0.523				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					MOBILITY ENHANCEMENTS					
BUDGET ACTIVITY 4		PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
User Appraisal			0.350	0.150		0.094		0.194				
Subtotal T&E			0.350	0.150		0.094		0.194				
Remarks:												
Contractor Engineering Support			0.200	0.070		0.063		0.065				
Government Engineering Support			0.100	0.045		0.052		0.053				
Program Management Support			0.100	0.045		0.052		0.053				
Program Management Personnel			0.100	0.045		0.052		0.053				
Travel			0.200	0.023		0.052		0.053				
Labor (Research Personnel)			0.100	0.045		0.063		0.069				
Miscellaneous			0.100			0.061		0.069				
Subtotal Management			0.900	0.273		0.395		0.415				
Remarks:												
Total Cost			5.200	1.400		1.340		1.394				
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 4	PROGRAM ELEMENT PE 0603709D8Z				PROJECT/THRUST NAME AND NUMBER ROBOTICS FOR AGILE COMBAT SUPPORT (RACS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
RACS	3.800	5.200	4.980	5.170	5.326	5.240	5.250	Continuing

A. Mission Description and Budget Item Justification. The Robotics for Agile Combat Support (RACS) currently addresses (1) urgent and compelling requirements from Air Combat Command (ACC) for a remote platform capable employing a variety of techniques to diagnose and render safe large vehicle bombs (LVBs) and improvised explosive devices (IEDs); (2) needs outlined in the Air Force Agile Combat Support (ACS) Mission Area Plan (MAP) for infrastructure support and force protection; and (3) needs and requirements for remotely detecting, identifying, and safely clearing surface and buried Unexploded Ordnance (UXO). Requirements Documentation is as follows:

a. Agile Combat Support (ACS) Mission Area Plan for FY01
b. Operational Requirements Document for All-purpose Remote Transport System [ORD CAF(USN) 014-93 I/II-A]
c. Mission Need Statement for Active Range Clearance [MNS CAF 306-98]
d. Mission Need Statement for Enhanced Force Protection Capabilities [MNS CAF 314-97]
e. Mission Need Statement for Explosive Ordnance Disposal Capabilities [MNS CAF(USN) 001-97]
f. Mission Need Statement for Autonomous Firefighting Capabilities [MNS CAF 311-90]

(U) FY 2001 Accomplishments

- Developed and applied teleoperated technologies in support of the US Army Corps of Engineers' program for UXO cleanup at Formerly Used Defense Sites (FUDS)
  - Conducted field demonstration at a former military reservation known as Camp Croft in Spartanburg, SC. The US Army Corps of Engineers (Huntsville) demonstrated a robotic alternative to manually conducted clearances within an impact zone. The following remote controlled systems were demonstrated concurrently over a three month period at Ordnance Operable Unit 6 (OOU 6), an area inside Camp Croft.
    - D-8 bulldozer – A jointly developed AFRL/USMC bulldozer pushed the surface contaminated soil down steep terrain to a centralized location for processing.
    - Automated Ordnance Excavator (AOE) – A jointly developed AFRL/NAVEODTECHDIV/AEC excavator transferred the stockpiled material from the D-8 and processed the soil through a sifter/shaker unit.
    - All-purpose Remote Transport System (ARTS) – An OSD/JRP developed system transferred the clean sifted material to a stockpile location for later transport back over the impact zone.
  - Collected data for evaluation of the feasibility of using remote systems.
    - Two previous attempts to clear the impact zone had only cleared a small section of land (10' x 600' to a one foot depth). Our demonstration cleared the entire site (5 acres) to depths of 1-4 feet minimizing the number of anomalies a UXO contractor would have to investigate.
    - Reducing the clearance time from several years to days and saving the Army Corps of Engineers hundreds of thousands of dollars on this site alone.
- Developed and applied advanced robotic technologies for integration onto existing and future unmanned systems platforms.
  - Integrated and demonstrated an articulated fire fighting nozzle mounted and controlled on the ARTS to aid fire fighter in crash/rescue

mission for large aircraft fires.

- Developed an ARTS charge setting tool capability to pickup, place and initiate explosive charge for active range clearance and Base Recovery After Attack (BRAT) missions.
  - Designed and prototyped a tray compartment to house 30 explosive charges along with the ability to drop entire tray.
  - Developed two methods of initiating timer cord (hot igniter coil and electro-magnetic cap).
  - Deployed charge setting unit to 75th CEG/CED (EOD unit) at Hill AFB for user evaluation during Aug – Nov 01.

- Designed and integrated a commercial water cutting tool as an ARTS deployable asset to aid EOD troops ability to access and attack an improvised explosive device.
  - Cooperative effort with the Office of Special Technology who provided two water cutting systems that were designed for integration onto the ARTS platform.
  - Integrated water cutting systems onto the ARTS platform. Developed a cutting head control mechanism to aid in attacking suspect articles.
  - Finalized test plans and scheduled for delivery to the 99th CEG/CED (EOD unit) at Nellis AFB NV in Nov 01.

- Developed 1-mile fiber optic system for deployment to Pacific Air Forces (PACAF) ARTS fleet to answer urgent and compelling need to operate the ARTS with a non-radio frequency communication package.
  - Completed prototype reel assembly and conducted field trials for dispensing and retracting fiber cabling.
  - Completed drawing package and fabrication of six units.
  - Transferring technology package to operate ARTS with fiber optic system to AAC/WMO as part of their Alternate Control System strategy.
  - Deployed six units directly to Air Force bases in Kunsan and Osan, Korea and Misawa and Kadena, Japan .
- Developed an ARTS flail based on previous UGV/S JPO mini-flail project. Two ARTS flails have been deployed to SouthWest Asia to aid in mine clearing/proofing operations.

- Continued development of a Laser Ordnance Neutralization System (LONS) to utilize a directed energy technology integrated on an unmanned platform to "burn" unexploded ordnance (UXO) and improvised explosive devices (IEDs).
  - Investigating the use of a Commercial-Off-The-Shelf (COTS) CO_2 laser applicability to perform at long ranges.
  - Continued design parameters for integration of a laser onto an unmanned system.

- Designed 2nd generation Articulated Remote Manipulator System (ARMS II), a pair of dual arm force-feedback manipulators for transition to a co-sponsored joint project with the Bureau of Alcohol, Tobacco, and Firearms (BATF).

(U) FY 2002 Plans

- Research and develop robotic systems to support of Agile Combat Support/Force Protection missions (i.e., Weapons of Mass Destruction (WMD) threat reduction, UXO disposal, structural protection, physical security).
  - Autonomous Mobility Research and Development Systems (AMRADS).
  - All-purpose Remote Transport System (ARTS).

- Next-Generation EOD Robot Remote Control Vehicle (RCV).
- P-19 Fire Fighting Vehicle.
- Automated Ordnance Excavation (AOE).

- Develop and apply advanced robotic technologies for integration onto existing and future unmanned system platforms in support of Agile Combat Support/Force Protection missions (i.e. WMD threat reduction, structural protection, physical security, mobility).
  - **(Mobility)** Examine existing Commercial-Off-The-Shelf (COTS) units, build custom components for specialized mission requirement, and test these mobility platforms in various mission scenarios.
    - Assessment of commercial and existing platforms for Next Generation EOD Remote Control Vehicle (RCV).
    - High speed vehicle.
    - Light weight platforms.
  - **(Navigation and Sensor Integration)** Investigate acquisition of vehicle system specific parameters for intelligent operations and integrate environmental data acquisition units to detect, classify and characterize environmental features for mission operations.
    - Global Positioning Systems (GPS) combined with Inertial Navigation Systems (INS).
    - Obstacle detection and avoidance.
    - Stereo Vision (depth perception).
    - Forward looking infrared (FLIR) and Night vision for teleoperation.
  - **(Communication)** Determine communications requirements for a network of mobile systems performing a mission.
    - Utilize communication relays, such as marsupial robots.
    - System awareness of location to maintain communications.
    - Non-line-of-sight communication.
  - **(Man/Machine Interface and Control)** Determine requirement for user interface to mobile systems and mission specific tools. Implement both high and low-end user interfaces for multiple mobile systems.
    - Robot-to-robot control (marsupial communication).
    - Multiple vehicle control.
    - Alternate control input (fiber optics).
  - **(Intelligence)** Determine the requirements for intelligent behaviors and implement an expanding intelligence system in the mobile system for mission success. This area includes path-planning, navigation, and intelligent behavior implements.
    - Three dimensional (3D) path planning.
    - Active high speed control.
  - **(Payload Development and Integration)** Develop and integrate the tools needed to perform the mission once the mobility platform reaches the destination. Tools range from an articulated robotic manipulator arm to a simple device to gain entry into a building.
    - Intelligent manipulation.
    - Laser Ordnance Neutralization System (LONS).

(U) FY 2003 Plans

- Research and develop robotic systems to support Agile Combat Support/Force Protection missions (i.e. UXO Disposal, WMD Threat Reduction, Structural Protection, Physical Security).
  - Autonomous Mobility Research and Development System (AMRADS).

- Next Generation EOD RCV.
- Robots Support Environmental Security (ROSES).
- Next Generation Small Robotic System (Mark VI replacement).

- Develop and apply advanced robotic technologies for integration onto existing and future unmanned system platforms in support of Agile Combat Support/Force Protection missions (i.e. UXO Disposal, WMD Threat Reduction, Structural Protection, Physical Security).
  - **(Mobility)** Examine existing Commercial-Off-The-Shelf (COTS) units, build custom components for specialized mission requirements, and test these mobility platforms in various mission scenarios.
    - Specialized/optimized platforms for Next Generation force protection robotic systems.
    - High speed vehicles.
    - Light weight platforms.
    - Low cost mobility.
  - **(Navigation and Sensor Integration)** Investigate acquisition of vehicle system specific parameters for intelligent operations and integrate environmental data acquisition units to detect, classify and characterize environmental features for mission operations.
    - Global Position Systems (GPS) combined with Inertial Navigation Systems (INS).
    - Scene-based/Visual Navigation.
    - Obstacle detection and recognition (ultrasonic sensors, line scanners).
    - Stereo Vision (depth perception).
    - Forward looking infrared (FLIR) and Night vision for teleoperation.
    - Auto-mapping and database mapping/modeling.
  - **(Communication)** Determine communications requirements for a network of mobile systems performing a mission.
    - Utilize communication relays, such as marsupial robots.
    - System awareness of location to maintain communications.
    - Non-line-of-sight communication.
    - Secure communication schemes.
  - **(Man/Machine Interface and Control)** Determine requirement for user interface to mobile systems and mission specific tools. Implement both high and low-end user interfaced for multiple mobile systems.
    - Robot-to-robot control (marsupial communication).
    - Multiple vehicle control.
    - Augmented Reality Interfaces.
  - **(Intelligence)** Determine the requirements for intelligent behaviors and implement an expanding intelligence system in the mobile system for mission success. This area includes path-planning, navigation, and intelligent behavior implementation.
    - Three dimensional (3D) path planning.
    - Active high speed control.
    - Robotic cooperative behavior.
  - **(Payload Development and Integration)** Develop and integrate the tools needed to perform the mission once the mobility platform reaches the destination. Tools range from an articularted robotic manipulator arm to a simple device to gain entry into a building.
    - Manipulation.
    - Inspection sensors.
    - LONS.

- Projectile Neutralization.

B. Other Program Funding Summary

The United States Air Force (USAF), Headquarters Air Combat Command (ACC) has programmed 3600 funding to support Advanced Research and Development (R&D) and Engineering, Manufacturing, and Development (EMD) for advanced force protection robotic systems designed under the RACS Program. In addition, ACC has programmed 3080 funding for the procurement, fielding, and sustainment of advanced force protection robotic systems/technologies developed under the RACS program.

		FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007
Cost								
	3600 (64617)	0.2	1.7	1.5	1.3	1.2	0.4	0.4
	3080 (28028)	3.8	6.2	4.5	2.4	8.7	5.6	2.1

($ in Millions)

Exhibit R-3 Cost Analysis (page 1)							Date:	February 2002				
DEFENSE-WIDE		Program Element					RACS					
BUDGET ACTIVITY 4		PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			0.600	0.867		0.819		1.270				
Ancilliary Hardware Development			0.100	0.371		0.351		0.250				
Systems Engineering			0.050	0.371		0.351		0.250				
Licenses												
Tooling												
GFE												
Award Fees			0.150	0.186		0.117						
Subtotal Product Development			0.900	1.795		1.638		1.770				
Remarks:												
Development Support			0.350	0.433		0.410		0.500				
Software Development			0.300	0.433		0.410		0.500				
Training Development			0.100	0.124		0.059		0.064				
Integrated Logistics Support												
Configuration Management												
Technical Data			0.100	0.124		0.117						
GFE												
Subtotal Support			0.850	1.114		0.996		1.064				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February 2002				
DEFENSE-WIDE		Program Element					RACS					
BUDGET ACTIVITY 4		PE 0603709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.300	0.681		0.451		0.389				
IOT&E												
Subtotal T&E			0.300	0.681		0.451		0.389				
Remarks:												
Contractor Engineering Support			0.700	0.866		0.720		0.766				
Government Engineering Support			0.100	0.124		0.234		0.258				
Program Management Support			0.150	0.186		0.293		0.319				
Program Management Personnel			0.100	0.124		0.234		0.228				
Travel			0.100	0.124		0.214		0.228				
Labor (Research Personnel)			0.500	0.124		0.100		0.074				
Miscellaneous			0.100	0.062		0.100		0.074				
Subtotal Management			1.750	1.610		1.895		1.947				
Remarks:												
Total Cost			3.800	5.200		4.980		5.170				
Remarks:												

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E,DEFENSE-WIDE/Budget Activity 4				R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **ADVANCED SENSOR APPLICATIONS PROGRAM** **PE 0603714D8Z**					
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	38.021	21.239	15.994	17.009	17.957	18.287	18.636	Continuing	Continuing
Project Name/No. and Subtotal Cost ASAP/P714	38.021	21.239	15.994	17.009	17.957	18.287	18.636	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: 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.

Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Mission Support -$38.021 million

FY 2002 Plans:

- Mission Support -$21.239 million

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,DEFENSE WIDE/BudgetActivity 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **PE 0603714D8Z** **ADVANCED SENSOR APPLICATIONS PROGRAM**

FY 2003 Plans:

- Mission Support -$15.994 million

B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget	38.021	15.780	16.037	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction,		-3.341		
b. Rescission/Below threshold Reprogramming, Inflation adjustments				
c. Other		8.800	-.043	
Current President's Budget	38.021	21.239	15.994	Continuing

Change Summary Explanation:

FY 2002: Adjustments for FFRDC reductions (Section 8032) -3.215; Cross-cutting congressional adjustments (Section 8123) -.126. Congressional add $8.8 million.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,DEFENSE WIDE/BudgetActivity 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **PE 0603714D8Z** **ADVANCED SENSOR APPLICATIONS PROGRAM**

FY 2003: Non-pay purchase inflation adjustments -.043.

C. Other Program Funding Summary: N/A

D. Schedule Profile: N/A

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)			DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E,DW/BA 4			R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NO. ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z/ P714
A. Project Cost Breakdown		($ in Thousands)	
Project Categories	FY 2001	FY 2002	FY2003
a. Salaries/Benefits			
b. Primary Hardware Development			
c. Ancillary Hardware Development			
d. Development Support Equipment Acquisition			
e. Research Support Equipment Acquisition	9.575	.882	.896
f. Software Development	1.500	1.950	1.372
g. Licenses	.238	.223	.227
h. Systems Engineering	1.170	.820	.834
i. Training Development	.600		
j. Integrated Logistics Support	.420	.699	.278
k. Quality Assurance	.260	.260	.264
l. Reliability, Maintainability & Availability	.544	.544	.554
m. Configuration Management	.752	1.870	.782
n. Technical Data	7.423	7.968	5.209
o. Development Test & Evaluation	7.385	2.829	2.332
p. Operational Test & Evaluation	.300		
q. Contractor Engineering Support	.841	.212	.215
r. Government Engineering Support	2.082		
s. Program Management Support	.786	.292	.298
u. Travel	.120	.350	.356
v. Research Personnel	4.000	1.575	1.600
w. Miscellaneous (less than 15%)	.025	.765	.777
Total	**38.021**	**21.239**	**15.994**

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)						**DATE** February 2002
APPROPRIATION/BUDGET ACTIVITY **RDT&E/BA 4**				**R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NO.** **ADVANCED SENSOR APPLICATIONS PROGRAM** **PE 0603714D8Z/P714**		
C. Funding Profile Fiscal Year actual and planned obligations and expenditures						
Funds Profile	PY Obs	CY Obs	BY1 Obs	PY Exp	CY Exp	BY1 Exp
PYQ1	10.838			3.214		
PYQ2	21.796			5.634		
PYQ3	5.387			6.809		
PYQ4				8.243		
PYTot	**38.021**			**23.900**		
CYQ1		10.750		6.514	3.150	
CYQ2		9.691		4.635	5.657	
CYQ3		.650		2.010	3.172	
CYQ4		.148		.951	2.948	
CYTot		**21.239**		**14.121**	**14.927**	
BY1Q1			10.923		3.467	3.201
BY1Q2			4.724		1.868	2.699
BY1Q3			.255		.829	1.191
BY1Q4			.092		.148	2.995
BY1Tot			**15.994**		**6.312**	**10.086**
BY2Q1						3.116
BY2Q2						1.856
BY2Q3						.844
BY2Q4						.092
BY2Tot						**5.908**
Total of fiscal year	**38.021**	**21.239**	**15.994**	**38.010**	**21.239**	**15.994**

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, BUDGET ACTIVITY 4					R-1 ITEM NOMENCLATURE CALS, The Strategy, PE 0603736D8Z				
COST ($ in Millions)	FY 01	FY 02	FY 03	FY 04	FY 05	FY 06	FY 07	Cost to Complete	Total Cost
Total PE Cost	8.522	6.680	1.647	1.677	1.709	1.776	1.810	Continuing	Continuing

A. Mission Description and Budget Item Justification.

CALS is an international core strategy to share integrated digital product data through a set of standards to achieve efficiencies in business and operational mission areas. DoD's overarching goal in CALS is to develop a seamless defense enterprise in which the knowledge products of the acquisition process are immediately and rapidly accessible to all authorized users while maintaining near immediate currency and quality of information. This desired state is referred to as the "Integrated Data Environment (IDE)". The IDE (immediate access to quality information) drives many defense-wide and functional-specific reforms and business process improvements. The rapid sharing of information is an implied requisite of Integrated Product and Process Teams, a fundamental process for implementing concurrent engineering and streamlining project management. Digitized information frees logistics support and operator personnel from the burden of cumbersome document or file formats for information processing or presentation – enabling new methods for the performance of maintenance and training tasks based on interactive electronic technologies. This program element is to (1) assess and transition evolving automation technologies into the CALS strategy; (2) develop, maintain and apply to weapon system program office operations an executable business model for the application of CALS and related technologies; (3) integrate technical and functional requirements into a Shared Information Framework of the standards, protocols, procedures, and network management conventions required to achieve compatible implementation of the IDE throughout the international defense enterprise.

B. Program Change Summary:

	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	1.525	1.641	1.647	Continuing
Appropriated Value	7.000	5.039		
Adjustments to Appropriated Value				
a. Congressionally Directed Appropriation Reduction				
b. Congressionally Directed Undistributed Reduction				
c. OSD Directed Undistributed Reduction	(.003)			
Current Budget Submit/President's Budget	8.522	6.680	1.647	Continuing

Change Summary Explanation: Adjustment reflects inflation saving and the Government-wide rescission.

Funding: N/A

Schedule: N/A

C. Other Program Funding Summary: N/A

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002

D. Execution

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

Labs/centers
Universities
FFRDCs
Contractors - 6.442
Other - .238

List only those entities receiving 10% or more of total funding available in the PE/FNC.

R-1 Shopping List - Item No

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2002	
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 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE 0603851D Cost	28.611	20.504	28.334	36.149	33.245	31.770	29.436	Continuing	Continuing
ESTCP Cost	28.611	20.504	28.334	36.149	33.245	31.770	29.436	Continuing	Continuing

A. Mission Description and Budget Item Justification

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.

FY 2001 Accomplishments:

- Reviewed and selected 29 technologies for demonstration.
  - Reviewed and selected sites for demonstration of technologies.
  - Prepared site-specific implementation plans.
  - Prepared sites and secure regulatory permitting.
- Continued to demonstrate and evaluate 30 selected technologies.
- Completed evaluation of 30 technologies.

By Pillar:

- Remediation: Successfully demonstrated and validated technologies in multiple high priority areas related to the Cleanup of contaminated DoD sites. For example, ESTCP Researchers have completed a standardized protocol that describes a simple and cost effective treatability test to determine the potential for employing reductive anaerobic biological in-situ treatment technologies to remediate chloroethenes. Successfully developed and demonstrated cost effective in-situ treatment of MTBE contaminated groundwater and advanced techniques to remediate lead contaminated soil. ($8.690 Million)
- Unexploded Ordnance: ESTCP validated UXO technologies are having a significant impact on the DoD UXO remediation efforts. ESTCP has established national test sites to support the test and evaluation of advanced UXO detection technologies. To address the challenge associated with locating UXO buried in highly vegetative and variable terrain, researchers have demonstrated portable detection systems that will allow the collection and analysis of high-quality data at all DoD ranges regardless of terrain or tree cover equivalent to the most advanced vehicular systems. To reduce false-positive rates for UXO detection methods, ESTCP researchers have demonstrated advanced algorithms using data from both Magnetometer and EMI sensors to improve ordnance characterization and the rejection of false targets. To address large area sites, ESTCP has demonstrated multiple airborne detection technologies. ($8.100 Million)
- Pollution Prevention: ESTCP continues to validate and transition environmentally clean technologies that directly support the military mission. Examples include, demonstration of an enhanced, “drop-in” fuel additive that promotes lower emissions; and demonstration of environmentally

friendly alternative for hard chrome plating for a wide variety of air craft components. ($7.906 Million)

- Compliance: Significant progress has been made in the development of waste treatment and environmental monitoring technologies required by DoD. These include, successful testing of a biological treatment system for TNT contaminated wastewater; successful demonstration of a self-regenerating filter to scrub small diameter particulate matter from DoD vehicle emissions; successful operational demonstration of an acoustic based leak detection system at Pearl Harbor, HI; and successful demonstration of an oil spill detection system. (3.915 Million)

FY 2002 Plans:

The FY2002 funds are invested in projects that address priority DoD environmental requirements.

- Review and award 25 technologies for demonstration.
- Continue and complete 59 technology demonstrations.
    - Review and select sites for demonstration of technologies.
    - Prepare site-specific implementation plans.
    - Prepare sites and secure regulatory permitting.

By Pillar:

- Remediation: Demonstrate and validate innovative technologies to restore DoD facilities contaminated with toxic or hazardous waste. ($7.018 Million)
- Unexploded Ordnance: Demonstrate and validate innovative technologies to detect UXO and remediate land contaminated with UXO. ($4.255 Million)
- Pollution Prevention : Demonstrate validate innovative technologies to reduce the use of hazardous materials, and curb emissions of pollutants in military operations as well as weapons systems manufacturing, operations, and maintenance. ($6.377Million)
- Compliance: Demonstrate and validate innovative technologies to ensure DoD complies with our federal, state, and local environmental laws. ($2.854Million)

FY 2003 Plans:

- 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: ($8.102 Million)
- UXO: ($6.068 Million)
- Pollution Prevention: ($8.933 Million)
- Compliance: ($5.231 Million)

FY 2004-07 Plans: The ESTCP will continue to program and budget for 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.

B. **Program Change Summary**:

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002

	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	24.906	25.314	25.314	Continuing
Appropriated Values	29.256	21.054		
Adjustments to Appropriated Values				
a. Undistributed reduction	(.334)	(.287)		
b. SBIR	(.311)	(.263)		
c. Other			3.020	
Current Budget Submit	28.611	20.504	28.334	Continuing

Change Summary Explanation**:** FY2001 and FY2002 changes reflect Congressional actions. FY2003 reflects increased requirements.

C. Other Program Funding Summary Not applicable

D. Execution

For the execution year (FY01):

Labs/centers
Universities
FFRDCs
Contractors
Other

No individual organization/group receives 10% or more of total funding available in ESTCP**.**

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide/Budget Activity 4	PROGRAM ELEMENT				PROJECT/THRUST NAME AND NUMBER Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z			
Cost ($ in Millions)		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007
ESTCP Cost		28611	20504	28334	36149	33245	31770	29436

A. Mission Description and Budget Item Justification

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, (3) Executive Order 12856 which requires Federal agencies place a high priority on obtaining funding and resources needed for the development of innovative pollution prevention programs and technologies for installations and in acquisitions, and (4) 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.

FY 2001 Accomplishments:

- Reviewed and selected 29 technologies for demonstration.
  - Reviewed and selected sites for demonstration of technologies.
  - Prepared site-specific implementation plans.
  - Prepared sites and secured regulatory permitting.
- Continued to demonstrate and evaluate 30 selected technologies.
- Completed evaluation of 30 technologies.

By Pillar:

- Remediation: Successfully demonstrated and validated technologies in multiple high priority areas related to the Cleanup of contaminated DoD sites. For example, ESTCP researchers have completed a standardized protocol that describes a simple and cost effective treatability test to determine the potential for employing reductive anaerobic biological in-situ treatment technologies to remediate chloroethenes. Successfully developed and demonstrated cost effective in-situ treatment of MTBE contaminated groundwater and advanced techniques to remediate lead contaminated soil. ($8.690 Million)
- Unexploded Ordnance: ESTCP validated UXO technologies are having a significant impact on the DoD UXO remediation efforts. ESTCP has established national test sites to support the test and evaluation of advanced UXO detection technologies. To address the challenge associated with locating UXO buried in highly vegetative and variable terrain, researchers have demonstrated portable detection systems that will allow the collection and analysis of high-quality data at all DoD ranges regardless of terrain or tree cover. To reduce false-positive rates of UXO detection methods, ESTCP researchers have demonstrated advanced algorithms using data from both Magnetometer and EMI sensors to improve ordnance characterization and the rejection of false targets. To address large area sites, ESTCP has demonstrated multiple airborne

detection technologies. ($8.100 Million)

- Pollution Prevention: ESTCP continues to validate and transition environmentally clean technologies that directly support the military mission. Examples include, demonstration of an enhanced, "drop-in" fuel additive that promotes lower emissions; and demonstration of environmentally friendly alternative for hard chrome plating for a wide variety of air craft components. ($7.906 Million)
- Compliance: Significant progress has been made in the development of waste treatment and environmental monitoring technologies required by DoD. These include, successful testing of a biological treatment system for TNT contaminated wastewater; successful demonstration of a self-regenerating filter to scrub small diameter particulate matter from DoD vehicle emissions; successful operational demonstration of an acoustic based leak detection system at Pearl Harbor, HI; and successful demonstration of an oil spill detection system. (3.915 Million)

FY 2002 Plans:

The FY2002 funds are invested in projects that address priority DoD environmental requirements.

- Review and award 25 technologies for demonstration.
- Continue and complete 59 technology demonstrations.
  - Review and select sites for demonstration of technologies.
  - Prepare site-specific implementation plans.
  - Prepare sites and secure regulatory permitting.

By Pillar:

- Remediation: Demonstrate and validate innovative technologies to restore DoD facilities contaminated with toxic or hazardous waste. ($7.018Million)
- Unexploded Ordnance: Demonstrate and validate innovative technologies to detect UXO and remediate land contaminated with UXO. ($4.255Million)
- Pollution Prevention : Demonstrate and validate innovative technologies to reduce the use of hazardous materials, and curb emissions of pollutants in military operations as well as weapons systems manufacturing, operations, and maintenance. ($6.377 Million)
- Compliance: Demonstrate and validate innovative technologies to ensure DoD complies with Federal, State, and local environmental laws. ($2.854 Million)

FY 2003 Plans:

- 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: ($8.102 Million)
- UXO: ($ 6.068Million)
- Pollution Prevention: ($8.933 Million)
- Compliance: ($ 5.231 Million)

FY 2004-07 Plans: The ESTCP will continue to program and budget for 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.

Exhibit R-2a, RDT&E Project Justification	Date: February 2002

B. Other Program Funding Summary Not Applicable

R-1 Shopping List - Item No

Exhibit R-2a, RDT&E S&T Project Justification
(Exhibit R-2, page X of X)

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE : (MONTH/YEAR) February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 4	**R-1 ITEM NOMENCLATURE PE NUMBER/PROJECT NUMBER** Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z

Project Cost Categories	FY 2001	FY 2002	FY 2003
Cost Categories:			
a. Demonstration & Validation	27.249	19.404	26.884
b. Program Management Support	1.362	1.100	1.450
TOTAL	28.611	20.504	28.334

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE : (MONTH/YEAR) February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 4	**R-1 ITEM NOMENCLATURE PE NUMBER/PROJECT NUMBER** Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to FY 2001	Budget FY 2001	Budget FY 2002	Budget FY 2003	Budget to Complete	Total Program
DoD	C	-	-	-	142.939	28.611	20.504	28.334	Continuing	Continuing

Actual or Budget Value ($ in millions)

Government Furnished Property

Item Description	Contract Method/Type or Funding Vehicle	Award or obligation Date	Delivery Date	Total Prior to FY2000	Budget 2001	Budget 2002	Budget 2003	Budget to Complete	Total Program

Product Development Property (list each item separately) N/A
Support and Management Property (list each item separately) N/A
Test and Evaluation Property (list each item separately) N/A
Subtotal Product and Development
Subtotal Support and Management
Subtotal Test and Evaluation

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE FEBRUARY 2002		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4							R-1 ITEM NOMENCLATURE Humanitarian Demining **PE 0603920D8Z**		
COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	12.611	13.220	13.555	13.529	14.047	14.320	14.558	Continuing	Continuing
Humanitarian Demining/P920	12.611	13.220	13.555	13.529	14.047	14.320	14.558	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) This Humanitarian Demining R&D program element focuses on the testing, demonstration and validation of equipment suitable for immediate use in various international humanitarian demining missions and environments. The goal is to provide this equipment to the international demining community so that they may assess the equipment`s capabilities in actual demining conditions. This program focuses on R&D technology development that reduces the time and cost associated with demining while improving the overall safety of the operator. This is accomplished through the adaptation of commercial-off-the-shelf equipment, the integration of mature technologies, and the leveraging from past and current R&D project activity in the tactical countermine and unexploded ordnance clearance mission areas. Through technological development, this program aims to achieve the following primary objectives: to improve existing mine/minefield detection; improve current wide-area survey equipment; clear large areas faster and more efficiently with improved mechanical mine/vegetation clearance equipment; provide improved protection for deminers; detect explosives in buried mines (biosensors); confirm the presence of mines (verification); mark and map mines/minefields; improve post clearance quality assurance (QA) equipment; and improve deminer hand tools. These areas of emphasis have been adopted as a direct result of an annual Humanitarian Demining Requirements Workshop, the most recent of which took place in July 2001.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4	**R-1 ITEM NOMENCLATURE** Humanitarian Demining **PE 0603920D8Z**

COST*(In Millions)*		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost		12.611	13.220	13.555	13.529	14.047	14.320	14.558	Continuing	Continuing
Humanitarian Demining/P920		12.611	13.220	13.555	13.529	14.047	14.320	14.558	Continuing	Continuing

(U) Project Number and Title: P920 Humanitarian Demining

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) **FY2001 Accomplishments:**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4	R-1 ITEM NOMENCLATURE Humanitarian Demining **PE 0603920D8Z**

(U) Continued to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging existing technology from the tactical countermine area. Continued to develop wide area detection, mine/minefield marking, mapping and large area survey system. Initiated a cooperative endeavor with international partners for an area reduction system based on vapor detection. Completed all technical testing and field evaluations under the International Pilot Project Technology Cooperation Project and published the final report quantifying the performance of all commercially available handheld metal detectors. Continued to develop vegetation and mechanical clearance and neutralization systems suitable for removing dense vegetation from mined areas and excavating and clearing landmines. Further developed and demonstrated individual deminer protective equipment. Continued development of equipment suitable for area reduction and quality assurance operations. Initiated and completed operational field evaluations of detection, mine/vegetation clearance, neutralization and personal deminer protection systems in mine infested regions of the world to include Angola, Chile, Croatia, Israel, Kosovo, Lebanon, Namibia, Nicaragua, Cambodia, and Thailand. Conducted site surveys and country assessments in Croatia, Israel, Mozambique, Nicaragua, Oman, Thailand, and Yemen to provide advice on specific prototype items developed under the program. Completed and distributed the 2000-2001 Humanitarian Demining R&D Program Developmental Technologies catalog that reports on progress in developing equipment to assist with the global demining effort. Initiated a new program video representing the current overall programs. Held the annual HD Requirements Workshop and formed the basis of the FY02 program structure from the input received from supported national mine action centers, and non-governmental organizations. (12.611 Million)

(U) FY 2002 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4	R-1 ITEM NOMENCLATURE Humanitarian Demining **PE 0603920D8Z**

(U) Continue to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging existing technology from the tactical countermine area. Continue to develop wide area detection, mine/minefield marking, and mapping and large area survey system. Continue detection cooperative endeavors with international partners. 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 QA operations. Continue to develop and demonstrate individual deminer protective equipment. Continue to develop information and instructional aids that improve mine awareness and the quality of deminer training. Conduct site survey(s)/country assessment(s) and also initiate operational field evaluations of the 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. Further develop information and instructional aids that improve mine awareness and the quality of deminer training. Conduct an annual HD Requirements Workshop, and co-sponsor an Asia Regional Technology Workshop with the State Department . Complete and distribute 2001–2002 program video. (13.220 Million)

(U) FY 2003 Plans:

(U) Continue to develop and demonstrate detection technologies for discrimination and confirmation to include leveraging existing technology from the tactical countermine area. Continue to develop detection technologies to improve detection capability and reduce false alarms. Continue to conduct site survey(s) and country assessment(s), and conduct 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. Complete and distribute the 2001-2002 Humanitarian Demining R&D Program Developmental Technologies catalog that reports on progress in developing equipment to assist with the global demining effort. Conduct an annual HD Requirements Workshop. (13.355 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4	R-1 ITEM NOMENCLATURE Humanitarian Demining **PE 0603920D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's FY Budget Submission	12.728	13.733	13.391	Continuing
Delta	-0.117	-0.221	0.000	
FY 2002 Amended President's Budget Submission	12.611	13.512	13.391	Continuing
Appropriated Value	12.728	13.512	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.117	0.000	0.000	
c. Other	0.000	0.000	-0.036	
Current FY 2003 Budget Submission	12.611	13.512	13.355	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 4	R-1 ITEM NOMENCLATURE Humanitarian Demining **PE 0603920D8Z**

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 adjustments. FY 2003 reductions reflect adjustments for inflation

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

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

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

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

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

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/ Budget Activity 4**					R-1 ITEM NOMENCLATURE **Coalition Warfare 0603923D8Z**			
COST ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Continue
Total 0603923D Cost	5.945	5.844	12.444	12.646	12.999	13.327	13.588	continuing
Coalition Readiness Integrated Management System	0.7	1.5	0	0	0	0	0	0
CAESAR International Demonstration	2.0	1.3	0	0	0	0	0	0
Coalition Air Picture/Air Tasking Order	2.0	0	0	0	0	0	0	0
Coalition Asset Tracking	0.5	.05	0	0	0	0	0	0
Coalition Tactical Communications Interoperability	0	1.0	1.2	0	0	0	0	0
Pacific Coalition Operational Wide Area Network	0	1.0	1.9	0	0	0	0	0
Shared Tactical Ground Picture	0.1	0.25	0	0	0	0	0	0
Modeling & Simulation in Coalition Environments	0.1	0.15	0	0	0	0	0	0
Coalition Warfare Program Support	.545	0.545	0.545	0.545	0.545	0.545	0.545	.545
Coalition Warfare Program – Future Projects	0	0	8.799	12.101	12.454	12.782	13.043	continuing

The Coalition Warfare Program provides resources for the U.S. portion of bi-lateral and multi-lateral development projects, aimed at improving interoperability with allies and other likely coalition partners. Recent coalition operations, exercises and experiments have revealed the increasing complexity and difficulty of prosecuting multi-national air, land, and sea campaigns. Interoperability gaps between partners have retarded mission efficiency and jeopardized force protection. The complexity of the coalition battlefield makes it necessary to work cooperatively with our likely coalition partners to solve interoperability gaps in C3I, logistics and weapon systems as well as to improve coalition training capabilities.

This program leverages foreign and other U.S. investment in ongoing projects so as to add a coalition capability that otherwise would not have existed. Both U.S. and foreign-unique technologies and research may be applied to improve the end product. Coalition Warfare funds (no more than 50% of total project cost) and foreign contributions (50% or more) are added to planned or existing U.S.-only projects so as to add a coalition capability that would not have otherwise existed.

Candidate projects are nominated by the CINCs (through their CINC Interoperability Program Offices), Services, OSD, or potentially, foreign governmental sources. OSD performs a down-select of projects based on programmatic executability, the scope of the coalition problem being approached, the potential to spread the benefits to multiple theaters, among other factors.

Candidate programs proposals for FY03-start programs have not yet been received so no selection process has taken place.

B. Program Change Summary:	FY2001	FY2002	FY2003	Total Cost
President's FY2001 Budget Submit	$11.8M	$12.870M	$12.396M	continuing
FY02 Amended President's Budget Submit	$11.8M	$12.943M	$12.478M	
Appropriated Value	$6.0M	$6.123M	$0	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	-$.055M	-$.279M	$0	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-$.013M	$0	$0	
c. Other (SBIR)	-$.148M	$0	-$.034M	
Current President's Budget	$5.945M	$5.844M	$12.444M	

C. Other Program Funding Summary	PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

D. Execution

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

Air Force Research Labs, Rome NY
Alphatech
Raytheon
Anteon Corportation

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Modeling & Simulation in Coalition Environments	0.1	0.15	0	0	0	0	0	0

A. Mission Description and Budget Item

The objectives of this program are to investigate standards based approaches for the development of a framework that enables the assessment of coalition operations and the range of possibilities for various concepts of operations (CONOPS), coalition force structures and mixes, and interoperability amongst coalition force elements. The framework will be based on leading standards in modeling and simulation, systems of systems development, and digital product models to provide an environment to investigate the pertinent issues and to demonstrate the impacts of alternate approaches for interoperability amongst coalition forces. The program will develop the framework for the environment and the initial components of that environment as a working demonstration of the approach and the basis for continued collaborative development and application.

B. Other Program Funding Summary

PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Pacific Coalition Wide Area Network (COWAN)	0	1.0	1.9	0	0	0	0	0

Mission Description and Budget:
The Pacific Combined Operations Wide Area Network (COWAN) is a permanent, classified coalition network service designed to bridge US classified networks and Pacific Rim partner nations' networks supporting maritime forces and shore planning staffs for escort and maritime interdiction missions for Operation Enduring Freedom as well as future training exercises and operations. The COWAN would be built as an Agile Virtual Private Network (VPN) to ensure security and privacy between U.S. users and coalition partners. The COWAN has a hub and spoke architecture, with the U.S. at the center. This model is necessary to ensure the privacy of each coalition partner's information. Imbedded tools would include secure e-mail, web, chat, and a common operational picture.

The DoD FY02 Appropriations bill provided $4.5M to accelerate the commercial COMSEC evaluation with NSA. The Coalition Warfare Program is providing the funding necessary to stand up the U.S. portion of the coalition capability. Equitable contributions will be made by the participating countries, to include Australia, Japan and possibly Singapore. Other countries may be added depending on the results of coalition exercises in CY02. One goal of the program is to serve as a counter-terrorism force network for over 40 participating countries.

B. Other Program Funding Summary

PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete
Coalition Warfare Program Support	0.545	0.545	0.545	0.545	0.545	0.545	0.545	0.545

A. Mission Description and Budget Item
This funding represents costs to the program for Department of Defense-levied fees as well as contractor support.

B. Other Program Funding Summary

PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Coalition Readiness Integrated Management System	0.7	1.5	0	0	0	0	0	0

A. Mission Description and Budget Item Justification
The Coalition Readiness Integrated Management System is designed to leverage the U.S. Navy's developing Battle Force Tactical Training (BFTT) System to provide U.S. and coalition forces interoperability training and combined mission rehearsal capability. The program is developing an in-situation/on-board training capability where combat teams would train in the real shipboard environment, at their work-stations. Further, the system is scaled to accommodate any number of platforms into the exercise to achieve joint force or coalition force training. This capability could be used to train for a expected contingency while sailing to the operation. Scheduled releases of BFTT software will produce automated measures of performance/measures of effectiveness (MOP/MOEs), multiple after-action-review (AAR) products and mission rehearsal scenario generation capability. The system will fully incorporate and leverage the Defense Modeling & Simulation Office's (DMSO) High Level Architecture and Run-Time Infrastructure (HLA/RTI) standard, which has also become a commercial standard for modeling and simulation.

An international cooperative agreement with Australia is in place. The United Kingdom and the Netherlands have also expressed a strong interest in participating in this cooperative program. Germany has requested data for a possible purchase of the software product and architecture. Other countries, including Japan, have also expressed interest in the Coalition Readiness Integrated Management System.

B. Other Program Funding Summary

		PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4
0207596F	**NAVSEA**	**8.0M**	**2.0M**	**0**	**0**	**0**	**0**	**0**	**0**

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification							Date: 02/2002	
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete
Coalition Warfare Program – Future Projects	0	0	9.344	12.646	12.999	13.327	13.588	continuing

A. Mission Description and Budget Item

- The Coalition Warfare Program provides resources for the U.S. portion of bi-lateral and multi-lateral development projects, aimed at improving interoperability with allies and other likely coalition partners. Recent coalition operations, exercises and experiments have revealed the increasing complexity and difficulty of prosecuting multi-national air, land, and sea campaigns. Interoperability gaps between partners have retarded mission efficiency and jeopardized force protection. The complexity of the coalition battlefield makes it necessary to work cooperatively with our likely coalition partners to solve interoperability gaps in C3I, logistics and weapon systems as well as to improve coalition training capabilities. Specifically, the Coalition Warfare Program will provide funding to develop enhanced coalition capability in the following eight areas: Unmanned Aerial Vehicles (UAVs), Chemical-Biological/WMD Defense, Training & Exercises, Combat Identification, Littoral Small Ship Technologies, Mine Countermeasures (sea and land mines), Air Refueling Technologies and Interoperable Tactical Communications.

New projects are selected for funding on an annual basis. Each candidate project may request up to two years of Coalition Warfare Program funding.

B. Other Program Funding Summary

PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4

R-1 Shopping List - Item No

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Coalition Tactical Communications Interoperability	0	1.0	1.2	0	0	0	0	0

A. Mission Description and Budget Item Justification
The Joint Tactical Radio System/Bowman Interoperability Program between the U.S. and the UK will co-develop, implement and test a Common Tactical Interoperable Waveform (CTIW) for BOWMAN and JTRS radios, and will conduct coalition/joint field testing to demonstrate the resultant UK-US waveform interoperability. An international agreement will be negotiated for this program. The JTR System will be software-reprogrammable, multi-band/ multi-mode capable, networkable, and provide simultaneous voice, data, and video communications. The threshold goal for interoperability between the JTRS and Bowman systems will be in voice communication. This cooperation will help define the waveforms for the more robust UK Programmable Digital Radio currently in early development.

The JTRS Joint Program Office, in conjunction with the Air Force and Army, is working to develop waveforms that will be interoperable with the legacy and developing tactical communication systems of Japan, Germany and France as well.

B. Other Program Funding Summary

	PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4
0604280D	**0**	**0.3M**	**0.3M**	**0.3M**	**0.2M**	**0.1M**	**0**	**0**

Exhibit R-2, RDT&E S&T Budget Item Justification
(Exhibit R-2, page 1 of 1)

Exhibit R-2a, RDT&E Project Justification								Date: 02/2002
RDT&E, Defense-wide/ Budget Activity 4	PE 0603923D8Z				PROJECT/THRUST NAME AND NUMBER			
Cost ($ in Millions)	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008
Shared Tactical Ground Picture	0.1	0.25	0	0	0	0	0	0

A. Mission Description and Budget Item

The development of a Shared Tactical Ground Picture Capability will provide a stream of knowledge and products directly enhancing each nation's existing tactical ground picture. The increased sharing of data, engineering of solutions, and demonstration of new capabilities will leverage each nations individual efforts. As a leadership activity, the Shared Tactical Ground Picture team will share and publicise its activities and products for full NATO use, and as appropriate for additional Partner-for-Peace nation member use.

At the conclusion of the Shared Tactical Ground Picture (STGP) initiative the tactical warfighter through collaborative use of data and value added engineering of existing systems will be provided an increased understanding and visibility of the tactical battlespace. Through the investigation of new technologies STGP will provide a new data sharing mechanism which will provide the tactical commander with a better perception of the battlespace then what currently exists in a multinational environment. This perception will be provided into existing command and control systems through the developed data display and management activity of the initiative. Enhanced data sharing will be accomplished over a communications architecture developed which supports the tactical warfighter through a shared information grid concept. Information from integrated sensors and the linkage of these sensors to shooters to support the mobile targeting of mobile objects will be achieved. In addition the shared information at all levels of command will allow for the exchange of command and control information from multinational participants to facilitate the situational awareness of the tactical warfighter and limit the occurrence of blue on blue engagements.

B. Other Program Funding Summary

PY	CY	BY1	BY2	BY2+1	BY2+2	BY2+3	BY2+4

R-1 Shopping List - Item No

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY **RDT&E – Defense Wide/Budget Activity: 4**				**R-1 ITEM NOMENCLATURE** **Joint Systems Education & Training – PE: 0604722D**					
COST ($ In Millions)	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**	**FY 2005**	**FY 2006**	**FY 2007**	**Cost to Complete**	Total Cost
Total Program Element (PE) Cost	**2.973**	**10.000**	**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 development of training and education prototypes for advanced distributed learning for all of the Services. It's broad, interservice use will establish a foundation for collaborative initiatives to jointly develop content and the learning environment for Advanced Distributed Learning (ADL). These prototypes will leverage successful research and development in training and education. Policy oversight of this program will be managed by ODUSD-R/R&T and the program will be executed in tow parts: $1.5 million by the US Army Simulation Training and Instrumentation Command (STRICOM) through the Joint ADL Co-Lab for prototype development efforts; and $8.5 million for the ADL Co-Lab in Alexandria to support the research, development and assessment of common specifications, guidelines, tutorials, and demonstrations.

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 2000 Accomplishments:

- Developed sixteen ADL prototypes using the ADL shareable courseware reference model.
- Initiated the compilation of guidelines for web-based instruction.

(U) FY 2001 Accomplishments:

- Developed 10 additional prototypes using the ADL shareable courseware reference model.
- Published versions 1.0 and 1.2 of guidelines for web-based instruction.
- Collected and share lessons learned from the 26 prototypes.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 4	R-1 ITEM NOMENCLATURE Joint Systems Education & Training – PE: 0604722D

(U) B. Program Change Summary	2001	2002	2003
Previous President's Budget	0	0	0
Delta	0	0	0
FY 2002 Amended President's Budget	0	0	0
Adjustments to Appropriated Value/Transferred Amount	0	10.000	0
a. Congressional realignment to PE0604722D	3.000	0	0
b. Congressionally Directed Undistributed Reductions	-.027	0	0
c. Other (DOD Program Changes)			
Current Budget Submit/President's Budget	2.973	10.000	0

(U) Funding: The change in FY-2002 is the result of congressional realignments or adjustments

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

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

(U) D. Execution: Labs/Centers: $1.5 Million - US Army Simulation Training and Instrumentation Command
$8.5 Million – ADL Co-Lab Alexandria – (Contract for R&D)

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 5					R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0604709D8Z			
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
Total PE Cost	14.915	15.003	13.643	13.873	14.114	14.418	14.700	Continuing
SRS	4.000	3.600	3.274	3.330	3.380	3.460	3.530	Continuing
RCSS	6.915	4.303	3.915	3.980	4.054	4.138	4.220	Continuing
MDARS-I	4.000	3.400	3.090	3.143	3.200	3.270	3.330	Continuing
MDARS-E	0.000	3.700	3.364	3.420	3.480	3.550	3.620	Continuing

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 four 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 Standardized Robotic System (SRS) – 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; (3) the Mobile Detection Assessment Response System, Interior (MDARS-I) – to provide physical security inside warehouses of fixed installations and large storage facilities, protection of critical inventory items and track movement of items in warehouses and ammunition storage facilities; and (4) the Mobile Detection Assessment Response System, Exterior (MDARS-E) – to provide unmanned roving security patrols among buildings and around the perimeter of large fixed installations.

B. Program Change Summary ($ million)

	FY2001	FY2002	FY2003
FY2001Previous President's Budget	11.553	13.197	13.590
FY2002 Amended Budget	15.053	15.197	13.643
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressionally Directed Appropriation Reduction			
b. Congressionally Directed Undistributed Reduction	(0.105)	(.194)	
c. OSD Directed Program Reduction/Increase	(0.033)		
Current Budget Submit/President's Budget	14.915	15.003	13.643

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 5	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0604709D8Z

Change Summary Explanation:
Funding: FY 2000-2001 inflationary savings
Schedule: N/A
Technical: N/A

C. Other Program Funding Summary
Not Applicable.

D. Execution
- Science & Engineering Services, Inc. (SESI), in Radcliff, Kentucky for RCSS. (3.579 Million)
- Mesa Associates, Inc., in Huntsville, Alabama for RCSS. (1.778 Million)

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 5	PROGRAM ELEMENT PE 0604709D8Z				PROJECT/THRUST NAME AND NUMBER STANDARD ROBOTICS SYSTEM (SRS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
SRS	4.000	3.600	3.274	3.330	3.380	3.460	3.530	Continuing

A. Mission Description and Budget Item Justification. The Standardized Robotic System (SRS) program is a generic and modular robotic system that can be retrofitted to many different military applications and vehicles. Currently, the SRS system is being built for three different engineer dozers (D7G, T3 and DEUCE) to allow remote obstacle breeching 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 Panther (contingency systems) in Bosnia and Kosovo that have cleared over 500 mines and submunitions. Panther is a M60 tank chassis with SRS system and mine rollers used to proof roads or fields for mines. The U.S. Army approved the Operational Requirements Document (ORD) in September 1997.

(U) FY 2001 Accomplishments

- Continued support for the M60 Panther in the Balkans.
- Finalized design and completed most testing of the SRS system for the Abrams Panther (M1A1).
- Conducted engineering and program management support for SRS system development.
- Began development of government SRS engineering support and depot repair capability.

(U) FY 2002 Plans

- Continue support of the M60 Panthers and develop strategy to replace the M60 Panther with the Abrams Panther in Bosnia and Kosovo.
- Field Abrams Panthers in the Balkans and complete production of spare systems.
- Finalize government engineering, software and depot support capability.
- Begin development of robotic capability for the USMC Assault Breacher Vehicle (ABU), M56 Coyote Smoke Obscuration System, and Ground Standoff Mine Detection System Block 0 (GSTAMIDS0).
- Develop new SRS acquisition strategy and begin execution.
- Start SRS SDD activity for the design, manufacture, and delivery of engineering prototypes for DEUCE.
- Begin planning for DT/OT.

(U) FY 2003 Plans

- Engineering and program management support for SRS system development.
- Continue SRS SDD activity for the design, manufacture, and deliver of engineering prototypes for DEUCE.
- Begin Developmental Test for SDD.
- Begin Production of SRS contingency kits for GSTAMIDS0.

B. Other Program Funding Summary

Exhibit R-2a, RDT&E Project Justification	Date: February 2002
Not Applicable.	

Exhibit R-3 Cost Analysis (page 1)							Date:	February-2002				
DEFENSE-WIDE BUDGET ACTIVITY 5		Program Element PE 0604709D8Z					SRS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			2.500	1.800		2.339		2.461				
Ancilliary Hardware Development												
Systems Engineering			0.500	0.600		0.390		0.362				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			3.000	2.400		2.729		2.823				
Remarks:												
Development Support			0.200	0.240		0.156		0.145				
Software Development			0.500	0.600		0.233		0.218				
Training Development												
Integrated Logistics Support			0.150	0.180		0.078		0.072				
Configuration Management			0.150	0.180		0.078		0.072				
Technical Data												
GFE												
Subtotal Support			1.000	1.200		0.545		0.507				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February-2002				
DEFENSE-WIDE BUDGET ACTIVITY 5		Program Element PE 0604709D8Z					SRS					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT												
IOT&E												
Subtotal T&E			0.000	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		0.000				
Remarks:												
Total Cost			4.000	3.600		3.274		3.330				
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 5	PROGRAM ELEMENT PE 0604709D8Z				PROJECT/THRUST NAME AND NUMBER ROBOTIC COMBAT SUPPORT SYSTEM (RCSS)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
RCSS	6.915	4.303	3.915	3.980	4.054	4.138	4.220	Continuing

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 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 breeching systems. A Mission Need Statement (MNS) and an Operational Requirements Document (ORD) have been approved by Army Training and Doctrine Command (TRADOC).

(U) FY 2001 Accomplishments
- Completed Milestone I for RCSS.
- Issued Request for Proposal (RFP) for competitive procurement.
- Established Source Selection Evaluation Board for competitive procurement.
- Received solicitations in response to RFP.
- Evaluated contractors' proposals.
- Executed Concept and Technology Development contract.

(U) FY 2002 Plans
- Start Initial Verification Testing (IVT) on systems delivered under Concept and Technology Development phase.
- Complete Milestone B.

(U) FY 2003 Plans
- Award SDD contract.
- Begin developmental testing on RCSS systems developed under SDD contract.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February-2002				
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 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPFF		4.648			1.012		0.729				
Ancilliary Hardware Development												
Systems Engineering			1.000	2.289		0.225		0.252				
Licenses												
Tooling			0.100			0.225		0.252				
GFE												
Award Fees												
Subtotal Product Development			5.748	2.289		1.462		1.233				
Remarks:												
Development Support			0.100	0.513		0.225		0.252				
Software Development			0.100	0.126		0.112		0.126				
Training Development			0.100			0.225		0.252				
Integrated Logistics Support			0.100			0.225		0.252				
Configuration Management			0.100			0.225		0.252				
Technical Data												
GFE												
Subtotal Support			0.500	0.639		1.012		1.134				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February-2002				
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 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT						0.394		0.441				
IOT&E												
Initial Verification Testing			0.267	0.274								
Subtotal T&E			0.267	0.274		0.394		0.441				
Remarks:												
Contractor Engineering Support			0.100	0.076		0.337		0.378				
Government Engineering Support			0.100	1.025		0.337		0.378				
Program Management Support			0.200			0.373		0.416				
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.400	1.101		1.047		1.172				
Remarks:												
Total Cost			6.915	4.303		3.915		3.980				
Remarks:												

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 5	PROGRAM ELEMENT PE 0604709D8Z				PROJECT/THRUST NAME AND NUMBER MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM – INTERIOR (MDARS-I)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
MDARS-I	4.000	3.400	3.090	3.143	3.200	3.270	3.330	Continuing

A. Mission Description and Budget Item Justification. The Mobile Detection Assessment Response System – Interior (MDARS-I) will provide commanders at Army, Air Force, Navy, and Defense Logistics Agency (DLA) facilities with an electro-mechanical capability to conduct semi-autonomous, random patrols and surveillance activities, including product assessment and theft detection fuctions. MDARS-I can be used in a variety of U.S. Army Installations: warehouses, office buildings, and hospitals. This system will randomly navigate building interiors, perform intrusion detection, inventory assessment, visual assessment, and audio response. Enhanced capabilities include detection on the move and the employment of response delay devices and the integration of fixed sensors and mobile platforms into a single system.

(U) FY 2001 Accomplishments
- Conducted Production Qualification Testing (PQT) II.
- Conducted Limited User Test (LUT).
- Conducted Logistics Demonstration.

(U) FY 2002 Plans
- Conduct Milestone C IPR for Low Rate Initial Production (LRIP) decision.
- Exercise Contract Option for LRIP.
- Initiate Pre-Planned Product Improvement (P3I) effort.

(U) FY 2003 Plans
- Continue P3I effort.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February-2002				
DEFENSE-WIDE		Program Element					MDARS-I					
BUDGET ACTIVITY 5		PE 0604709D8Z										
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development			1.000	0.680								
Ancilliary Hardware Development			0.200									
Systems Engineering			0.200	0.453		1.340		1.347				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			1.400	1.133		1.340		1.347				
Remarks:												
Development Support			0.100	0.289								
Software Development			0.150	0.227		0.436		0.633				
Training Development			0.100	0.170								
Integrated Logistics Support			0.100	0.334								
Configuration Management			0.200	0.397								
Technical Data			0.100									
GFE												
Subtotal Support			0.750	1.417		0.436		0.633				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February-2002				
DEFENSE-WIDE BUDGET ACTIVITY 5			Program Element PE 0604709D8Z				MDARS-I					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT			0.650	0.340		0.412						
IOT&E			0.750					0.449				
Subtotal T&E			1.400	0.340		0.412		0.449				
Remarks:												
Contractor Engineering Support			0.100	0.170								
Government Engineering Support			0.150	0.170		0.902		0.714				
Program Management Support			0.200	0.170								
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management			0.450	0.510		0.902		0.714				
Remarks:												
Total Cost			4.000	3.400		3.090		3.143				

Exhibit R-2a, RDT&E Project Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE WIDE, BUDGET ACTIVITY 5	PROGRAM ELEMENT PE 0604709D8Z				PROJECT/THRUST NAME AND NUMBER MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM – EXTERIOR (MDARS-E)			
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
MDARS-E	0.000	3.700	3.364	3.420	3.480	3.550	3.620	Continuing

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, including barrier assessment and theft detection functions. MDARS-E can be used in a variety of applications: general storage yards; depots; Arms, Ammunition, and Explosives (AA&E) storage areas; air fields; railyards; and port facilities. The MDARS-E will autonomously conduct surveillance activities checking for intruders, conducting lock interrogations, and assessing the status of facility barriers, such as doors of AA&E storage bunkers. Uses include the detection of unauthorized personnel, verification of barrier and product status, and the remote investigation of an alarm source.

(U) FY 2001 Accomplishments
- No System Development and Demonstration (SDD) funding this fiscal year.

(U) FY 2002 Plans
- Award SDD Contract.
- Conduct Customer Test (DT).
- Monitor the SDD Hardware Contract.

(U) FY 2003 Plans
- Continue to monitor SDD Hardware Contract.

B. Other Program Funding Summary
Not Applicable.

Exhibit R-3 Cost Analysis (page 1)							Date:	February-2002				
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 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development				0.863								
Ancilliary Hardware Development				0.123								
Systems Engineering				0.493		1.458		1.252				
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development				1.479		1.458		1.252				
Remarks:												
Development Support				0.062				0.083				
Software Development				0.555		0.474		0.520				
Training Development				0.123				0.083				
Integrated Logistics Support				0.247				0.167				
Configuration Management				0.123				0.083				
Technical Data												
GFE												
Subtotal Support				1.110		0.474		0.936				
Remarks:												

Exhibit R-3 Cost Analysis (page 2)							Date:	February-2002				
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 2001 Cost	2002 Cost	2002 Award Date	2003 Cost	2003 Award Date	2004 Cost	2004 Award Date	Cost To Complete	Total Cost	Target Value of Contract
DT						0.617						
IOT&E								0.500				
Customer Test				0.493								
Subtotal T&E				0.493		0.617		0.500				
Remarks:												
Contractor Engineering Support				0.247								
Government Engineering Support				0.124		0.815		0.732				
Program Management Support				0.247								
Program Management Personnel												
Travel												
Labor (Research Personnel)												
Miscellaneous												
Subtotal Management				0.618		0.815		0.732				
Remarks:												
Total Cost				3.700		3.364		3.420				
Remarks:												

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)					DATE: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5					R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P771/P773			
COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total Cost
Total Program Element (PE) Cost	16.100	16.328	10.797	10.863	18.859	19.205	19.571	Continuing
LINK-16 - P771	4.025	5.470	3.703	5.138	15.464	19.205	19.571	Continuing
Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT) - P773	12.075	10.858	7.094	5.725	3.395			

A. Mission Description and Budget Item Justification

This program funds ongoing system level engineering of the existing Link 16 system for joint interoperability and the development of the next generation Link 16 system, the Multifunctional Information Distribution System (MIDS). System level engineering responsibilities include Link 16 spectrum issues and Link 16 joint enhancements. Spectrum issues include system engineering, testing, maintaining necessary equipment, performing DoD internal and external coordination and platform integration/certification required to coexist and operate in the Air Radio Navigation Safety frequency band. Joint enhancements planned for Link 16 include Dynamic Network Management (DNM), Time Slot Reallocation (TSR), Gateways, Joint Interface Control Officer (JICO) Toolset, Relative Navigation, Link 16 Weapons Applications and improvements to Link 16 Track Quality, Time Slot Synchronization, Target Correlation/Decorrelation, Geodetic Data Registration, Common Time Reference, and Combat ID. MIDS is a joint and international cooperative program involving U.S., France, Italy, Germany and Spain. Designed for tactical combat applications and environments, MIDS will provide a highly jam-resistant, secure digital (voice and data) information distribution system, enabling rapid integrated communications, navigation, and identification among tactical and command and control warfare elements. The MIDS-Low Volume Terminal (LVT) will make Link 16 more affordable for a larger population of U.S. platforms and systems and will be interoperable with previously developed and produced Link 16 equipment, JTIDS Class 1 and 2. Affordability is being achieved through the implementation of open and commercial architecture standards and parts that will allow the tailoring of production configurations to the minimum needs of different U.S. platforms and missions. This program funds the U.S. cost share of MIDS development, fabrication, and test of EMD terminals and terminal level pre-operational support for U.S. platforms which are implementing MIDS.

This program is funded under BA-5, Engineering and Manufacturing Development, because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P771/P773

- Program Change Summary –

B. Program Change Summary

	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget	16.100	16.572	16.901	Continuing
Appropriated Value	4.025			
Adjustments to Appropriated Value				
a. Congressional Directed Undistributed Reductions		-.244		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment				
c. Other			-6.104	
FY 2003 President's Budget Submit	16.100	16.328	10.797	Continuing

Change Summary Explanation

FY 2002: Adjustments for FFRDC reductions (Section 8032) -.127; Crossing-cutting congressional adjustments (Section 8123) -.117.
FY 2003: Funding transfer to support AF CSEL program -6.000; Non-pay purchase inflation adjustments -.045.

Schedule: N/A

Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)						DATE: February 2002		
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5						R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P771		
COST *(In millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total Cost
LINK-16 - P771	4.025	5.470	3.703	5.138	15.464	19.205	19.571	Continuing

A. Mission Description and Budget Item Justification

This program funds ongoing system level engineering of the existing Link 16 system for joint interoperability and the development of the next generation Link 16 system, the Multifunctional Information Distribution System (MIDS). System level engineering responsibilities include Link 16 spectrum issues and Link 16 joint enhancements. Spectrum issues include system engineering, testing, maintaining necessary equipment, performing DoD internal and external coordination and platform integration/certification required to coexist and operate in the Air Radio Navigation Safety frequency band. Joint enhancements planned for Link 16 include Dynamic Network Management (DNM), Time Slot Reallocation (TSR), Gateways, Joint Interface Control Officer (JICO) Toolset, Relative Navigation, Link 16 Weapons Applications and Improvements to Link 16 Track Quality, Time Slot Synchronization (TSS), Target Correlation/Decorrelation, Geodetic Data Registration, Common Time Reference, Time Critical Strike (TCS) and Combat ID.

PROGRAM ACCOMPLISHMENTS AND PLANS

1. FY 2001 ACCOMPLISHMENTS

Continue Link 16 ($4.025)

- Obtained final spectrum Certification.
- Continued spectrum management efforts, including testing, associated with receiving and maintaining frequency certification.
- Continued Link 16 technical upgrade and support for international users.
- Continued technical oversight, planning, and Joint Service Coordination of Link 16 enhancements including Dynamic Network Management, and Joint Interface control Officer Toolset Support System (JSS).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P771

2. FY 2002 PLANS

Continue Link 16 ($5.470)

- Continue spectrum management efforts, including testing associated with receiving and maintaining frequency certification.
- Continue Link 16 technical upgrade and support for international users.
- Continue technical oversight, planning, and Joint Service Coordination of Link 16 enhancements including Dynamic Network Management, Joint Interface Control Officer Toolset Support System (JSS), Gateways and Missile Tactical Terminals.

3. FY 2003 PLANS

Continue Link 16 ($3.703)

- Continue spectrum management efforts, including testing associated with receiving and maintaining frequency certification.
- Continue Link 16 technical upgrade and support for international users.
- Continue technical oversight, planning, and Joint Service Coordination of Link 16 enhancements including Dynamic Network Management, Joint Interface Control Officer Toolset Support System (JSS), Gateways and Missile Tactical Terminals.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P771

B. Program Change Summary

	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget	4.025	8.971	10.003	Continuing
Appropriated Value	4.025			
Adjustments to Appropriated Value				
a. Congressional Directed Undistributed Reductions		-.087		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment		-3.414		
c. Other			-6.300	
FY 2003 President's Budget Submit	4.025	5.470	3.703	Continuing

Change Summary Explanation

FY 2002: Adjustments for FFRDC reduction (Section 8032), and Cross-cutting congressional adjustments (Section 8123) -.087. Realignment of funds from P771 to P773 in support of the SE&I contract and the High Level Language CPU upgrade -3.414.
FY 2003: Funding transfer to support AF CSEL program, and Non-pay purchase inflation adjustments -2.076. Realignment of funds from P771 to P773 in support of the SE&I contract and the High Level Language CPU upgrade -4.155.

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary: Not Applicable

D. Schedule Profile: Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

COST *(In millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Total Cost
MIDS – P773	12.075	10.858	7.094	5.725	3.395			

A. Mission Description and Budget Item Justification

The Multifunctional Information Distribution System (MIDS) Low-Volume Terminal (LVT) is a U.S. joint and international (U.S., France, Germany, Italy, and Spain) cooperative program to develop and produce the next generation LINK-16 system. Designed for tactical combat applications and environments, MIDS will provide a highly jam-resistant, secure, digital (voice and data) information distribution system, enabling rapid integrated communications, navigation, and identification among tactical and command and control warfare elements. Affordability is being achieved through the implementation of open and commercial architecture standards and parts which will allow the tailoring of production configurations to the minimum needs of different U.S. platforms and missions. MIDS-LVT will be interoperable with the earlier generations of LINK-16 equipment, JTIDS Class 1 and 2. This Program Element will fund the U.S. cost share of development, fabrication and test of EMD terminals, and terminal level pre-operational support for U.S. platforms which are implementing MIDS. This element also funds preparations for competitive production. This element does not include the qualification and procurement of a MIDS variant for the F-15 which is called Fighter Data Link (FDL); the FDL is funded as an F-15 program element.

PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 2001 ACCOMPLISHMENTS:

- EMD Terminal and Platform Integration Support ($12.075)
- Continued integration, testing, and delivery of EMD terminals and refurbish CDT&E terminals.
- Completed initial at-sea Developmental Test for MIDS on Ship.
- Continued F/A-18 Initial Developmental and Operational Test & Evaluation terminal support.
- Continued F/A-18 flight testing support.
- Continued correction of EMD deficiencies resulting from operational testing.
- Performed redesign and regression testing of EMD terminals.
- Continued SE&I support capabilities for EMD terminals and platform test, installation, and integration requirements.
- Provided U.S. Engineering Release to support F/A-18, F-16, and Army platform testing requirements.

- Completed software enhancements/upgrades for Army terminals, LVT(2).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

- Initiated hardware upgrades and repairs for Army terminals, LVT(2).
- Continued software support capability and technical data support for MIDS International Program.
- Initiated second software block cycle upgrade.
- Supported development, test, and evaluation of product improvements and enhancements.
- Initiated Developmental Test and Evaluation terminal support for F-16.
- Initiated Developmental Test and Evaluation test flights for F-16.
- Defined plans and requirements for Technology Enhancements studies.

2. FY 2002 PLANS:

- EMD Terminal and Platform Integration Support ($10.858)
- Continue F/A-18 MIDS Developmental Testing.
- Complete F/A-18 Technical Evaluation.
- Initiate Army Initial Operational Test and Evaluation for LVT(2).
- Achieve Army Initial Operational Capability for LVT(2).
- Continue software enhancements/upgrades for Army terminals, LVT(2).
- Complete hardware upgrades and repairs for Army terminals, LVT(2).
- Continue correction of EMD deficiencies resulting from operational testing and evaluation.
- Continue supporting development, test and evaluation of product improvements and enhancements.
- Continue the SE&I support capabilities for EMD terminals and platform test, installation, and integration requirements.
- Continue U.S. Engineering Releases to support F/A-18, F-16, and Army platform testing requirements.
- Perform redesign and regression testing of EMD terminals.
- Integrate MIDS on Ship with shipboard combat systems and conduct testing.
- Continue Developmental Test and Evaluation terminal support for F-16.
- Continue Developmental Test and Evaluation test flights for F-16.
- Initiate Force Deployment Evaluation for F-16.
- Initiate third software block cycle upgrade.
- Complete first software block cycle upgrade.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

3. FY 2003 PLANS:

- EMD Terminal and Platform Integration Support ($7.094)
- Initiate Operational Assessment for F-16.
- Complete second software block cycle upgrade.
- Complete F/A-18 Operational Evaluation.
- Initiate Follow-On Test and Evaluation for F/A-18.
- Achieve Milestone III decision.
- Implement study recommended approach for Technology Enhancements.
- Initiate High Level Language Central Processing Unit upgrade.
- Continue correction of EMD deficiencies resulting from operational testing and evaluation.
- Provide limited SE&I support capabilities for EMD terminals and platform test, installation, and integration requirements.
- Continue software enhancements/upgrades and hardware upgrades for Army terminals, LVT(2).
- Continue Developmental Test and Evaluation terminal support and test flights for F-16.
- Continue Force Deployment Evaluation for F-16.
- Continue Operational Assessment for F-16.
- Conduct MIDS on Ship Technical evaluation and Operational evaluation.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

B. Program Change Summary

	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget	12.075	7.601	6.898	Continued
Appropriated Value	12.075			
Adjustments to Appropriated Value				
a. Congressional Directed Undistributed Reductions		-.157		
b. Rescission/Below threshold Reprogramming, Inflation Adjustments		3.414		Continued
c. Other			.196	
FY 2003 President's Budget Submit	12.075	10.858	7.094	Continued

Change Summary Explanation:

FY 2002: Adjustments for FFRDC reductions (Section 8032), and Cross-cutting congressional adjustments (Section 8123) -.157. Realignment of funds from P771 to P773 in support of the SE&I contract and the High Level Language CPU upgrade $3.414 million.
FY 2003: Transfer of funds to AF CSEL program and non-pay purchase inflation adjustments -3.969. Realignment of funds from P771 to P773 in support of the SE&I contract and the High Level Language CPU upgrade $4.165 million.

Schedule: N/A

Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

C. Other Program Funding Summary

	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total Cost
Procurement:								
APN								
BLI 052500	47.234	32.373	48.577	48.746	51.294	43.667	49.862	Cont.
BLI 014500			13.000	13.000	13.400	13.700	14.000	Cont.
OPN								
BLI 261400			3.702	7.251	1.128	3.431		Cont.
APF								
PE0207134F/PE0207130F	22.700							Cont.
PE0207133F	13.600	31.900	37.000	27.900	22.700	23.200	20.900	Cont.
Proc, DW								
PE0208864C/5C	3.500	2.900	2.200					Cont.
PE0208861C					1.300	1.500	2.600	Cont.
Related RDT&E								
PE0205604N	16.509	21.256	17.965	8.283				Cont.
PE0604270N	1,300							1.300
PE0207133F								3.500
PE63883C		.500						Cont.
PE64240F	1.300							
Cont.								

SCN – Funding for MIDS hardware is not separately identified in the SCN budget exhibits.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

D. Acquisition Strategy

USD(AT&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 is consistent with the Acquisition Strategy Report (ASR) approved by USD(AT&L) in November 1999. The FY00 MIDS LRIP terminals were equitably split between the two US-led contracts. FY01 and out-year quantities will be competitively procured. USD(AT&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, an OIPT was held on 10 August 01. The OIPT approved a two phased LRIP buy and recommended to USD (AT&L) to proceed with the acquisition of MIDS terminals without a formal DAB. The first phase was approved for 59 terminals and spares in September 2001. The second phase is for 60 terminals and emerging requirements. The second phase occurred in November 2001 after USD(ATL) reviewed DOT&E's assessment.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2A Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Common Joint Tactical Information 0604771D8Z/P773

E. Schedule Profile

	FY 2001	FY 2002	FY 2003
Program	Supp 3 1Q/01		
Milestones	LRIP Lot 2 4Q/01	LRIP Lot 3 3Q/02	MS III 4Q/03
EMD Contract		Contract close-out 4Q/02	
System Engineering & Integration			
Deliveries:		S/W BC1 Upgrade 3Q/02	S/W BC2 Upgrade 3Q/03
T & E Milestones			
Ships	DT 3Q/01		TECHEVAL/OPEVAL 3Q/03
F/A-18		TECHEVAL 3Q/02	OPEVAL 1Q/03
Army		IOT&E 3Q/02	
F-16			DT&E Continue >>

EXHIBIT R-3, FY 2001/2003 RDT&E,DW PROJECT COST ANALYSIS DATE: February 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604771D8Z PROJECT NUMBER: P771

PROJECT TITLE: COMMON JOINT TACTICAL INFORMATION

Exhibit R-3 Cost Analysis (page 1)								Date: February 2002				
APPROPRIATION: RDT&E, DW BUDGET ACTIVITY : 5			PROGRAM ELEMENT: 0604771D8Z					COMMON JOINT TACTICAL INFORMATION				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
LINK-16 Spectrum Support		Various	9.498	.171	Various	750						
LINK-16 Engineering Support		Various	3.124	3.414	Various	2.113	Various	.892	Various	Cont.	Cont.	Cont.
LINK-16 Support		Various	3.982									
LINK-16 Enhancements		Various	.426	.200								
LINK-16 Missile Tactical Terminals		TBD				1.000	Feb 02	1.100	Jan 03	Cont.	Cont.	Cont.
Gateways		TBD				.607	Feb 02	.681	Jan 03	Cont.	Cont.	Cont.
Dynamic Network Management		TBD				.700	Feb 02	.720	Jan 03	Cont.	Cont.	Cont.
JICO Toolset (JSS)		Various	.289	.240	Various	.300	Feb 02	.310	Jan 03	Cont.	Cont.	Cont.
Subtotal Product Development			17.319	4.025		5.470		3.703		Cont.	Cont.	Cont.
Remarks:												
Total Cost			17.319	4.025		5.470		3.703		Cont.	Cont.	Cont.

EXHIBIT R-3, FY 2001/2003 RDT&E, DW PROJECT COST ANALYSIS DATE: February 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604771D8Z PROJECT NUMBER: P773
PROJECT TITLE: COMMON JT TACTICAL INFO

Exhibit R-3 Cost Analysis (page 1)												Date: February 2002
APPROPRIATION: RDT&E, DW BUDGET ACTIVITY : 5			PROGRAM ELEMENT: 0604771D8Z/P773									COMMON JT TACTICAL INFORMATION
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Product Development												
Primary Hardware/Software Development	CPIF	MIDSCO Wayne, NJ	191.812	0		0				0	191.812	196.590
Pre-operation EMD Terminal Support	CPIF	MIDSCO Wayne, NJ	2.706	0		0				0	2.706	2.706
Software Support	FFP	BAE Systems Wayne, NJ	0	2.192	Dec 01	2.146	Dec 02			0	4.338	4.338
Software Support Activity		TBD						2.296	Jan 03	9.120	11.416	11.416
Subtotal Product Development			194.518	2.192		2.146		2.296		9.120	210.272	215.050
Remarks: The MIDSCO EMD contract period of performance ended 30 June 2000, with the exception of contract close-out activity. A new System Engineering and Integration contract was awarded in June 2000 to complete unfinished EMD work scope and to provide continued EMD terminal support.												
Support Costs												
Production Readiness Agreements Mfg Prototyping	FFP	Allied Signal Teterboro, NJ	3.189	0		0				0	3.189	3.189
Production Readiness Agreements Mfg Prototyping	FFP	Viasat Carlsbad, CA	6.346	0		0				0	6.346	6.346
Production Readiness Agreements Mfg Prototyping	FFP	Data Link Solutions Cedar Rapids, IA	1.000	0		0				0	1.000	1.000
Production Readiness Agreements	FFP	Thompson-CSF Colombes Cedex, France	1.000	0		0				0	1.000	1.000
Production Readiness Agreements	WX	SSC SD San Diego, CA	.795	0		0				0	.795	.795
Subtotal Support			12.330	0		0				0	12.330	12.330

EXHIBIT R-3, FY 2001/2003 RDT&E, DW PROJECT COST ANALYSIS DATE: February 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604771D8Z PROJECT NUMBER: P773
PROJECT TITLE: COMMON JT TACTICAL INFO

Exhibit R-3 Cost Analysis (page 2)										Date: February 2002		
APPROPRIATION: RDT&E,DW BUDGET ACTIVITY : 5		PROGRAM ELEMENT: 0604771D8Z/P773								COMMON JOINT TACTICAL INFORMATION		
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 01 Cost	FY 01 Award Date	FY02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation												
System Engineering	WX	SSC SD – Code 64 San Diego, CA	6.800	.439	Sep 01	. 386	Jan 02	.377	Jan 03	0	8.002	8.002
System Engineering	WX	SSC SD – Code 45 San Diego, CA	9.270	.049	Sep 01	.015	Jan 02	.017	Jan 03	0	9.351	9.351
Software Support	MIPR	Warner Robins Robins AFB, GA	2.062	.430	Sep 01	.445	Jan 02	.460	Jan 03	0	3.397	3.397
System Engineering	MIPR	MITRE Ft. Monmouth, NJ	1.939	.533	Oct 01	.550	Oct 02	.550	Oct 03	0	3.572	3.572
System Engineering, and Integration	FFP	BAE Systems Wayne, NJ	5.933	6.502	Various	6.391	Various	2.886	Various	0	21.712	21.712
System Engineering	Various	Various	15.182	1.505	Jan 01	.550	Jan 02	.147	Jan 03	0	17.384	17.384
Subtotal T&E			41.186	9.458		8.337		4.437		0	63.418	63.418
Remarks												
Management Services												
Program Management Support	FFP	Vredenburg Carlsbad, VA	2.306	0		0				0	2.306	2.306
Miscellaneous Program Support	FFP/ WX/PD	Various	9.897	.425	Jan 01	.375	Jan 02	.361	Jan 03	0	11.058	11.058
Contract Services	MIPR	AF Pentagon Washington, DC	1.400	0		0				0	1.400	1.400
Subtotal Management			13.603	.425		.375		.361		0	14.764	14.764

EXHIBIT R-3, FY 2001/2003 RDT&E, DW PROJECT COST ANALYSIS DATE: February 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604771D8Z PROJECT NUMBER: P773
PROJECT TITLE: COMMON JT TACTICAL INFO

Exhibit R-3 Cost Analysis (page 3)												Date: February 2002
APPROPRIATION: RDT&E,DW BUDGET ACTIVITY : 5			PROGRAM ELEMENT: 0604771D8Z/P773									COMMON JOINT TACTICAL INFORMATION
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 01 Cost	FY 01 Award Date	FY02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Total Cost			261.637	12.075		10.858		7.094		9.120	300.784	305.562

Remarks

AWARD FEES

The award fee on contract has been reduced from $15.7 million to $8.2 million due to recognition that the contractor's performance does not support award fee payout at the amount originally established. After this reduction, the U.S. share of the entire Award Fee on contract is approximately $3.4 million. Contractor performance earned one award fee payment in June 1995, of which the US share was $471,582 and one award fee payment for the period ending November 1995, of which the US share was $101,120. The percentage of award fee paid based on the reduced fee amount of $8.2 million is approximately 29%. The percentage of award fee paid based on the original fee amount of $15.7 million is 17%.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 5							R-1 ITEM NOMENCLATURE Software Development **PE 0605013**			
COST *(In Millions)*	FY2001	FY2002	FY 2003	FY 2004	FY 2005	FY2006	FY 2007		Cost to Complete	Total Cost
Total Program Element (PE) Cost	12.635		.700							13.335
Confirmation Foreign Visits System			.300							.300
DOT&E Knowledge-based Management System			.400							.400

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) Regarding the FY 2001 program, the Department's current accounting systems and processes were designed primarily to provide budgetary accounting information and reports required by Congress and the Office of Management and Budget. Consequently, many of these systems do not satisfy current cost accounting information requirements recently imposed on all federal government agencies nor meet the Department's management needs for cost information in support of more cost effective decisions. The FY 2001 Program supports an initiative to improve cost accounting capabilities within the Department.

(U) Confirmation Foreign Visit System (CFVS). In FY 2001 the Deputy Secretary of Defense directed the Office of the Under Secretary of Defense(Policy) (OUSD(P) to implement major changes in the automated support for international visits " to improve the Department's ability to protect technologies under development or test at Research & Development facilities and test and evaluation centers". In response to this direction, OUSD(P) will deploy the CFVS to track visitors at 130 Research, Development Test & Evaluation (RDT&E) facilities to support the Department of Defense counterintelligence research and technology program. The CFVS will reside on the unclassified network. It will receive downloads of data on a daily basis that will contain enough information to identify visits and visitors at the RDT&E sites.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 5	R-1 ITEM NOMENCLATURE Software Development **PE 0605013**

(U) Enterprise Knowledge-based Management System (DEKMS). DEKMS is a reengineering effort for Director of Operational Test & Evaluation (DOT&E) to streamline existing administrative processes, and optimize the manner in which DOT&E Action Officers manage their oversight of major Defense acquisition program weapon systems. Throught the development of personalized "Administrative Notebooks", Action Officers will have fast access to all pertinent background and decision-making information in support of their DOT&E mission. A combination of Plumtree Portal software, Semio taxonomy software, and the Oracle Relational Database Management System will be integrated to form the basis for this knowledge-based management system.

(U) Project Number and Title: PE 0605013 Software Development

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2002 Accomplishments:

(U) N/A

(U) FY 2003 Plans:

(U) **Confirmation Foreign Visit System** . FY 2003 efforts will provide a means to capture after action information pertaining to approved visits to DoD RDT&E sites. The specific objective are:

- Develop software code changes based on user comments and analysis from the initial operational test site.
- Test software and expand current performance envelope and provide capability to additional sites.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 5	R-1 ITEM NOMENCLATURE Software Development **PE 0605013**

(U) **DOT&E Knowledge-base Management System** FY 2003 efforts are as follows:

- Develop Prototype "Administrative" based Knowledge Management System.
- Administrative functions to be develop include personnel security and property management modules. These modules will include staff profiles in support of Continuity of Operations Plan activities.
- Establish capability to track security clearances, parking passes, performance reviews, etc.
- Develop software code to track status of government credit card purchase and supply requests.

(U) B. Program Change Summary	**FY 2001**	**FY 2002**	**FY 2003**	**Total Cost**
Previous President's Budget	12.000	0	0	0
Delta	.750			
Amended President's Budget Submission	12.750	0	0	0
Appropriated Value	12.750			
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	-.115	0	0	0
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0	0	0	0
c. Other (internal reprogramming)	0	0	.700	.700
Current FY 2003 Budget Submission	12.635	0	.700	.700

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense-Wide/BA 5	R-1 ITEM NOMENCLATURE Software Development **PE 0605013**

(U) **Funding**: FY 2003 funds in the amount of $700K is provided for Enterprise Knowledge-Based Management System and software development of the Confirmation Foreign Visits Systems.

(U) **Schedule**: **Confirmation Foreign Visits Systems**. 10/1/2002 thru 9/30/2002
DOT&E Knowledge-base Management System 10/1/2002 thru 9/30/2002

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

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

(U) **D.** **Acquisition Strategy**: **Confirmation Foreign Visit System.** OUSD(P) plans to acquire software development from an in-house IDIQ contract awarded competitively to Advanced Technology Inc. **DOT&E Knowledge-base Management System.** DOT&E will utilize an existing Office of the Secretary of Defense Information Technology Blanket Purchase Agreement vehicle.

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

Exhibit R-2/R-2a, RDT & E Budget Item Justification								February 2002	
Appropriation/Budget Activity ENGINEERING AND MANUFACTURING DEVELOPMENT DEFENSE WIDE, BUDGET ACTIVITY 5					Item Nomenclature Financial Management Improvement System PE 0605016D8Z				
Cost ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	0	98.521	96.250	113.758	189.535	177.189	157.885	Continuing	Continuing

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT

This program element is to provide funding for the sustainment of the Department of Defense (DoD) wide financial management enterprise architecture and the design, development and proof of concept of the "To Be" Defense architecture. 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.

Program Accomplishments and Plans/New Starts:

Exhibit R-2/R-2a, RDT & E Budget Item Justification	February 2002

FY 2003 Plans:

1. (16,182) Maintain and provide updates to the financial management enterprise architecture and transition plan. Analysis support will be provided for potential changes to the architecture. All updates will be configuration managed to ensure an audit trail is maintained.
2. (59,618) Execution of a proof of concept for the Defense-wide enterprise architecture. At a minimum, six different business line activities (e.g., personnel, payroll, acquisition, supply, property, and medical) will be used in the proof of concept testing. The business line will conduct a Business Process Reengineer (BPR), implement the developed Defense standards, and deploy for prototype testing the system design recommended by the adopted Defense-wide enterprise architecture.
3. (21,500) Execution of the first phase of the enterprise architecture transition plan will be executed. To move the Department from its current "As Is" environment to the desired "To Be" environment will require a phased approached, which will be developed as a requirement of the enterprise architecture. Execution of the transition plan will allow the Department is make progress while moving toward its desired state. Effort such as implementation of Defense standards, Departmental performance metrics and system consolidations are anticipated to be presented as phases of the transition plan.

B. Program Change Summary	FY2001	FY2002	FY 2003
Previous President's Budget	0	100.000	94.008
Appropriated Value	0	100.000	96.508
Congressional Directed Transfer	0	0	0
Adjustment to Appropriated Value/Transferred Amount	0	0	0
a. Congressionally Directed Undistributed Reductions	0	-1.479	0
b. Inflationary Adjustments	0	0	-.258
FY 2003 Budget Estimates Submit	0	98.521	96.250

Exhibit R-2/R-2a, RDT & E Budget Item Justification	February 2002

Current Budget Submit/President's Budget

Funding: Continuation of new program established in FY 2002

Schedule: Maintenance of the Department-wide Enterprise Architecture, conduct proof of concept and begin execution of the Enterprise Architecture transition plan.

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.

Exhibit R-3, RDT & E, DW Project Cost Analysis									Date: February 2002			
APPROPRIATION: RDT&E, BUDGET ACTIVITY: 5						PROGRAM ELEMENT: 0605016D8Z			FINANCIAL MANAGEMENT IMPROVEMENT SYSTEM			
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Maintain Architecture	TBD	TBD*		0	N/A	0	N/A	15.89	TBD			
Proof of Concept Testing	TBD	TBD*		0	N/A	0	N/A	58.86	TBD			
Execute Transition Plan	TBD	TBD*		0	N/A	0	N/A	21.5	TBD			

* Office of the Under Secretary of Defense (Comptroller) will be the overseeing agency, however, most of the effort will be accomplished by contract.

Exhibit R-2, RDT&E Budget Item Justification							Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6					R-1 ITEM NOMENCLATURE UNEXPLODED ORDNANCE DETECTION & CLEARANCE PE 0603858D8Z			
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete
Total PE Cost	1.194	1.152	1.185	1.212	1.231	1.257	1.284	Continuing

A. Mission Description and Budget Item Justification.

This program element funds the Joint Unexploded Ordnance Coordination Office (JUXOCO) of the Unexploded Ordnance Center of Excellence (UXOCOE); to develop policy and provide oversight in coordinating requirements and technology in detection and clearance of unexploded ordnance (UXO) within the Department of Defense (DoD), as well as with other United States and international agencies, academia, and industry; to establish and maintain standards for testing, modeling, and evaluation of unexploded ordnance detection and clearance technology; and to establish, gather, and maintain a database for the results of these efforts.

In response to a request from the House National Security Committee (HNSC) and concerns of the General Accounting Office (GAO), the Department of Defense submitted a plan in March 1997, "Report to Congress: Unexploded Ordnance Clearance: A Coordinated Approach to Requirements and Technology Development." This report was developed by a joint, inter-agency task force comprised of the proponents of the unexploded ordnance (UXO) clearance mission areas (countermine, explosive ordnance disposal, environmental remediation, humanitarian demining, and active range clearance). The report defined research and development priorities, program management, and cooperative activities for technology applicable to area ordnance clearance, also known as UXO clearance. The report also described a plan to maintain visibility over and leverage technology efforts within DoD, at other government agencies, and in private industry for the detection, neutralization, and disposal of UXO. In May 1997, the Under Secretary of Defense for Acquisition and Technology directed the establishment of the UXO Center of Excellence (UXOCOE) to implement this plan, and in October 1997, the Department established the operational arm of the UXOCOE, the Joint UXO Coordination Office (JUXOCO), which is collocated with the Night Vision Electronic Sensors Directorate at Ft. Belvoir, VA.

(U) FY 2001 Accomplishments

- Conducted requirements and technology workshops to coordinate and improve the efficiency of technological thrusts for DoD UXO RDT&E. ($0.120 million)
- Attended external conferences, seminars, workshops and meetings to collect and coordinate UXO RDT&E information. ($0.080 million)
- Analyzed UXO RDT&E data and information collected during requirements and technology workshops, which including: Resource Managers Meeting, Multi-University Research Initiatives (MURI) Conference, ESTCP/SERDP Conference, Joint Robotics Program Workshops, etc. ($0.100 million)
- Generated an Annual UXO Clearance Report focused on the coordination of all UXO RDT&E efforts among five mission areas (Countermine, Explosive Ordnance Disposal, UXO-Environmental Remediation, Humanitarian Demining, and Active Range Clearance). ($0.238 million)
- Analyzed worldwide efforts in UXO RDT&E to expand JUXOCO's frame of reference into potential solutions. ($0.100 million)
- Continued to update and maintain the UXO clearance / detection databases and computer web site to promote interaction and sharing of information, concepts and technology within DoD, other US and international agencies, academia, and industry. ($0.100 million)
- Integrated international and industrial research and equipment into an expanded computerized UXO RDT&E database to enhance information sharing. ($0.100 million)
- Promoted industry and academic involvement (both US and foreign) in UXO clearance RDT&E. ($0.100 million)

- Coordinated standardized scientific experiments to gather data on the performance of developmental detection sensors at JUXOCO's Ft. A.P. Hill pilot site. ($0.156 million)
- Collected, analyzed and posted developmental detection sensor data on the web site for dissemination and use by researchers in detection, signal processing, and algorithm development. ($0.100 million)

(U) FY 2002 Plans

- Conduct requirements and technology workshops to coordinate and improve the efficiency of technological thrusts for DoD UXO RDT&E. ($0.120 million)
- Coordinate / collect UXO RDT&E information by attending external conferences, seminars and workshops and meetings. ($0.075 million)
- Analyze UXO RDT&E data and information collected during requirements and technology workshops, which include: Resource Managers Meeting, Multi-University Research Initiatives (MURI) Conference, ESTCP/SERDP Conference, Joint Robotics Program Workshops, focused UXO Mission Area Workshops, etc. ($0.100 million)
- Generate an Annual UXO Clearance Report focused on the coordination of all UXO RDT&E efforts among five mission areas (Countermine, Explosive Ordnance Disposal, UXO-Environmental Remediation, Humanitarian Demining, and Active Range Clearance). ($0.187 million)
- Analyze worldwide efforts in UXO RDT&E to expand JUXOCO's frame of reference into potential solutions. ($0.100 million)
- Maintain and update the UXO clearance / detection databases and computer web site to promote broader interaction and sharing of information, concepts and technology within DoD, other US and international agencies, academia, and industry. ($0.105 million)
- Integrate international and industrial research and equipment into the computerized UXO RDT&E database to enhance information sharing. ($0.100 million)
- Promote broader DoD, industry and academic involvement (both US and foreign) in UXO clearance RDT&E. ($0.100 million)
- Coordinate standardized scientific experiments to gather data on, and model the performance of developmental detection sensors at Ft. A.P. Hill pilot site. ($0.165 million)
- Collect, analyze and post developmental detection sensor data on the web site for dissemination and use by researchers in detection, signal processing, and algorithm development. ($0.100 million)

(U) FY 2003 Plans

- Conduct requirements and technology workshops to coordinate and improve the efficiency of technological thrusts for DoD UXO RDT&E. ($0.120 million).
- Coordinate / collect UXO RDT&E information by attending external conferences, seminars and workshops and meetings. ($0.075 million).
- Analyze UXO RDT&E data and information collected during requirements and technology workshops, which include: Resource Managers Meeting, Multi-University Research Initiatives (MURI) Conference, ESTCP/SERDP Conference, Joint Robotics Program Workshops, focused UXO Mission Area Workshops, etc. ($0.100 million)
- Generate an Annual UXO Clearance Report focused on the coordination of all UXO RDT&E efforts among five mission areas (Countermine, Explosive Ordnance Disposal, UXO-Environmental Remediation, Humanitarian Demining, and Active Range Clearance). ($0.200 million).
- Analyze worldwide efforts in UXO RDT&E to expand JUXOCO's frame of reference into potential solutions. ($0.100 million)
- Continue to update and maintain the UXO clearance / detection databases and computer web site to promote broader interaction and sharing of information, concepts and technology within DoD, other US and international agencies, academia, and industry. ($0.105 million)
- Integrate international and industrial research and equipment into the computerized UXO RDT&E database to enhance information sharing. ($0.085 million).

- Promote broader DoD, industry and academic involvement (both US and foreign) in UXO clearance RDT&E. ($0.115 million)
- Coordinate standardized scientific experiments to gather data on the performance of detection sensors at the Ft. A.P. Hill pilot site. ($0.185 million)
- Collect, analyze and post developmental detection sensor data on the web site for dissemination and use by researchers in detection, signal processing, and algorithm development. ($0.100 million)

B. Program Change Summary ($ million)

	FY2001	FY2002	FY2003
FY2001 Previous President's Budget	1.204	1.165	.481
FY2002 Amended Budget	1.204	1.165	1.188
Appropriated Value			
Adjustments to Appropriated Value			
a. Congressionally Directed Appropriation Reduction	(0.008)		
b. Congressionally Directed Undistributed Reduction	(0.002)	(0.013)	
c. OSD Directed Program Reduction/Increase			
d. Inflationary Adjustment			(.003)
FY2003 Current Budget Submit/President's Budget	1.194	1.152	1.185

Change Summary Explanation:
Funding: N/A
Schedule: N/A
Technical: N/A

C. Other Program Funding Summary

FY 2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007

Not Applicable.

D. Execution
Not Applicable.

BUDGET JUSTIFICATION
FOR PROGRAM ELEMENTS OF THE
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM
FY 2003 BUDGET ESTIMATES SUBMISSION

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2002		
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test & Evaluation, Defense-wide				R-1 ITEM NOMENCLATURE Technical Studies, Support & Analysis PE 0605104D					
Cost (In Millions	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	30.315	27.400	30.023	30.641	31.290	31.898	32.609	Continuing	Continuing
P421 Tech Studies, Support & Analysis	30.315	27.400	30.023	30.641	31.290	31.898	32.609		

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: This program element is classified in Budget Activity 6 (Management Support) because it is the 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 Command, Control, Communications and Intelligence [ASD(C3I)], Director for Program Analysis and Evaluation (DPA&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 economic environment, the need for objective analyses and forward-looking planning for the mid and long-range (at acceptable near-term risk) becomes greater.

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PROGRAM ACCOMPLISHMENTS AND PLANS:

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

FY 2001 Accomplishments

- Expanded past research examining the differences in how the Services allocate Housing O&M costs. Results could lead to DoD policy using best practices, to reduce O&M costs.
- Completed the threat and risk mitigation identification, describe the requirements for assured logistics communication, and identify the relationship between varying levels of risk and degree of assurance required
- Implement analytical applications to support QDR issue examination and recommendations; a facilitated forum to assist up to 50 mid-level to senior DoD logistics professionals in framing logistics strategy options for 2010-2020; Draft Logistics Operations and business area QDR Report; Final Logistics Operations and Business Area QDR Report
- Conduct the Competitive Sourcing/A-76 Peer Review--reengineer/improve the competitive sourcing process, benchmark current practices, expand for strategic sourcing and create standardized documents. Provide outreach recommendations to stakeholders.
- Pursue the USD(AT&L) & DepSecDef goal to eliminate inadequate military housing by 2010. Compare construction of similar housing with private sector to determine if costs/processes differ.
- During the QDR, implement a model to improve long-term (i.e., over 18-20 years) planning of defense acquisitions -- particularly portfolio affordability, stability, and schedule
- Technical support to manage and foster interoperability for the acquisition of U.S. military and coalition warfighting capability.
- Support the framework for interoperability shortfalls to develop priorities for interoperability objectives and employ them within USD (AT&L) acquisition management activities (e.g., DAES reviews, DAB).
- Plan and initiate reviews of DoD-wide systems engineering, integration, and testing activities related to system-of-system acquisitions, to evaluate and compare the success of alternative technical and management approaches for accomplishing interoperability objectives.
- Based on international trends in information technologies, characterize alternative acquisition policies within U.S. and allied/coalition countries as they might affect success in acquiring and integrating systems for joint and coalition interoperability.
- Review joint architecture development activities in support of USD (AT&L) participation the Architecture Steering Group, Architecture Control Council, and other CIO interfaces with Services and DoD agencies.
- Continue analysis in support of laboratory improvement initiatives mandated by Congress or DoD.
- Support development of Simulation Based Acquisition (SBA) within the Defense Department.

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- Support activities for analyzing the interoperability dimensions of military requirements presented in new Operational Requirements Documents and assessing whether the requirements as stated are adequate for producing a system that will achieve the needed interoperability.
- Review allied/coalition partner system developments and acquisition programs to assess interoperability potential and impacts.
- Continue AT&L dedicated support to U.S. program integration for system developments in fulfillment of NATO objectives embodied in the Defense Capabilities Initiative.
- Review plans for Joint Warfighting Experiments (JWEs) and Joint Warfighting Capability Assessments (JWCAs) for implementation of relevant C4ISR system architectures and demonstrations of interoperability.
- Based on processes applied in analysis of the Family of Interoperable Operational Pictures, review selected system-of-system concepts including Global Information Grid (GIG) to assess application of the Joint Technical Architecture and the extent of resulting interoperability.
- Implement steps to review and document processes and technologies DoD-wide that serve as barriers or enablers to information, logistics, and business system interoperability.
- Prepare Congressionally mandated Joint Warfighting S&T Plan and companion S&T planning documents.
- Continue research on planning manufacturing with industry in cooperation with the National Center for Advanced Technologies.
- Provide technical and engineering assistance on assigned Departmental directed Science & Technology initiatives
- Perform an analysis to recommend an improved process for logistics business areas participation in the 2001 QDR leading to a credible revised defense plan
- Update Logistics Strategic Plan based on DRID 54 results, develop and maintain a DoD logistics management initiatives database that supports the strategic plan to include Services/DLA logistics initiatives input data and PPBS data specific to these initiatives
- Implement a project management plan that will serve as the framework for these diverse efforts, and outputs will include specific recommendations for policy and resource action, as well as cooperative efforts with both Defense and industry
- Implement approaches identifying the actions necessary to move forward with workforce restructuring and remove impediments
- Analyze 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.
- Complete independent evaluation of the requirement for future Base Realignment and Closure Rounds
- Update a relational database for decision making to improve facility management and streamline the infrastructure

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- Finalize Facilities Strategic Plan and Base Structure Report and develop tools to manage facility inventory.
- Finalize UAV programs to assess progress on areas specified in SECDEF UAV vision letter; identify program strengths and weaknesses to include technical, programmatic, and fiscal considerations; recommend policy, funding, or process changes to improve the management and execution of these programs.
- Continue the Section 5002, Federal Acquisition Streamlining Act of 1994 required effort to review incentives and personnel actions available to SecDef to encourage excellence in acquisition management , via a balance score card process at pilot sites
- Provide follow-on analysis and execution of Future Workforce 2005 Taskforce initiatives.
- Examine methods and procedures for efficient implementation of facilities management in field organizations, and develop/publish simple guidelines for distinguishing between sustainment, restoration and modernization expenses.
- Re-examine Target Replacement Life for each of the 400 facilities analysis categories to support development of PA&E-sponsored facilities aging model.
- Develop a comprehensive utilities and energy management strategy to manage energy (not infrastructure), and privatize utilities, simultaneously with DOD's efforts to procure energy competitively and conserve energy.
- Administer the Renewable Energy Feasibility Study & Implementation Program: Supports Sec 204 of EO 13123 (Jun 99) to expand the use of renewable energy and meet the goal of tripling renewable energy capacity by 2010.

FY2002 Program

- Assess the effectiveness and cost of alternative mixes of naval surface combatant forces in the 2010 to 2020 time period
- Assess the threat of hostile nation C4ISR capabilities against US forces and US counter-measure capabilities to preclude or inhibit the threat nation's capability to execute that scenario
- Continue USD (AT&L) dedicated support to the Shared Tactical Ground Picture (STGP) in support of coalition warfighter operations at the tactical level to enable sharing of underlying existing data.
- Analyze weapon systems performance, cost, and schedule issues in support of acquisition milestone decisions and DoD planning, programming, and budgeting activities.
- Congressional direction--Evaluate weapon systems requirements and acquisition issues, and to submit master planning documents for key defense mission areas.
- Conduct ongoing technical analyses on specific and highly specialized Electronic Warfare (EW) systems and technology issues
- Prepare the Congressionally-mandated annual DoD Electronic Warfare Plan.
- Continue analytical support to establish U.S. positions for ammunition stockpile guidance at the NATO SPG meetings.

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- Technical support to manage and foster interoperability for the acquisition of U.S. military and coalition warfighting capability.
- Evaluate technical and architectural issues in cruise and ballistic missile theater defense including analysis of radar and electro-optical systems, missile propulsion, missile guidance-and-control, software, lasers, algorithms, and systems engineering.
- Assess architectures for cruise missile defense of North America including attribution, early warning and area defense.
- Develop a common architecture for all DoD Unmanned Aerial Vehicle (UAV) mission planning applications among the services.
- Evaluate migration of current DoD UAV mission planning systems to this common architecture and prioritize development of common modules for new UAV systems.
- Conduct a comprehensive study of missile inventory life including its determinants and prediction, its role in driving replacement program, and the highly complex set of approaches in design, development, test, production, test, deployment, storage, etc., that affect missile life. All phases of the missile life cycle will be assessed for possible improvements.
- Conduct an independent follow-on review and analyses for the Congressionally–mandated Anti-Tank Weapons Master Plan
- Produce cost estimates, time estimating relationships, independent schedule assessments, and analyses of technology trends and transition plans relating tot tactical aircraft major acquisition programs in preparation for milestone reviews to aid in Defense Acquisition Board decisions.
- Perform a study, as required in the Defense Planning Guidance, on the threat, requirements, capability options, resources, and R&D for Hard & Deeply Buried Target Defeat.
- Support the framework for interoperability shortfalls to develop priorities for interoperability objectives and employ them within USD(AT&L) acquisition management activities (e.g., DAES reviews, DAB).
- Plan and initiate reviews of DoD-wide systems engineering, integration, and testing activities related to system-of-system acquisitions, to evaluate and compare the success of alternative technical and management approaches for accomplishing interoperability objectives.
- Based on international trends in information technologies, characterize alternative acquisition policies within U.S. and allied/coalition countries as they might affect success in acquiring and integrating systems for joint and coalition interoperability.
- Review joint architecture development activities in support of USD(AT&L) participation the Architecture Steering Group, Architecture Control Council, and other CIO interfaces with Services and DoD agencies.
- Continue analysis in support of laboratory improvement initiatives mandated by Congress or DoD.
- Continue research on planning manufacturing with industry in cooperation with the National Center for Advanced Technologies.
- Provide technical and engineering assistance on assigned Departmental directed S&T initiatives.
- Support development of Simulation Based Acquisition (SBA) within the Defense Department.

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- Support activities for analyzing the interoperability dimensions of military requirements presented in new Operational Requirements Documents and assessing whether the requirements as stated are adequate for producing a system that will achieve the needed interoperability.
- Review allied/coalition partner system developments and acquisition programs to assess interoperability potential and impacts.
- Continue AT&L dedicated support to U.S. program integration for system developments in fulfillment of NATO objectives embodied in the Defense Capabilities Initiative.
- Review plans for Joint Warfighting Experiments (JWEs) and Joint Warfighting Capability Assessments (JWCAs) for implementation of relevant C4ISR system architectures and demonstrations of interoperability.
- Based on processes applied in analysis of the Family of Interoperable Operational Pictures, review selected system-of-system concepts including Global Information Grid (GIG) to assess application of the Joint Technical Architecture and the extent of resulting interoperability.
- Implement steps to review and document processes and technologies DoD-wide that serve as barriers or enablers to information, logistics, and business system interoperability.
- Provide technical support for Acquisition Council, M&S based acquisition executive steering board.
- Prepare annual update of the Congressionally mandated Joint Warfighting Science and Technology Plan and the companion science and technology planning documents.
- Continue to reengineer logistics processes based on CALS technologies
- Continue to employ CALS in developing architectures to govern the modernization of integrated supply chain information systems
- Further definition of COE requirements and procedures, logistics enterprise action planning and information management policy in support of Global Combat Support System (GCSS), development of appropriate performance metrics and continued executive responsibilities for the conduct of the Logistics Information Board and subordinate Service and Agency activities
- Provide in-depth to the vision for DoD logistics in the Logistics Strategic Plan
- Develop supply chain strategies for applying commercial practices in the DoD logistics and operational environment and providing data access through “shared” data, and effective, direct support of the joint warfighter.
- Develop policies for process integration across functional and organizational boundaries.
- Identify opportunities for sharing supply chain “lessons-learned” among Component organizations.
- Continue the Section 5002, Federal Acquisition Streamlining Act of 1994 required effort to review incentives and personnel actions available to SecDef to encourage excellence in acquisition management, via a balance score card process at pilot sites.
- Provide follow-on analysis and execution of Future Workforce 2005 Taskforce initiatives.

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FY2003/2004 Plan

- Implement capabilities roadmap and investment strategy that were identified in the 2002 Combat Identification Architecture Study. Plan and initiate reviews to insure Architecture Study is being implemented.
- Provide technical support for the International Cooperative Opportunity Group (ICOG) initiative for Interoperable Tactical Communications.
- Total Ownership Cost Reduction: Conduct technical analyses supporting the Reduction of Total Ownership Cost (R-TOC) initiative, which seeks to reduce cost in the sustainment segment of the life cycle of weapon systems.
- Conventional Munitions Analytical Support: Provide an assessment of DoD conventional munitions posture including preparation of the Conventional Munitions Master Plan (CMMP) biennially for submission to the Congress.
- NATO Ammunition Stockpile Planning Guidance (SPG): Provide analytical support for the establishment of U.S. positions for ammunition stockpile guidance at NATO stockpile guidance meetings
- DoD Electronic Warfare (EW) Analyses: Conduct ongoing technical analyses on specific and highly specialized Electronic Warfare (EW) systems and technology issues
- Prepare the Congressionally-mandated annual DoD Electronic Warfare Plan.
- CMD /BMD Syst Engrng & Tech Assistance: Conduct a study to evaluate technical and architectural issues in cruise missile and ballistic missile theater defense including analysis of radar systems, electro-optical systems, missile propulsion, missile guidance-and-control, software, lasers, algorithms, and systems engineering.
- Cruise Missile Defense of North America: Continue a macro-study assessing architectures for cruise missile defense of North America including attribution, early warning and area defense.
- TacAir Warfare Programs Tech/Schedule Risk Assessment: Produce cost estimates, time estimating relationships, independent schedule assessments, and analyses of technology trends and transition plans relating tot tactical aircraft major acquisition programs in preparation for milestone reviews to aid in Defense Acquisition Board decisions

Support for USD (POLICY)

FY 2001 Accomplishments:

- Continue to collect, analyze, and update statistics on a wide range of macroeconomic and defense indicators used for responsibility-sharing comparisons among NATO nations, Japan and the Republic of Korea
- Concluded a study of Taiwanese air defense systems
- Conducted a series of defense assessments of the Baltics, and studied US Overseas Force Posture Options

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- Conducted studies on Chinese perspectives and strategy in the Asia Pacific Region
- Conducted a series of assessments of the possible impact of the use of weapons of mass destruction on CENTCOM's ability to conduct operations in southwest Asia.
- Initiated assessments of defense/military capabilities of Albania, Macedonia, Croatia, and the Republics of Slovakia and Slovenia.
- Initiated a study on enhancing security cooperation with Mediterranean Allies
- Conducted a study of International Search & Rescue as a Means of Theater Engagement
- Initiated a study of US/Taiwan Armed Forces Interoperability
- Initiated a study of the Kargil conflict to better understand India-Pakistani relations
- Assessed DoD nuclear planning efforts to determine how well the employment guidance has been fulfilled; provided analysis and support for the most recent version for the Policy Guidance for the Employment of Nuclear Weapons; and reviewed nuclear weapons allocation planning and assessed the results of each plan.
- Provided detailed computer modeling support for independent assessments of national missile defense, theater missile defense, and shared early warning.
- Continued to support work on the analysis of Military Operations in Urban Terrain
- Provided support to an AT&L led study on hard and deeply buried target defeat for the Congress
- Conducted a study on deterring Iraq
- Initiated study of defense assessments of the Czech Republic, Hungary, and Poland, Bulgaria
- Conducted a study of Pre-Conflict Force Employment Options
- Conducted the worldwide combating conference
- Conducted a study on Interagency Crisis Action Planning Performed Under PDD 56
- Conducted a study of Greater Efficiency in Humanitarian Assistance Operations
- Initiated a study on the Alternate Joint Communications Center (with C3I and JS)

FY 2002 Program

- Identify and assess geo-political changes which affect Defense planning
- Develop procedures to establish a Joint Presence Policy
- Analyze issues related to the department's role in homeland security.
- Conduct studies and analyses on issues related to terrorism and strategies for combating terrorism

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- Conduct a study of postwar operations against weapons of mass destruction
- Develop a methodology for assessing risks associated with defense strategy, force structure, and program developed as a result of the 2001 Quadrennial Defense Review
- Continue to develop and revise existing plans to consider the chemical-biological threat, in particular in CENTCOM and EUCOM
- Continue to conduct regionally-focused studies on critical issues of concern to the department.
- Continue to collect, analyze, and update statistics on a wide range of macroeconomic and defense indicators used for responsibility-sharing comparisons among NATO nations, Japan and the Republic of Korea
- Continue Continuity of Operations Planning (COOP) to develop a robust and viable program
- Conduct the Interagency Terrorism Response Awareness Program (I-TRAP) (ongoing)
- Continued to support work on the analysis of Military Operations in Urban Terrain
- Provide technical and analytical support and independent research to the Defense Policy Board
- Develop strategies to respond to emerging issues in missile proliferation
- Assess implementation of nuclear employment policy guidance
- Assess critical policy issues involved with national and theater ballistic missile defense
- Conduct a study on improving Standards and Readiness for Chemical and Biological Defense
- Conduct expert analyses of smallpox research
- Conduct a study on updating Ukraine's National Security Strategy
- Provide administrative and technical support to the overseas travel clearance program
- Initiate the development of a business plan for the USDP
- Obtain expert support for reforming the PPBS system and preparing the Defense Planning Guidance Scenario Appendix
- Obtain administrative, research, analytical and data base automation support for the National Disclosure Policy Secretariat
- Continue with the Alternate Joint Communications Center Capabilities Study
- Continue to provide analytical, technical, and administrative support to the DoD Combating Terrorism Conference
- Conduct a study of enhancing DoD crisis action planning for Noncombatant Evacuation Operations
- Study the effectiveness of training and equipping programs for peace operations
- Study the roles of special operations forces role in defense intervention
- Conduct an assessment of worldwide alignment of special operations force assets
- Study improved situational awareness of crisis decision-makers by integrating of global geographic information systems

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- Study political-military decision-making processes in the Arab States of the Gulf
- Study enhancing distance learning education
- Study the impact of African oil on U.S. national security interests
- Conduct workshops on the future of sub-Saharan Africa
- Continue the study of international search and rescue as a means of theater engagement
- Develop a database of weapons of mass destruction in Central Asia
- Conduct a study on shifting the biological defense paradigm
- Conduct analyses concerning issues flowing from the Quadrennial Defense Review

FY2003/2004 Plan

- Continue to develop and revise existing plans to take into account the chemical-biological threat, in particular in CENTCOM and EUCOM
- Continue to conduct regionally-focused studies on critical issues of concern to the department
- Continue to collect, analyze, and update statistics on a wide range of macroeconomic and defense indicators used for responsibility-sharing comparisons among NATO nations, Japan and the Republic of Korea
- Assess implementation of nuclear employment policy guidance.
- Continue to study the political military dimensions of developing a national missile defense
- Provide detailed computer modeling support for independent assessments of national missile defense and nuclear employment policy.
- Continue Continuity of Operations Planning (COOP) analyses and support.
- Conduct the Interagency Terrorism Response Awareness Program (I-TRAP) (ongoing)
- Continue to support work on the analysis of Military Operations in Urban Terrain
- Develop strategies to respond to emerging issues in missile proliferation
- Continue to provide technical and analytical support and independent research to the Defense Policy Board
- Continue analyses on transforming the force

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Support for the USD (Personnel & Readiness)

FY 2001 Accomplishments

- Began broad-based initiative to develop Strategic Human Resources Plan, which will cover both military and DoD civilians
- Continued contractor support on compensation issues being examined by the 9th Quadrennial Review of Military Compensation.
- Continued modeling and analytic support for the Department's recruiting and retention programs for both active duty and Reserve Component personnel.
- Concluded and synthesized analyses of the cost-effectiveness of the Military Health System, including Tricare, and its effect on recruiting, retention, and the quality of life of service members.
- Continued the Congressionally-mandated test and evaluation of the privatization of selected aspects of recruiting.
- Monitored quality of life, equal opportunity, and diversity of the force, and modeled their effects on recruitment and retention, especially on high-demand or expensive-to-train skills and specialties.
- Evaluated alternative models of delivery of child care services by the Department.
- Evaluated a demonstration of a new concept of a recruiting station, a station that is located in a shopping mall and takes maximum advantage of walk-in traffic and of new and exciting ways to appeal to the youth of today.
- Initiated a major new effort to design new and more effective ways to manage the Department's civilian workforce, to deal with the short-term issue of a rapidly-aging workforce and the longer-term issues of how best to attract and retain high quality civilians with appropriate skills and experience.
- Concluded analysis of optimum policy tools/recruiting approaches to attract recruits from youth college-bound /with some college.

FY 2002 Program

- Perform a comprehensive review of active and reserve mix, organization, priority missions and associated resources to optimize the use of Reserve components in the defense of the United States, in small-scale contingencies, and in major combat operations
- Continue the development and implementation of the Strategic Plan for Human Resources, a comprehensive approach to recruiting, retaining, and managing the military and civilian personnel of the Department.
- Develop and evaluate changes in the military and civilian compensation systems that will be required to achieve the Department's Strategic Plan for Human Resources.
- Conclude the Congressionally-mandated test and evaluation of the privatization of selected aspects of recruiting.
- Conclude the effort to design new and more effective ways to manage the Department's civilian workforce.

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- Close-out contractor support on compensation issues being examined by the 9th Quadrennial Review of Military Compensation, and publish final report.
- Evaluate the extent to which competition for recruits among the four military Services drives up the cost of recruiting.
- Provide continuing assessment of the military compensation system and its effect on motivating, retaining, and shaping the force.
- Evaluate the economic value of military health care benefits and compare it to health care benefits provided in the private sector.
- Update the Department's comprehensive summary of the compensation system for military members (last updated in 1996).
- Continue to explore innovative ways to combine active and reserve forces when carrying out all missions of the Department, including the missions of homeland defense and ant-terrorism.
- Continue to assess most cost-effective ways to recruit, train, and retain uniformed military personnel (active and reserve forces)
- Monitor and assess the equal opportunity climate in the Department, and develop alternate approaches to improving that climate
- Examine support provided to the reserve components by active duty personnel.
- Respond to congressional mandates and directives.

FY 2003/2004 Plan

- FFRDC support to extend a panel of private citizens assessing responses to domestic terrorism (the Gilmore Panel)--mandated by Congress, NDAA 2002.
- Conclude the implementation of the Department's Strategic Plan for Human Resources.
- Continue to explore and evaluate more flexible approaches to the management of civilian personnel.
- Examine the role of reserve components in all Department activities, including homeland defense/anti-terrorism campaigns.
- Assess the quality of life programs of the Department.
- Evaluate the implementation of the Tricare for Life benefit mandated by Congress.
- Continue to monitor and evaluate recruiting and retention of both military and civilian personnel
- Continue to assess the cost-effectiveness of the military health care system.
- Develop and evaluate any changes in the military compensation system necessary to support DoD's human resources plan.
- Continue to assess the need for child care within the Department, and most cost-effective means of providing quality child care
- Analyze equal opportunity data provided by the Services
- Analyze the extent and impact of sexual harassment within the Department.
- Respond to congressional mandates and directives

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General Support to Director, Program Analysis & Evaluation

FY 2001 Accomplishments:

1. Major Defense Issues:

- Analyzed digitization's operational effectiveness, accounting for program delay and delayed resorting; informed Program Reviews for FY 02-07 and the QDR, and provided alternative, executable options for Army as digitization evolves near term.
- Developed a methodology for assessing a major issue regarding the Army in the QDR.
- Continued development of critical management indicators, tools, and techniques for incorporation into DPP materials used to provide DoD senior leadership with an overview of long-term trends, "health", and affordability of the defense program.
- Researched aircraft characteristics and performance data to support studies of air superiority force structure alternatives.
- 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 radar technologies to meet future shipboard air defense needs. Developed transition plan for implementing acquisition for next generation radars. Analyzed radar configurations of ship classes, alternatives to shipboard radars, and adequacy of the Navy's acquisition plans for next-generation shipboard air defense radars.
- Provided expert analytical critique and assistance for developing mathematical/engineering tools needed to examine selected TACAIR analyses and studies to include aircraft end-game maneuver, aircraft attrition, stealth utility, laser performance, weapons effects, and aircraft CER development.
- Assessed Army's update to the Analysis of Alternatives for the Comanche helicopter addressing issues in the areas of low observability and the achievement of weight goals; reviewed potential cost tradeoffs between component materials alternatives.
- Created guidance to the services for comprehensive Analyses of Alternatives to support the DAB acquisition Milestones
- Supported defense analysis professional forum.
- Supported symposium for DoD cost research activities among OSD, the military services, and defense agencies.
- Re-estimated translator vectors to improve accuracy of Defense Employment and Purchases Projection System (DEPPS) projections of DoD spending.
- Developed recommendations for fee-for-service funding arrangements for the Armed Forces Institute of Pathology.
- Developed updated predictive Personnel Inventory Cost and Compensation Model (PICCM) model to advance assessment of programming decisions concerning future military manpower gains, losses, demographics and costs.
- Analyzed aerial refueling tanker requirements in support of air mobility operations.

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- Determined opportunities to increase savings / reduce costs associated with energy use and environmental cleanup associated with BRAC closures.
- 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 top line.
- Analyzed repair process problems that contribute to degradation of aircraft readiness.
- Developed relationships for O&M funding based on key parameters that can be used to gauge the sufficiency of military service and major defense agency funding for O&M.
- Improved cost estimating relationships for Ballistic Missile Defense systems in preparation for major milestone reviews.
- Provided necessary data to address policy issues related to the magnitude, sources, and characteristics of weapon systems cost growth and schedule growth.
- Provided an innovative view of how the DoD cost community estimates aircraft production support labor costs.
- Developed methodologies for assessing program progress, and estimating lifecycle cost and risk of integrated and/or confederated systems of software-intensive systems
- Collected, analyzed, and exploited latest available information to develop databases and methods for estimating development and production costs of next generation tactical aircraft.
- Estimated cost of F-22, JSF, and other military aircraft, the results of which are required for the MSII independent cost estimate for the JSF program scheduled for early FY 2001.
- Improved 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.
- Provided senior leaders with key analyses to aid in resource allocation decisions and enhance defense planners' ability to make most effective use of scarce collective defense resources.
- Analyzed U.S. involvement in smaller-scale contingencies and issues related to U.S. military in these operations; assessed impact of projected level of global engagement on U.S. force structure, PERSTEMPO/OPTEMPO, and ability to fight and win MTWs.
- Built an analytic foundation for examining opportunities and challenges arising from operations with non-U.S. military organization in future smaller scale contingencies (SSCs).
- Established measures of effectiveness and assessment methods, and identify synergies to ensure consistent management throughout DoD's Regional Centers for Security Studies.
- Shared an analytical methodology with selected foreign governments that will produce a resource-constrained, multi-year defense program that supports the national security strategy and can be converted into a defense budget that can be justified to Parliament.

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2. Joint Efforts (Primarily QDR):

- Analyzed long-term planning scenarios through the exercise of three models, JICM, ITEM, and TACWAR to support the QDR and other decision making processes.
- Improved the capability to address QDR and follow-on issues relating to regional conflicts-both traditional MTWs and longer-range threats with the Joint Integrated Contingency Model (JICM).
- Built an analytic foundation for examining smaller scale contingencies (SSCs) with emphasis on how best to balance the requirements of MTWs and SSCs within the strategy of shape, respond, and prepare.
- Developed analytic foundation for examination of SSCs with special emphasis on incorporating international organizations (IOs) and non-governmental civilian organizations (NGOs) capabilities and concepts of operations into DoD's SSC programmatic analysis.
- Assessed key features of contemporary defense logistics management framework and environment; identified associated potential major defense logistics challenges; developed 21st Century logistics support concepts that meet projected needs.

3. Development of Tools and Databases:

- Provided for various initiatives to improve the analytic structure of the FYDP necessary to facilitate credible FYDP-based analyses of force and infrastructure resources and to enhance value to DoD decision makers.
- Developed statistical methods that will model the relationship between customer funding (as contained in the FYDP), and the resulting purchases from working capital funds over the program period.
- Continued development and enhancement to model which will aid in understanding the dynamics of the Managed Care Support contracts, predicted health care costs and the contractor's reimbursement under the contract, support the budgeting process, and performed what-if scenarios.
- Provided research on new tools for estimating costs of new development programs in key product sectors.
- Provided new estimating relationships for future Navy ship acquisition programs.
- Supported symposium on sound integration and planning of DoD economic research activities among OSD, the military services, and defense agencies.
- Provided a parametric estimate based on historical aircraft propulsion components and the limited experience from current technology to help in developing reasonable and defensible cost estimates.
- Improved the Department's suite of joint mobility and campaign models and simulations. Performed detailed comparison of the mobility functionality of JWARS with MIDAS, the proposed replacement model

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- Provided expert up-to-date research and consultative services on information technology and information assurance.
- Improved PA&E's ability to evaluate program assumptions in areas related to software. Improved ability to evaluate costs and benefits of software development programs and strategies.

FY 2002 Program:

- Develop metrics to assess the DoD transformation of forces/strategies/resources management.
- Develop plans for improving the Department's PPBS -Planning Programming & Budgeting System .
- Examine complex issues identified in the Joint Airborne Electronic Attack Analysis of Alternatives.
- Assess operational effectiveness of air-launched weapon performance in Operation Enduring Freedom.
- Examine, analyze and evaluate the risks and implications of defense strategies that support national objectives to include an assessment of threat environment that focuses on the impacts of asymmetric threats; DoD's roles, responsibilities, and requirements for homeland defense; alternate postures of engagement; and the unique demands of smaller scale contingencies.
- Explore transformation strategies and implementation plans for new operational concepts and new organizational arrangements that exploit new technologies.
- Look to more adaptive force structures that will address the emerging threat while simultaneously addressing the long standing issues of tempo, readiness, and infrastructure.
- Examine investment strategies accounting for interrelationship between re-capitalization, transformation, force structure spending.
- Conduct analyses of the modernization program to strike a balance between modernizing platforms and modernizing weapons.
- Explore strategies that maintain nuclear deterrence and stability in the changing security environment.
- Continue to build and refine analytical tools that can better address current and emerging issues facing the department. These tools include cost analysis and research tools, effectiveness analysis tools, and the PPBS.
- Develop cost analysis and research tools to address the costs of the military medical delivery system and will improve our ability to understand and project DoD infrastructure and requirements.
- Develop effectiveness analysis tools and conduct studies to provide independent estimates of the cost and operational effectiveness of planned weapon systems.
- Continue support for FYDP Improvement initiative, the Automated Program Planning System, and the PPBS automated tool kit.

FY 2003/2004 Plan:

- Analyze the impact of the projected level of global engagement on US force structure on PERSTEMPO and OPTEMPO.

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- Analyze cost and force capability implications of current and future defense programs.
- Examine issues identified in previous lessons learned small-scale contingency studies to explore alternative force structures in support of SSCs.
- Assess allies' progress toward implementing the Defense Capabilities Initiative.
- Determine aerial refueling investments necessary to optimize force closure and minimize risk while supporting the range of deployment scenarios in the new defense strategy.
- Evaluate technical issues related to concepts and designs for satellite, reconnaissance, theater missile defense, and national missile defense systems.
- Continue provision of 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.
- Develop improved methodologies for estimating weapon system development costs by the use of simulation techniques.
- Improve cost estimating techniques by the analysis of historical cost data of aircraft propulsion components.
- Develop a comprehensive process to estimate the life-cycle cost of the next generation unmanned aerial vehicle systems.

General Support for ASD (C3I)

FY 2001 Accomplishments:

- Supported the Information Superiority Investment Strategy (ISIS) through investment strategy recommendations for information superiority programs and capabilities in support of the PPBS and QDR.
- Reviewed the evolving Defense Integrated Vulnerability Assessment (DIVA) process and protocols to ensure they are comprehensive and consistent given the range of force protection, CIP and IA concerns.
- Developed a network operations Capstone Requirements Document for submission to the JROC which was critical to establishing NETOPS requirements within the formal requirements generation system.
- Developed methodology to assess information interoperability processes and ensure compliance with C4ISR Architecture
- Conducted analysis to explore impacts of C4ISR system capabilities on strike mission effectiveness and assess program tradeoffs.

FY 2002 Program:

- Initiate a study of new spectrum efficient technologies that will ensure DoD’s continued access to spectrum to conduct operations.
- Support the development of draft regulatory framework with FAA to enable UAV integration into the national airspace.
- Develop mid- and long-range strategies for national strategic C3 systems as an entity.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 2002**
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- Study the development of risk management methodologies and tools necessary to specifically address infrastructure protection of our national defense.

FY 2003 Plan:

- Continue to review information operations/information warfare policies and implement improved strategies.
- Continue to evaluate warfighting requirements, plans, programs, budgets, and investment programs for acquisition of C4ISR
- Analyze defensive IW capabilities.
- Support space systems acquisition and review.

Technical Support for the Joint Staff

FY 2001 Accomplishments:

- Assess Joint Interoperability & GIG Architecture Compliance Study provided in depth analysis & specific recommendations for action on key selected architectural & interoperability issues. These reports will become basis for J6 position on issues as they come before the JROC, MCEB and CIO Executive Boards.
- CINC Theater Engagement Planning (TEP), to develop a streamlined and simplified process for Joint Engagement Planning
- Information Support (IS) for UCP 03 -- Process provided recommendations on how to best organize the unified commands and Combat Support Agencies to execute current and projected "Information Support" missions.
- Warfighter Information Flow Analysis--identified, described, and prioritized current and near term limitations in information awareness, access, and interoperability, and delivery across the GIG from the CINC/JTF perspective. Also proposed changes to doctrine and capability implementation approaches to yield near-term improvements to information flow and dissemination
- Senior NCO Joint Professional Military Education study to include three phases: Planning, Execution, and Implementation on how to get Joint Training to NCOs.
- Future Imagery Architecture (FIA) ERA Collection and Exploitation Requirements Assessment Tool. This study produced a methodology to determine future Imagery Analyst manning requirement for the Unified Commands.
- Reserve Component (RC) JPME. This study went towards the development of a web-based tool for measuring requirements associated with RC JPME Distributed Learning.
- Reviewed the use of the EHF SATCOM system and identified impediments to the efficient use of the system.
- Logistics Directorate Focused Logistics Wargame (FLOW) Support for wargame development, documentation, modeling and database building, and training.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 2002**
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- Focused Logistics Wargame 2001 supported critical J4 requirements for modeling/database integration, and postgame archiving
- Network Operations (NETOPS) Architecture Assessment Study--for closer coupling/ integration of functions within the telecommunications network, information assurance, and information dissemination management.

FY 2002 Program:

- Future Imagery Architecture (FIA) Analyst Allocation will conduct a cost benefit analyses for General Defense Intelligence Program POM build for Imagery analysts allocation to Commands and Service Centers.
- Global Command and Control System Operational Requirements Analysis to provide detailed analysis and documentation of GCCS baseline operational capabilities.
- Joint Vision 2020 Implementation Master Plan (JIMP) to provide Executive Agents with Multinational and Interagency 21st Century Challenges.
- Strategic Analysis of Afghanistan and its Neighbors to provide a grand strategy overview of Afghanistan and its neighbors.
- Enhanced Joint Lessons Learned Information Management Study to develop Joint Lessons Learned Architecture and framework for information acquisition, storage, and retrieval to support organizations information/data users.
- Reserve Component Employment to provide foundation analysis for RC employment under a new defense strategy to support OSD, CINC, and Service decisions on policy, force employment, and force apportionment.
- Common Aero Vehicle (CAV) Utility for Conventional Deterrence and Global Precision Attack to determine the military utility of conventional precision strike from space transiting systems.
- Munitions Certification to evaluate services munitions certifications/explosives safety programs/ DOD Policies.
- Logistics Simulation for Current Force Analysis (CFA) to improve Joint Logistics Assessments generated for the CFA 2002.
- Joint Deployment and Theater Distribution Pillar (FLOW03) for CINC input to the development and analysis cycle of FLOW03.
- Information Superiority Transformation Strategy Assessment to develop an Information Superiority Transformation Strategy
- Joint Development Process Owner and Global Distribution Owner Integration to provide smart integration of Joint Deployment and Global Distribution to achieve “same in peace as war” process.
- Analysis of Narrowband Terminal Requirements to revise Demand Assigned Multiple Access Implementation Plan.
- Warfighter Information Dissemination Management to analyze information flow and dissemination capabilities of the GIG.
- Warfighter Mission Information Management Analysis to help “operationalize” Mission Information Management.
- Operationalizing Knowledgement Centric Warfare to help operationalize Knowledge Management.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 2002**
APPROPRIATION/BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide**	R-1 ITEM NOMENCLATURE **Technical Studies, Support & Analysis PE 0605104D8Z**

FY 2003 Plan:

- "Quick-turnaround" assessments directed by Chairman of the Joint Chiefs of Staff
- JV2020 implementation--careful analysis in organization dynamics and structuring.
- Develop and maintain joint doctrine for the employment of the Armed Forces.
- Continue to provide responsive wargaming, analysis and assessment capabilities to support future Chairman of the Joint Chiefs of Staff requirements
- Assess Joint Warfighting Capabilities
- Continue to use collaborative analysis process to exploit Service expertise in the Services and to help in the assessment of complex joint issues.

	FY2001	FY2002	FY2003	Total Cost
B. Program Change Summary				
FY 2001 Previous President's Budget	30.597	33.613	29.304	Continuing
FY 2002 Amended Budget	30.315	33.805	NA	Continuing
Appropriated Value	30.597	27.805		Continuing
Adjust to Appropriated Value/President's Budget	(.282)	(.405)		Continuing
Congressional Undistributed Reductions, Inflation Savings, Gov't-Wide Rescission, and Below Threshold Reprogramming				
FY 2003 Current Budget Submit/President's Budget	30.315	27.400	30.023	Continuing

Funding:

Schedule: N/A Technical: N/A

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

D. Schedule Profile **N / A**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 6					R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SUPPORT TO C3I** **PE 0605116D8Z**				
COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	59.783	28.312	14.979	15.042	16.321	16.852	17.182	Continuing	Continuing
DERF Request	0	0	4.900	3.300	3.100	5.700	9.400		

A. Mission Description and Budget Item Justification

Brief Description of Element: The program element supports technical and analytic efforts to evaluate and improve the management oversight of national and DoD 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; development and integration of CINC architectures to better define command capabilities; oversight of information operation activities; and integration and overarching requirements/planning process for national and nuclear C2 capabilities. This program is funded under Budget Activity 6, RDT&E Management Support because it includes studies and analysis in support of RDT&E efforts.

Program Accomplishments and Plans:

FY 2001 Accomplishments: ($59.783 million)

- Analytical and research support for DoD space, command and control, and information superiority programs.
- Analyses and evaluation of joint information operations and integration of IO into military operations.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE Program Element (PE) PE 0605116D8Z **SUPPORT TO C3I** **PE 0605116D8Z**

- Support for the Joint Course of Action Analysis and Targeting Support (JCOATS) initiative.
- Supported research and development activities of the Pacific Disaster Center (PDC) to improve system capabilities utilizing prototyping methodologies and develop improved information products and services for the disaster management community.
- Supported the development and fielding of data capture, conversion systems in support of the Joint Counterintelligence (CI) Assessment Group. Funding also supported the development of a secure, integrated indexing retrieval system allowing retrieval along technical and CI threat/ capability lines.

FY 2002 Plans: ($28.312 million)
- Continue analytic research support for DoD space policy issues, command and control, IO, and information superiority programs.
- Support activities of the National Security Space Architect (NSSA) organization responsible for the integration of space system architectures, elimination of vertical stove-piped space systems, and achieving efficiencies in acquisition and future operations through space program integration.
- Enhance functionality of C4ISR resource systems and the Information Technology Management application.
- Support development of CINC architectures to define command capabilities and perform cross-CINC analysis of capabilities to impact IT investment decisions.
- Continue research and development activities of the Pacific Disaster Center.
- Enhance UAV integration into civil air space program efforts.

FY 2003 Plans: ($14.979 million)
- Continue analytic research support for DoD space policy issues, command and control, IO, and information superiority programs.
- Continue to enhance functionality of C4ISR resource systems and the Information Technology Management application.
- Support development of CINC architectures to define command capabilities and perform cross-CINC analysis of capabilities to impact IT investment decisions.
- Support the Joint C4ISR Architecture Planning/Analysis System – an automated tool that will assist the CINCs, Defense Agencies, and OSD in developing, integrating, and using C4ISR architectures.
- Support the Integrated Planning and Management Program, an effort to improve national and DoD nuclear command and control programs. Analytic support includes establishing capstone requirements documents, integrated architectures, roadmap planning and strategies that assure cohesive, integrated and interoperable programs across DoD as well as various ground, air, and land mobile platforms and programs.
- The Domestic Emergency Response Information Services (DERIS) program is a non-add to this program because it is funded in the DERF to support expansion of the technology demonstrations and coordinating IT planning for aspects of Homeland Security. Specifically, substantial additional work is

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE Program Element (PE) PE 0605116D8Z **SUPPORT TO C3I** **PE 0605116D8Z**

required for a robust, secure Homeland Security communications network – particularly in areas associated with military-civil interface for terrorism early warning an crisis response. ($2.000)

- The Critical Infrastructure Protection program is a non-add in this program because it is funded in the DERF which provides funding to produce GIS-based maps of military installation proximity to Chemical Biological Nuclear and Radiological (CBNR) facilities and CINC support to develop consequence management plans in the event of terrorist attacks on CBNR facilities. Overlay real-time meteorological data on GIS maps. Provides systems engineering and integration of technology, tools and techniques for critical infrastructure situational awareness. This work includes the management of complex databases and developing GI data standards; visualization of complex infrastructure networks; integration of secure information exchange, storage and retrieval protocols to support infrastructure information sharing in the GIS-based environment. Develops visualization techniques to produce an integrated picture of the operational impacts of cascading disruptions to critical infrastructures. ($2.900)

B. Program Change Summary	FY2001	FY 2002	FY2003	Total Cost
Previous President's Budget	58.227	21.061	10.250	Continuing
Appropriated Value	58.227			
Adjustments to Appropriated Value				
a. Congressionally directed Reductions		-249		
b. Rescission/Below threshold reprogramming, Inflation Adjustments				
c. Other		7.500	4.729	
Current President's Budget	58.227	28.312	14.979	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE Program Element (PE) PE 0605116D8Z **SUPPORT TO C3I** **PE 0605116D8Z**

FY 2002: Adjustment for FFRDC reductions (Section 8032) -.076; and Cross-cutting congressional adjustments (Section 8123) -.173. Congressional Adds for Pacific Disaster Center 6 million and UAV Integration into Civil Air Space 1.5 million.
FY 2003: Non-pay purchase inflation adjustments -.041

C. Other Program Funding Summary Cost: N/A

D. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **FOREIGN MATERIAL ACQUISITION & EXPLOITATION** **PE 0605117D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total Cost
Total Program Element (PE) Cost	71.503	31.578	32.382	34.435	36.351	37.017	37.720	Continuing
Project Name/No. and Subtotal Cost FMA&E/P411	71.503	31.578	32.382	34.435	36.351	37.017	37.720	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: This program is involved in the acquisition and exploitation of foreign military equipment and military technology. The DoD Foreign Material Program acquires and exploits foreign materiel systems, subsystems, components, commercial items with military applications, and technologies as well as related technical and operational documents. The FY 2000 and out year program is a classified activity about which information is available to properly cleared and authorized personnel. This program supports acquisition and exploitation of foreign military equipment and military technology and therefore is funded under Budget Activity 6, RDT&E Management Support.

Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Mission Support (71.503 million)

FY 2002 Plans:

- Mission Support (31.578 million)

FY 2003 Plans:

- Mission Support (32.382 million)

B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	71.503	31.951	31.662	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction		(.373)		
b. Rescission/Below threshold Reprogramming, Inflation Adjustments			.72	
c. Other				
Current President's Budget	71.503	31.578	32.382	Continuing

Change Summary Explanation:
FY 2002: Adjustments for FFRDC reduction (Section 8032) -.116 and Cross-cutting congressional adjustments (Section 8123) -.257.
FY 2003: Non-pay purchase inflation adjustments -.090.

C. Other Program Funding Summary Cost: N/A

D. Schedule Profile: N/A

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6				R-1 ITEM NOMENCLATURE Export License Control – PE: 0605123D8Z					
COST *($ In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	5.945	10.434	10.702	0	0	0	0	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 (OUSD(P)), for export license processing and analysis. 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. This program is a new start effort.

(U) FY 2001 Plans:

- Initiate definition of requirements and security analysis.
- Complete System Development Plan.
- Complete Functional Requirements Document.
- Begin prototype development.
- Develop System Test Procedures.
- Develop System Implementation Plan.

(U) FY 2002 Plans:

- Field prototypes
- Validate System Requirements
- Validate System Design
- Procure and field production hardware (Phase 1)
- Field communications infrastructure improvements

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Export License Control – PE: 0605123D8Z

(U) B. Program Change Summary	FY 2001	FY 2002	FY2003	Total Cost
Previous President's Budget	6.000	10.500	10.731	Continuing
Amended FY 2002 President's Budget	6.000			
Congressional Directed Undist Reduction	-.055	-.066		
Other			-.029	
President's Budget Submission	5.945	10.434	10.702	Continuing

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. Other Program Funding Summary: Procurement funds: FY2002 ($2.489 million).

(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.

(U) E. Schedule Profile: Program milestone chart follows.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLATURE Export License Control – PE: 0605123D8Z

USXPORTS - Incremental Build Schedule

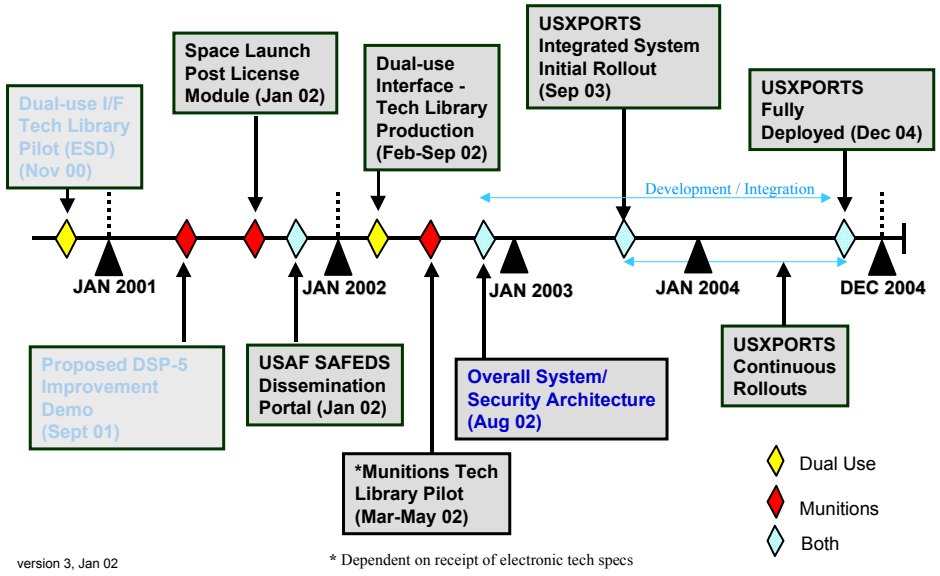

Exhibit R-2, RDT&E Budget Item Justification						Date: February 2002			
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6				R-1 ITEM NOMENCLTURE Defense Travel System – PE: 0605124D8Z					
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007		Total Cost
Total Program Element (PE) Cost	9,038	19,600	30,358	32,284	34,080	34,704	35,364		195,428
Defense Travel System	9,038	19,600	30,358	32,284	34,080	34,704	35,364		195,428

(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. Funding for the R&D elements of this program has been realigned from the O&M appropriation, in accordance with OSD memo dated Oct 26, 1999, Subject: Budgeting for Information technology and Automated Information Systems.

PROGRAM ACCOMPLISHMENTS AND PLANS: ($ in Thousands)

1. (U) FY 2001 ACCOMPLISHMENTS: ($9,038)

   - ($4,438) Testing of the mappings between the Defense Travel System's Common User Interface (CUI) and DTS Pilot Site Defense Accounting & Disbursing Systems (DADS) (CDS, STANFINS, SOMARDS, SRD-1, SABRS, STARS-FL/HCM, ADS and GAFS). There are currently 35+ different accounting and disbursing systems that DTS must interface with.

   - ($3,281) Continued development of electronic maps between the CUI and the DADS.

   - ($770) Continued development of the MIS/Archive for electronic storage of travel records

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLTURE Defense Travel System – PE: 0605124D8Z

PROGRAM ACCOMPLISHMENTS AND PLANS: (Continued)

- ($30) Initial upload of personnel profiles from DMDC files during testing.
- ($519) Successfully completed DTS program assessment and DoD infrastructure assessment

2. (U) FY 2002 ACCOMPLISHMENTS: ($19,600)

- ($1,313) Continue development and testing of DADS interfaces with CUI
- ($8,641) Deploy DTS to 10 initial pilot sites for assessment.
- ($7,946) Development of Jefferson software release that includes critical system functionality.
  - CBA Reconciliation
  - Group Travel
  - Deployment Automation Tool
  - Personal Leave in Conjunction with Official Travel (PLOT)
  - Pull Down Menus
- ($1,000) Continued development of the MIS/Archive for electronic storage of travel records.
- ($700) DEBX to DADS mapping

3. (U) FY 2003 PLANS: ($30,358)

- ($11,826) Continue test and integration of DADS interfaces and software releases, DADS system changes, MIS Archive , development of Interface Control Documents and Memorandums of Agreement (MOA) .
- ($1,000) DTS security requirement risk assessment, compliance validation, and PKI certification.
- ($14,417) Complete Jefferson software release and testing. Start Madison software release development.

- ($3,115) Engineering support.

4. (U) FY2004 PLANS: ($32,284)

- ($15,460) Continue test and integration of DADS interfaces and software releases, DADS system changes, MIS Archive, development of Interface Control Document and Memorandums of Agreement (MOA).

- ($12,100) Continue development and test of P3I items.

- ($4,724) Engineering Support.

(U) B. PROGRAM CHANGE SUMMARY:	FY2001	FY 2002	FY2003	Cost to Complete
(U) Previous Pres Budget	9,038	29,955	32,875	Continuing
(U) Adjustments:				
(U) a. Congressional Adjustments		-10,000		
(U) b. Recissions				
(U) c. Other		- 355	-2,517	Continuing
(U) FY 2003 Budget Estimates:	9,038	19,600	30,358	Continuing

(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 2002 funding decrease is due to congressional adjustments, PBD and inflationary reductions/adjustments. FY 2003 decrease is due to PBD and inflationary reductions/adjustments.

(U) Schedule: Program schedule is currently being updated to reflect the FY02 budget marks.

(U) Technical: None.

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E – Defense Wide/Budget Activity: 6	R-1 ITEM NOMENCLTURE Defense Travel System – PE: 0605124D8Z

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

Project Number & Title	FY2000 Actual	FY2001 Estimate	FY2002 Estimate	FY2003 Estimate	FY2004 Estimate	FY2005 Estimate	FY2006 Estimate	FY2007 Estimate	To Complete
(U) O&M Line Defense Travel System	19,981	42,879	61,639	53,838	37,000	12,462	12,731	13,007	Continuing

(U) D. ACQUISITION STRATEGY: Not Applicable

(U) E. SCHEDULE PROFILE: Not Applicable

BUDGET JUSTIFICATION
FOR PROGRAM ELEMENTS OF THE
OSD RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, DEFENSE-WIDE PROGRAM
FY 2003 BUDGET EXTIMATES SUBMISSION

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2002		
APPROPRIATION/BUDGET ACTIVITY Defense Wide RDT&E (0400) Budget Activity Six							R-1 ITEM NOMENCLATURE Foreign Comparative Testing (FCT) PE 0605130D		
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	31.405	34.839	31.670	32.392	33.412	34.074	34.721	Continuing	Continuing

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 CINCs and Services 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 expenditure of funds.

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

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 2001 Accomplishments:
- Completed Anti-Jam GPS Antenna (GAS-1N)
- Completed Combat Vehicle Crew Fire Extinguisher
- Completed Combat Vehicle Troop Seat
- Completed F-15 Countermeasures Dispenser (BOL)
- Completed Joint RAAWS Ammo Upgrade Phase II
- Completed Lightweight Hand Grenade
- Completed Mine Protected Clearance Vehicle
- Completed Space Qualified Digital Signal Processor
- Completed Stealth Screen
- Completed Wind Tunnel Internal Force Balance

- Continued Advanced Lightweight Grenade Launcher Ammunition
- Continued Gunfire Detection System
- Continued High Performance Hydraulic Pump for AAAV
- Continued Infrared Flare for C-17
- Continued Joint Protective Aircrew Ensemble
- Continued Large Aircraft Decontamination System
- Continued Less Sensitive RDX
- Continued Lightweight Aluminum Track for AAAV
- Continued Lightweight Chemical Agent Detector
- Continued Lightweight Diesel Driven Auxiliary Power Unit for AAAV
- Continued MC-130H Air Refueling System Pod
- Continued Micro Satellite for Space Experiments
- Continued Parachute Leaflet Delivery System
- Continued Plastic Practice Bombs
- Continued Retractable Arresting Cable System
- Continued Star Tracker
- Continued Wide Band Klystron for E-3 AWACS
- Initiated and completed Antenna Mast for Tactical Mobile Communications
- Initiated and completed Expeditionary Airfield Light-Duty Mat System
- Initiated and completed IR/UV Threat Simulator
- Initiated and completed Muzzle Brake/Suppressors
- Initiated and completed Personal Temperature Regulation System
- Initiated and completed Submarine Torpedo Room Berthing Pod
- Initiated and completed Tactical Long Range Passive IR Sensor
- Initiated and completed Unattended Ground Imager
- Initiated Advanced Demolition Weapons
- Initiated Airborne Video Recorder/Replay System
- Initiated Bradley Fighting Vehicle Long-Life Roadwheels
- Initiated Chemical Protective Gloves
- Initiated Driver’s Vision Enhancer
- Initiated Floating Smoke Pot Components
- Initiated High Mobility Excavator
- Initiated MAAWS Illumination Round
- Initiated Man Portable Multisensor System
- Initiated Multi-Bandwidth Submarine Antenna

- Initiated Optically Improved SADA II
- Initiated Prophet Ground
- Initiated Skin/Open Wound Decomtamination
- Initiated Tactical Geographic Information System, Maria
- Initiated Very Low Frequency (VLF)/Low Frequency (LF) Composite Bushing Replacement

FY 2002 Plans: (FY02 new starts & continuing projects)
Fund the following new or continuing foreign system tests and evaluations and/or technology assessments to include:

- Complete Advanced Lightweight Grenade Launcher Ammunition
- Complete Airborne Video Recorder/Replay System
- Complete Bradley Fighting Vehicle Roadwheels
- Complete Chemical Protective Gloves
- Complete Driver's Vision Enhancer
- Complete Floating Smoke Pot Components
- Complete Gunfire Detection System
- Complete High Mobility Excavator
- Complete High Performance Hydraulic Pump
- Complete Infrared Flare for C-17
- Complete Joint Protective Aircrew Ensemble
- Complete Large Aircraft Decontamination System
- Complete Less Sensitive RDX
- Complete Lightweight Aluminum Track for AAAV
- Complete Lightweight Chemical Agent Detector
- Complete Lightweight Diesel Driven Auxiliary Power Unit for AAAV
- Complete Man Portable Multi-Sensor System
- Complete MC-130H Aerial Refueling System Pod
- Complete Micro-Satellite for Space Experiments
- Complete Multi-Bandwidth Submarine Antenna
- Complete Optically Improved SADA II
- Complete Parachute Leaflet Delivery System
- Complete Plastic Practice Bombs
- Complete Prophet Ground
- Complete Retractable Arresting Cable System
- Complete Skin/Open Wound Decontamination

- Complete Star Tracker
- Complete Tactical Geographical Information System
- Complete VLF/LF Composite Bushing Replacement Project
- Complete Wide-band Klystron for E-3 AWACS
- Continue Advanced Demolition Weapons
- Continue MAAWS IR Illumination Round
- Initiate and complete 7.62mm Lightweight Machine Gun
- Initiate and complete Laser Obstacle Avoidance System
- Initiate and complete Self-Regulating Anti-G Ensemble
- Initiate and complete Stand Alone Cooling Suit
- Initiate 40mm Dud Reducing Ammo
- Initiate Communications Distribution System
- Initiate Digital Flight Control System for EA-6B
- Initiate High Frequency Adaptive Antenna Receive System
- Initiate NBC Multi-purpose Sock
- Initiate Self-Destruct Fuze for MLRS
- New Start – Initiate Eagle Vision Upgrade (30 day Congressional notification to be forwarded separately)

FY 2003 Plans: (FY2002 Continuing Projects)
Fund approximately 44 new or continuing foreign system tests and evaluations and/or technology assessments to include:

- Complete Advanced Demolition Weapons
- Complete Communications Distribution System
- Complete Digital Flight Control System for EA-6B
- Complete Eagle Vision Upgrade
- Complete High Frequency Adaptive Antenna Receive System
- Complete NBC Multi-purpose Sock
- Complete Self Destruct Fuze for MLRS
- Continue 40mm Dud Reducing Ammo
- Continue MAAWS IR Illumination Round
- Initiate Supersonic Target Missile (This project was approved as a FY2001 new start but deferred pending resolution of export control issues.)

FY 2004 Plans: (FY2003Continuing Projects)
Fund approximately 44 new or continuing foreign system tests and evaluations and/or technology assessments to include:

- Complete 40mm Dud Reducing Ammo
- Complete MAAWS IR Illumination Round
- Complete Supersonic Target Missile

(U) PROGRAM CHANGE SUMMARY:

(U) B. Program Change Summary	FY2001	FY2002[1]	FY2003[1]	FY2004[1]	FY2005[1]	Total Cost
Previous President's FY2002 Budget Submit	31.697	31.837	32.835	32.835	32.835	Continuing
Delta	(.292)	(.930)	(1.077)	(.236)	0.888	Continuing
FY2002 Amended President's Budget Submit	31.405	30.907	31.758	32.599	33.723	Continuing
Appropriated Value	31.697	30.907	31.758	32.599	33.723	Continuing
Adjustments to Appropriated Value						
a. Section 8086 Reduction of .07%	(0.222)	0.000	0.000	0.000	0.000	
b. OSD Directed Undistributed Reduction	0.000	0.000	0.000	0.000	0.000	
c. Other	(0.070)	+ 3.932	(0.088)	(0.207)	(0.311)	
Current President's Budget	31.405	34.839	31.670	32.392	33.412	Continuing

C. **(U) OTHER PROGRAM FUNDING** NA

D. **(U) EXECUTION** NA

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Budget Activity 6					R-1 ITEM NOMENCLATURE **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**				
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	.636	44.274	60.708	64.330	67.985	69.553	70.581	Continuing	Continuing
DERF Request	0	0	42.060	7.300	10.000	13.200	11.700		

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: 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, the identification and resolution of national and tactical interoperability issues and fostering Defense-wide and joint support to military forces. 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. Funding also supports technical, analytical and developmental initiatives in support of Information Assurance (IA) at the DoD enterprise level, to include certification and accreditation (C&A) support systems, enterprise Computer Network Defense, Vulnerability Management and sensoring concept development and technical analysis, and system engineering and software development support for enterprise-level IA activities. This program is funded under BA-6, Management Support, because it includes studies and analyses in support of R&D efforts.

Program Accomplishments and Plans:

FY 2001Accomplishments:

- Intelligence Mission Support ($0.636 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

FY 2002 Plans: ($44.274 million)

- Supports the development of advanced analytical methods, techniques and tools adapted from the social behavioral, and cognitive sciences for unique Information Operations (IO) human factor applications. Funding will provide fused, operationally relevant analysis of leadership behaviors and potential routes of access to enable development of operational courses of action for Information Operations.
- Support the development of proof-of-concept scenarios for a joint E-Space and network analysis and mapping capability to enable the development of operational courses of action for Information Operations. Analyses will address the refinement and development of analytic capabilities, collection strategies, collaborative processes and knowledge data bases in response to crisis planning requirements.
- Implements recommendations of the IA/IT Human Relations Integrated Process Team Report, to manage critical IA and IT personnel. Modify/develop personnel system database software necessary to manage critical IA skills.
- Enables mission essential applications to use Public Key Infrastructure (PKI), -C2, Logistics, Finance, etc, enabling use of the security as well as electronic business/electronic commerce aspects of PKI; provides PKE engineering support to DoD Components.
- Provides Critical Infrastructure Protection – Combatant Commanders identify critical requirements for execution of their operational and contingency plans. Includes incorporation of CIP Master Scenario Events Lists (MSELs) for war games and exercises. Develop methods to assess vulnerability of critical assets.
- Provides Computer Network Defense Support – Provides Information Assurance Vulnerability Assessment (IAVA) tracking and improving the DoD Enterprise Sensor Grid. Develop and operate system to provide automated notification of IAVAs and distribution of patches to CINCs, Services, Agencies and to determine real time status of IAVA compliance.
- Continues development of enterprise software supporting Certification and Accreditation of DoD information systems and computer networks ("Digital DITSCAP")
- Supports the Global Infrastructure Data Capture (GIDC) effort; funding provides for unclassified hard copy and image file conversion of DoD technology documents through Optical Character Recognition (OCR) process to electronic format that is retrievable using automation tools.
- Supports the Maui High Performance Computing Center (MHPCC) initiative that provides for a pilot project to demonstrate unique relationships based on search techniques using the MHPCC to harvest massive but topic relevant amounts of open source information.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

FY 2003 Plans: ($60.708 million)

- Continue 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.
- Continue support to E-Space and Network Analysis Center – to include further development of analytic methodologies and refinement of techniques and tools for network analysis and proof-of-concept scenario testing.
- Continue software/database development essential to manage critical IA and IT personnel.
- Provide research and technical analysis of emerging applications, services and protocols in support of enterprise-wide "ports and protocols" policy essential to development of "securable" enterprise applications and operations. Continue engineering support for mission essential applications to use Public Key Infrastructure.
- Expand "Digital DITSCAP" certification & accreditation (C&A) software into a "enterprise standard" C&A and vulnerability management information system.
- Continue research and technical analysis of enterprise sensoring and intrusion detection correlation concepts.
- Support IA Scholarship and IA Academic Center of Excellence programs.
- Continue to provide Critical Infrastructure Protection.
- Continue support for Computer Network Defense and Vulnerability Assessments, including support in developing certification and accreditation of DoD Computer Network Defense Service (CNDS) Providers (e.g., CERTs), development of correlation tools and database development for vulnerabilities and intrusion data, enterprise-wide, and research and technical analysis of emerging CND concepts
- The National Infrastructure Protection Center Crucial Player project is a non-add in this program because it is funded in the DERF to support focus on the counterintelligence (CI) aspects of emerging technologies and cyber threats to the U.S. critical infrastructures. The CP team works with the Defense and Intelligence communities to produce predictive analysis in information warfare and terrorist threats. Future efforts will support collection requirements, as well as Homeland Security and CI operational activities. ($1.600)
- The Hard and Deeply Buried Targets (HDBT) project is a non-add in this program because it is funded in the DERF to assess new technology that will leap ahead of that being used in foreign Denial and Deception, particularly but not exclusively through partnership with Academia and the National Laboratories. ($3.200)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

- The Information Operations project is a non-add in this program because it is funded in the DERF to provide technical assessment/coordination of Operation Enduring Freedom (OEF) operational activities within the DoD and interagency in a time critical environment. Details are classified and will be provided separately. ($4.500)
- The Collaboration Planning/Enablers project is a non-add in this program because it is funded in the DERF. Collaborative Planning Enablers enhance worldwide ad hoc crisis and deliberate planning both vertically and horizontally across all domains. Funding will provide for the continued fielding to include installation and technical support of the Defense Collaboration Tools for rear and forward deployed warfighting units, elements of Homeland security, and for transportable collaboration systems for exercise support and emergency deployment. Funding also provides for research and development of advanced collaboration tools, advanced network engineering in compliance with GIG, and for development of interoperable collaboration standards. Funding in outyears provides for technology refresh, upgrades to existing systems and 24x7 technical systems support. ($32.760)

B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	.636	56.653	57.576	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional Directed Undistributed Reduction.		-20.679		
b. Rescission/Below Threshold Reprogramming, Inflation Adjustment				
c. Other		8.300	3.132	
Current President's Budget	.636	44.274	60.708	Continuing

Program Change Summary Explanation:

FY2002: Adjustments for FFRDC reductions (Section 8032) -$20.206, and Cross-cutting congressional adjustments (Section 8123) -.$473; Congressional Adds of $8.300 million.
FY 2003: Non-pay purchase inflation adjustments -.168; and increase to support IO efforts $3.300 million.

C. Other Program Funding Summary Cost: N/A

D. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 2002	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 6							R-1 ITEM NOMENCLATURE Office of Force Transformation (OFT) **PE 0605799D8Z**			
COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	20.0	20.0	20.0	20.0	20.0	20.0	Continuing	Continuing

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

(U) In accordance with the 2001 Quadrennial Defense Review (QDR) "…to support the transformation effort, and to foster innovation and experimentation, the Department will establish a new office reporting directly to the Secretary and the Deputy Secretary of Defense. The Director, Force Transformation will evaluate the transformation efforts of the Military Departments and promote synergy by recommending steps to integrate ongoing transformation activities."

The Director and OFT will assist the Secretary of Defense in the development of DoD's force transformation strategies, ensuring linkage to military strategic functions of preparing the future military and dissuading competitive entry, weighing potential threats to U.S. vital interests and leveraging emerging technologies. They will make recommendations for processes and activities to ensure continuous and broadly focused force structure transformation.

Responsibilities include, but are not limited to, the assessing experimentation efforts, identifying promising operational concepts and technologies, prototype selection for further experimentation, wargaming, research, and analysis.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 6	R-1 ITEM NOMENCLATURE Office of Force Transformation (OFT) **PE 0605799D8Z**

(U) It will capitalize on research, education and training in technologies of strategic importance to national security. It provides an emphasis on ground-breaking research, prototyping, and education and training in selected research areas which are vital to advancement of technologies. This will provide the military with leading-edge technologies as well as increase long-term technical growth in these areas, infuse new ideas and approaches, all of which are important for national security. This program will also employ advances in information technologies and telecommunications to provide extensive connectivity among the partners and research performers from the outset. Thus, strengths of individual investigators can be effectively linked, taking advantage of geographically disbursed national resources. Mechanisms will be established for personnel exchange and interactions to provide for continuing education of highly qualified researchers already working in leading edge and emerging S&T. Research is aimed at breakthroughs to enable continued competitive advantage of the United States military. This endeveaour requires truly innovative research.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 6	**R-1 ITEM NOMENCLATURE** Office of Force Transformation (OFT) **PE 0605799D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	20.0	20.0	20.0	20.0	20.0	20.0	Continuing	Continuing

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) FY 2002 Plans:

(U) Funding will be used to catalyze transformational activities such as war gaming, research, study groups, analysis and prototypes for operational experimentation. These include large-scale high-risk projects as required to leverage emerging technologies, seize opportunities or to suppress service risk. Theoretical and experimental achievements will be fully documented. Research will continue along lines both needs and opportunity driven, dependent upon success.($ 5.0 Million)

(U) FY 2003 Plans:

(U) Efforts will continue in FY03 pursuing the discovery, exploration and innovation of transformational activities to ensure the United States militaries sustain competitive advantage. Since specific investigator-initiated projects compete for funding each year, no detailed description of the research is possible at this time. ($ 20.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 6	R-1 ITEM NOMENCLATURE Office of Force Transformation (OFT) **PE 0605799D8Z**

(U) B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	0.000	0.000	0.000	Continuing
Appropriated Value	0.000	0.000	20.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	0.000	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current President's Budget	0.000	0.000	20.000	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2003 Resources necessary to initiate and sustain the Force Transformation Directorate.

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

(U) **Technical**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 6	R-1 ITEM NOMENCLATURE Office of Force Transformation (OFT) **PE 0605799D8Z**

(U) C. OTHER PROGRAM FUNDING SUMMARY COST: N/A

(U) D. ACQUISITION STRATEGY: N/A

(U) E. SCHEDULE PROFILE: N/A

Exhibit R-2, RDT&E Budget Item Justification								Date: February 2002		
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6					R-1 ITEM NOMENCLATURE SBIR/Challenge Administration PE 0605790D8Z					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	1.662	1.713	14.544	2.103	2.059	2.041	2.067	2.107	continuing	continuing
SBIR/Challenge Admin No.P-518	1.662	1.713	14.544	2.103	2.059	2.041	2.067	2.107	continuing	continuing

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: Under the Small Business Innovation Research (SBIR) program, DoD funds approximately $550 million annually in mission-oriented R&D projects at small technology companies. The goal of the program is to stimulate the development of new technologies to improve U.S. military and economic capabilities. In recent years the DoD has implemented improvements in its SBIR Program as well as a plan for the rapid transition of SBIR technologies into DoD acquisition programs. These improvements were developed by the Office of the Secretary of Defense and the SBIR program managers for the military departemnts and Defense agencies in response to Section 818, Public Law 105-261 and the Small Business Research and Development Acts of 1992 and 2000. Execution of these improvements continue as an integral part of the DoD SBIR Program.

The purpose of these Congressional initiatives is to increase significantly the program's effectiveness in discovering and developing new technologies that are successfully commercialized in defense markets and/or the private sector. DoD has implemented these initiatives, recognizing that the commercialization of SBIR technology is a primary means by which SBIRtechnologiesimprove the capabilityof military systems and the productivity of the U.S. economy.

PE 0605790D8Z is the only source of funds for the coordination and evaluation of the component SBIR programs within DoD, because the 1992 SBIR Act provided that "a Federal agency shall not use any of its SBIR budget...for the purpose of funding administrative costs of the program." PE 0605790D8Z funds central elements of SBIR program coordination and evaluation that are required by law, including:

- Monitoring the degree to which SBIR technologies are commercialized in military and private sector markets (in response to Section 818 of P.L. 105-261) based on performance-based metrics for DoD's SBIR program.
- Execution of processes and initiatives to facilitate the transition of SBIR-developed technologies into DoD acquisition programs (in response to Section 818 of P.L. 105-261);

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR/Challenge Administration PE 0605790D8Z

- Execution of processes and initiatives to facilitate participation in the program by small technology companies that have never before done business with DoD (in response to P.L. 102-564); and
- Monitoring of DoD-wide SBIR program expenditures, to meet Congressionally mandated reporting requirements (97-219, P.L. 102-564 and 106-554).

This program element will also fund the administration of the Congressionally-directed "Challenge Program (section 812 of P.L. 106-65), whose purpose is to create competitive incentives for major acquisition programs' prime contractors to adopt new technology from commercial firms, particularly small technology companies.

The FY 2002 Defense Appropriation Act provides $12.5 million "only for the further development and rapid insertion of innovative SBIR technologies as competitive alternatives to Defense acquisition program technologies" through the Department's Challenge Program.

PROGRAM ACCOMPLISHMENT AND PLANS:

FY 2001 Accomplishments: This budget item funded implementation of USD(AT&L) and/or Congressionally-directed initiatives including the following: (1) Implementation of quantifiable, performance-based metrics for the DoD SBIR program and the small companies that participate in the program, based on the degree to which SBIR technologies are commercialized in military and private sector markets; (2) Implementation of a process for using a company's track record in commercializing its prior SBIR awards as a critical factor in the evaluation of the company's SBIR proposals; (3) Implementation of the Congressionally-directed plan for the rapid transition of SBIR technologies into DoD acquisition programs; (4) Monitoring of DoD-wide SBIR program expenditures, as well as DoD's annual reporting to Congress and the Small Business Administration on the operation of DoD's SBIR program; and (5) Implementation of processes to streamline the SBIR process and facilitate participation in the program by companies not used to doing business with the government. (1.713 million)

FY 2002 Plans: This budget item is funding continuing execution of the USD(AT&L) and/or Congressionally-directed initiatives, including the following activities: (1) tracking the metrics of commercialization of SBIR R&D in military and/or private sector markets; (2) analysis of these metrics for purposes of program evaluation and improvement; (3) use of the metrics in the process for evaluating the SBIR proposals from small companies; (4) Implementation of the Congressionally-directed plan for the rapid

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR/Challenge Administration PE 0605790D8Z

transition of SBIR technologies into DoD acquisition programs; (5) Evaluation of USD(AT&L)-directed initiatives; and (6) Monitoring of DoD-wide SBIR program expenditures and implementation of processes to facilitate participation in the program by companies not used to doing business with the government. Starting this FY (02) this program element will also fund the

administration of the new, Congressionally-directed "Challenge" program (Section 812 of P.L. 106-65), whose purpose is to create competitive incentives for major acquisition programs' prime contractors to adopt new technology from commercial firms, particularly small technology companies. This program element includes funding for travel, including invitational travel, in support of the above activities, as well as Congressionally provided funding of $12.5 million “only for the further development and rapid insertion of innovative SBIR technologies as competitive alternatives to Defense acquisition program technologies” through the Department’s Challenge Program. ($14.544 Million).

FY 2003 Plans: This budget item will continue to fund the execution of USD(AT&L) and/or Congressionally-directed initiatives to track and analyze metrics of the SBIR program’s effectiveness; evaluate the success of recent program improvements; monitor DoD-wide program expenditures; facilitate participation by new companies; and facilitate the transition of SBIR-developed technologies into DoD acquisition programs. It will also fund the coordinated implementation of the Congressionally-directed Challenge program across DoD, as well as evaluation of the program, including (1) Developing metrics of the effectiveness of the pilot program in consultation with the Military Departments; (2) Initiating an independent evaluation of the pilot program; (3) Developing a web-based system for the dissemination of the prime contractors' Technology Insertion Plans, so that commercial firms can readily search for and identify opportunities for insertion of their technology into acquisition programs; and (4) Collecting and analyzing data on program implementation from the participating acquisition program offices, program executive offices, and prime contractors, for use in reporting to DoD's acquisition leadership and the Congressional defense committees on Challenge program implementation. ($2.103 Million)

FY 2004 Plans: This budget item will continue to fund the execution of USD(AT&L) and/or Congressionally-directed initiatives to track and analyze metrics of the SBIR program’s effectiveness; evaluate the success of recent program improvements; monitor DoD-wide program expenditures; facilitate participation by new companies; and facilitate the transition of SBIR-developed technologies into DoD acquisition programs. It will also fund the coordinated implementation of the Congressionally-directed

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR/Challenge Administration PE 0605790D8Z

Challenge program across DoD, as well as evaluation of the program, including (1) Developing metrics of the effectiveness of the pilot program in consultation with the Military Departments; (2) an independent evaluation of the pilot program; (3) a web-based system for the dissemination of the prime contractors' Technology Insertion Plans, so that commercial firms can readily search for and identify opportunities for insertion of their technology into acquisition programs; and (4) Collecting and analyzing data on program implementation from the participating acquisition program offices, program executive offices, and prime contractors, for use in reporting to DoD's acquisition leadership and the Congressional defense committees on Challenge program implementation. ($2.059 Million)

B. Program Change Summary

	FY2001	FY2002	FY 2003	Total
President's FY 2001 Budget	1.728	1.757	2.108	Continuing
President's FY 2002 Amended Budget	1.728	1.757	2.108	Continuing
Appropriated Value	1.728	1.757	2.108	Continuing
Adj. to Approp. Value/President's Budget	-.015	+12.787	-.005	
FY 2003 Budget Estimate	1.713	14.544	2.103	Continuing

Change Summary Explanation:

Funding: The change in funding in FY 2001 is the result of undistributed Congressional reductions (.012) and a reprogramming inflation adjustment (.003). The change in funding in FY 2002 is the result of a Congressional increase (.311). The change in funding in FY 2002 is the result of the FY 2002 Defense Appropriation Act which provides $12.5 million "only for the further development and rapid insertion of innovative SBIR technologies as competitive alternatives to Defense acquisition program technologies" through the Department's Challenge Program.

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E Budget Item Justification	Date: February 2002
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR/Challenge Administration PE 0605790D8Z

C. Other Program Funding Summary: N/A

D. Acquisition Strategy: N/A

E. Schedule Profile N/A

Exhibit R-2, RDT&E Budget Item Justification									February 2002	
DEFENSE-WIDE, RDT&E (0400) BUDGET ACTIVITY SIX					DEVELOPMENTAL TEST & EVALUATION PE 0605804D					
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Cost to Complete	Total Cost
PE 0605804D	43.510	45.829	48.913	49.284	49.554	50.263	51.510	Cont'g	Cont'g	Cont'g

*-FY2000 appropriation was under Director, Test & Evaluation, Defense (0450) for FY2000 and prior years. Beginning with FY2001, appropriation was transferred to Defense-wide RDT&E (0400).

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

(U) BRIEF DESCRIPTION OF ELEMENT:

JT&E programs are process, rather than product, focused T&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&E programs solve relevant Warfighter issues in a joint T&E environment, develop and improve Joint Test Capabilities and Methodologies.

This Research Category 6.5 PE supports technical analysis and evaluation by DT&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 OT&E, and ensures DT&E Programs are sound, well-executed and sufficiently address system's ability to meet Warfighter's needs.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 2001 Accomplishments:

JT&E Programs:

- Completed Joint Suppression of Enemy Air Defense (JSEAD), conducted outbriefings, distributed the final report, and transitioned legacy products.
- Continued Joint WarFighter (JWF), Joint Close Air Support (JCAS), Joint Theater Distribution (JTD), Joint Shipboard Helicopter Integration Process (JSHIP), Joint Global Positioning System Combat Effectiveness (JGPSCE), and Joint Cruise Missile Defense (JCMD) testing.
- Chartered the Joint C2 Intelligence, Surveillance and Reconnaissance (JC2ISR) and Joint Battle Damage Assessment (JBDA) test projects and commenced testing activities.
- Determined through SAC prioritization the FY 2000 Feasibility Studies: Joint UAV for Time Sensitive Operations (JUAV-TSO) and Joint C4ISR Outcome-based Integrated Architecture Assessment (JCOBIAA) were necessary and feasible for chartering as JT&Es.
- Conducted the FY 2001 JT&E annual nomination review, and are determined that Joint Battlespace Integration Test (JBIT) and Joint Versatile Information System On-Line (JVISION) proposals will be directed as Feasibility Studies for conduct in FY 2002.

Exhibit R-2, RDT&E Budget Item Justification	February 2002

T&E Independent Activities:

- Review, coordination, and approval of 48 Test and Evaluation Master Plans (TEMPs) (Draft and Service Approved).
- Review and coordination on all significant program documentation to include: 395 Defense Acquisition Executive Summaries (DAES); 48 Acquisition Decision Memoranda (ADM); and, 1587 Other Documents Reviewed.
- Analyses of programs for compliance with DT&E policies identified in the DoD 5000 acquisition policy and monitoring of on-going developmental test program activities through participation in 660 local and 273 out-of-town developmental test program fora.
- Completed Commercial Test & Evaluation "Best Practices" Study. Used results in a "Best Practices Workshop" in FY2001. Initiated follow-on study to determine the utility of the results and those best practices that should be adopted by the Department.

(U) FY 2002 Plans:

JT&E Programs:

- Oversight of the JT&E programs.
- Complete JWF, conduct the outbriefings, distribute the final report, and transition legacy products.
- Continue JTD, JCAS, JSHIP, JGPSCE, JCMD, JBDA, JC2ISR, JUAV-TSO, and Joint Methodology to Assess C4ISR Architecture (JMACA) (formally JCOBIAA) testing.
- Charter the SAC prioritized FY 2001 Feasibility Studies as Joint Tests and commence testing activities.
- Conduct SAC prioritized FY 2001 Feasibility Studies.
- Conduct JT&E annual review of nominations for potential feasibility studies for conduct in FY 2003.
- Determine through SAC prioritization the FY 2002 Feasibility Studies.

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 S&TS, 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 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.

(U) FY 2003 Plans:

JT&E Programs:
- Oversight of the JT&E programs.
- Complete JTD, JCAS and JSHIP, conduct outbriefings, distribute the final reports, and transition legacy products.
- Continue JGPSCE, JBDA, JC2ISR, JCMD JUAV-TSO, JMACA and SAC-prioritized FY 2002 joint tests.
- Charter the SAC prioritized FY 2002 Feasibility Studies as Joint Tests and commence testing activities.
- Conduct SAC prioritized FY 2002 Feasibility Studies.
- Conduct JT&E annual review of nominations for potential feasibility studies for conduct in FY 2004.
- Determine through SAC prioritization the FY 2003 Feasibility Studies.

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 S&TS, 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 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.

(U) FY 2004 Plans:

JT&E Programs:
- Oversight of the JT&E programs.
- Complete JGPSCE, conduct outbriefings, distribute the final reports, and transition legacy products.
- Continue JCMD, JBDA, JC2ISR, JUAV-TSO, JMACA and SAC-prioritized FY 2002 and FY 2003 joint tests.
- Charter the SAC prioritized FY 2003 Feasibility Studies as Joint Tests and commence testing activities.
- Conduct SAC prioritized FY 2003 Feasibility Studies.
- Conduct JT&E annual review of nominations for potential feasibility studies for conduct in FY 2005.
- Determine through SAC prioritization the FY 2004 Feasibility Studies.

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 S&TS, 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 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.

B. PROGRAM CHANGE SUMMARY ($ MILLION):

	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget Submit	43.510	44.382	46.449	Continuing
Delta	0.000	+2.000	+2.600	
FY02 Amended PB Submission	43.510	46.382	49.049	
Appropriated Value	43.510	46.382	49.049	
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction				
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment				
c. Other	0.000	- 0.553	- 0.136	
Current Budget Submit/President's Budget	43.510	45.829	48.913	Continuing

C. OTHER PROGRAM FUNDING SUMMARY: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Foreign Counterintelligence Activities** **PE 0305127D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	13.916	14.839	16.005	16.605	15.735	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: This program element supports foreign counterintelligence operations, data collection, analysis, dissemination, and production of counterintelligence information. Specific efforts include support for the Defense Counterintelligence Information System (DCIIS) and the JCAG Information Dominance Center. This program is funded under Budget Activity 7, Operational System Development because it supports intelligence efforts that involve engineering development.

Program Accomplishments and Plans:

FY 2001 Accomplishments: N/A

FY 2002 Plans: N/A

FY 2003 Plans: ($13.916 million)

- Support the Defense Counterintelligence Information System development.
- Support the JCAG Information Dominance Center.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Foreign Counterintelligence Activities** **PE 0305127D8Z**

B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget				Continuing
Appropriated Value				
a. Congressionally Directed Undistributed Reductions.				
b. Rescission/Below threshold program adjustments				
c. Other			13.916	
FY 2003: Budget Estimates Submission			13.916	Continuing

Change Summary Explanation:
FY 2003: Funding transferred to this PE to support new foreign CI activities

Schedule: N/A
Technical: N/A

C. Other Program Funding Summary: N/A

EXHIBIT R-2a, RDT&E Project Justification								DATE: **February 2002**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, DW BA-7**	PROGRAM ELEMENT NAME AND NUMBER PE 0305127D8Z				PROJECT NAME AND NUMBER #9001B CI Software Development/ #9040 CI IDC Bridge					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Project Cost	**0.000**	**0.000**	**0.000**	**13.916**	**14.839**	**16.005**	**16.605**	**15.735**	**Continuing**	**77.100**
RDT&E Articles Qty										

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total
-0-	-0-	-0-	11.916	12.798	13.901	14.437	14.494	67.546

Responds to a 1992, Deputy Assistant Secretary of Defense for Counterintelligence and Security Countermeasures, DASD (CI&SCM), requirement for an interoperable DoD CI automation System. The system's goal is to eliminate duplication and inefficiencies by ensuring connectivity between, and within, DoD's CI elements at all levels. It requires quality, availability, timeliness and horizontal sharing of counterintelligence information in the basic areas of CI Collection, Investigations, Operations, Functional Services, Analysis and Production as well as metrics. The Defense Counterintelligence Information System (DCIIS) Requirements Oversight Office identifies requirements. The DCIIS was placed in a sub-set of the Migration Defense Intelligence Threat Data System (MDITDS) under the control of DIA. DIA was responsible for the development of the system and DCIIS was responsible for the requirements and the infrastructure build. DCIIS accomplished the infrastructure build and initiated life-cycle support through the Services. DCIIS ended its association with MDITDS during October 2000 when MDITDS failed to deliver an acceptable software product. DCIIS subsequently established a Joint Program Office during December 2000 and is currently organizing a software acquisition strategy in compliance with DoD Directive 5000.1, DoD Regulation 5000.2-R, and DoD Directive 5200.28 unencumbered by MDITDS or the antiquated technology originally selected by the DIA MDITDS Program Manager. The Mission Need for a DCIIS automated system has been revalidated by the CI Community, the DCIIS program operational requirements document is in final staffing and a proof of concept was delivered based on an analysis of alternatives (AOA) and a Booze Allen Study. The DCIIS Program will reach milestone B during 2nd quarter FY2002.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS: The DCIIS Program has placed a robust infrastructure in place in the Military Services. This infrastructure will host an automated system that will provide the CI Community with quality, availability, timeliness and horizontal sharing of counterintelligence information in the basic areas of CI Collection, CI Investigations, CI Operations, CI Functional Services, CI Analysis and Production and CI Metrics. An acquisition effort is underway to develop the software system with CI tools featuring interoperability, scalability, portability and security in compliance with the current DoD 5000 series.

(U) The development approach for each year taken by DCIIS will enable it to take advantage of related future Analysis and Production CI tool development efforts for Defense.
DCIIS Milestones:
FY 02 - Collection Module Increment I Fielding and Investigations Module Increment I Fielding
FY 03 - Annalysis & Production Increment I Fielding and Operations Module Increment I Fielding
FY 04 - Collection Module Increment II Fielding and Functional Services Increment I Fielding
FY 05 - Operations Module Increment II Fielding
FY 06 - Functional Services Increment II Fielding and CI Tools Increment II Fielding

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Defense Joint Counterintelligence Program** **PE 0305146D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	17.939	6.058	6.442	6.802	6.926	7.059	Continuing	Continuing
JCAG (DERF)	0	0	48.000	51.000	55.000	56.000	60.000		

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: In FY 2000 the Deputy Secretary of Defense established the Defense Joint Counterintelligence Program. The Joint Counterintelligence Assessment Group (JCAG) was created as part of that initiative. The JCAG is tasked with developing and implementing an analysis center to support the protection of critical technology in the government. This activity responds to Deputy Secretary of Defense guidance to develop and operate such a capability to protect DoD critical technology programs from threats posed by foreign intelligence activities, foreign information operations, terrorist, and other clandestine or covert threats. The JCAG mission includes evolving analytic processes and techniques to take advantage of leading technologies and produce horizontal critical technology profiles and risk assessments. These profiles and assessments provide the necessary information for the government to understand the extent to which critical technology may be exposed or unprotected, with information to support decisions on how to improve protection both within and across programs. This program is funded under Budget Activity 7, Operational System Development because it supports intelligence efforts that involve engineering development.

Program Accomplishments and Plans:

FY 2001 Accomplishments: N/A

FY 2002 Plans: ($17.939 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Defense Joint Counterintelligence Program** **PE 0305146D8Z**

- Establishes JCAG IOC. Planned products include Horizontal Critical Technology Profiles, Horizontal Risk Assessments, and Tailored Information Products.
- Classified Platform Harvest initiative supports sensitive data acquisition and conversion activity in areas such as Blue Weapons data and foreign visitor data. Initiative also supports development of tactics, techniques, and procedures for remote data conversion and processing.
- Established JCAG Full Operational Capability (FOC). FOC will add a spiral development effort to insert new technologies, capabilities, and data sources into the JCAG Automated Information System (AIS) to provide refinement of JCAG products.
- Continue Technology/Operations Beta site activities to provide the capability to assess, integrate, and test the applicability of commercial and government technologies that support the JCAG mission, and provide to the analysts the ability to evaluate potential analytical tools and evolve analytical processes.

FY 2003 Plans: ($6.058 million)

- Continue support to JCAG IOC and products that include Horizontal Critical Technology Profiles, Horizontal Risk Assessments, and Tailored Information Products.
- Continue support to assist in JCAG's Full Operational Capability (FOC). FOC will add a spiral development effort to insert new technologies, capabilities, and data sources into the JCAG Automated Information System (AIS) to provide refinement of JCAG products.
- Continue Technology/Operations Beta site activities to provide the capability to assess, integrate, and test the applicability of commercial and government technologies that support the JCAG mission, and provide to the analysts the ability to evaluate potential analytical tools and evolve analytical processes.
- JCAG is a non-add in this program because it is funded in the DERF to provides funding for the advanced information systems as well as contractor analysts to support the protection of personnel and critical DoD assets from new and emerging clandestine and covert threats, specifically terrorist activity. Provides the capability to increase threat awareness; identify vulnerabilities before a compromise occurs; monitors high-risk situations; investigates anomalous behavior; deters foreign collection efforts; and responds to acts of espionage. In addition, provides the capability to monitor and track foreign visitors and foreign contacts with DoD facilities and personnel worldwide. Conducts domestic threat and risk assessments in support of tasking and requirements levied by the Department and provides DoD systems support to the Foreign Terrorist Tracking Task Force by establishing a virtual real time ability to detect and track foreign terrorist activities and terrorist pre-operational activities. The JCAG will deploy information developed by DARPA to ensure that DoD's leadership, from the installation level through the senior leadership of the Department, has a common relevant operational picture of risks and threats associated with foreign terrorism.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **Defense Joint Counterintelligence Program** **PE 0305146D8Z**

B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget		5.977	3.366	Continuing
Appropriated Value				
a. Congressionally Directed Undistributed Reductions.		-.038		
b. Rescission/Below threshold program adjustments				
c. Other		12.000	2.692	
FY 2003 Budget Estimates Submission		17.939	6.058	Continuing

Change Summary Explanation:
FY 2002: Defense Joint Counter Intelligence funding transferred to this PE $1.2 million; CI correlation Tool funding realigned from PE 0305190 $4.777 million.
FY 2003: Non-pay purchase inflation adjustments -.016

Schedule: N/A
Technical: N/A

C. Other Program Funding Summary: N/A

EXHIBIT R-2a, RDT&E Project Justification		DATE:
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/BA-7**	PROGRAM ELEMENT NAME AND NUMBER **Defense Joint CI Program, PE 0305146D8Z**	PROJECT NAME AND NUMBER **Joint Counterintelligence Assessn**

(U) PROGRAM CHANGE SUMMARY: N/A

CHANGE SUMMARY EXPLANATION: N/A

B. OTHER PROGRAM FUNDING SUMMARY: N/A

C. ACQUISITION STRATEGY: DoD Data Analysis and Engineering Services Contract, Harris Technical Services Corporation (HTSC) provides analysis support of all source data and provides system design support to the data analysis function. GSA Contracts: Gray Hawk Systems Task Order provides Systems Engineering and Technical Assistance; Sytex Task Order provides systems development and engineering support; and Oracle Task Order provides technical research, development, and test support. The JCAG program follows a Systems Development Life Cycle methodology to ensure schedule, budget, technology insertion and risk mitigation goals are met. Utilize existing GSA and DoD contract vehicles.

D. SCHEDULE PROFILE:

FY01				FY02				FY03	
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	

Technical and Operations Beta sites operational

Exhib

EXHIBIT R-2a, RDT&E Project Justification							DATE:	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/BA-7**	PROGRAM ELEMENT NAME AND NUMBER **Defense Joint Counterintelligence Program PE 035146D8Z**					PROJECT NAME AND NUMBER **Joint Counterintelligence Assessment (**		
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Cor
Joint Counterintelligence Assessment Group		17.939	6.058	6.442	6.802	6.926	7.059	Continui

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Joint Counterintelligence Assessment Group (JCAG) is tasked with developing and implementing an analysis center to support the protection of critical technology in the government. This activity responds to Deputy Secretary of Defense guidance to develop and operate such a capability to protect DoD critical technology programs from threats posed by foreign intelligence activities, foreign information operations, terrorist, and other clandestine or covert threats. The JCAG mission includes evolving analytic processes and techniques to take advantage of leading technologies, and produce horizontal critical technology profiles and risk assessments. These profiles and assessments provide the necessary information for the government to understand the extent to which critical technology may be exposed or unprotected, with information to support decisions on how to improve protection both within and across programs. Delays in establishing a capability to conduct horizontal analysis will directly impact/delay the government's ability to quantify the extent to which technology or information is at risk, and properly size responses or programs to mitigate this risk. By leveraging from the latest technologies, analysts will exploit massive databases with dynamic retrieval, analysis, and presentation tools for decision-makers to visualize the threats, vulnerabilities, and solution sets to the DoD critical technology protection mission.

OSD/C3I has asked for an acceleration of the program based on the current world situation and the security threat to national assets. The JCAG budget across the FYDP falls short of adequate funding for a collection and analysis activity of necessary depth for an effective program. An accelerated near-term capability will require increased funding in order to develop a revised and automated analytic approach with the depth of data necessary to produce near-term meaningful products. Further reductions in the budget will severely limit the program's ability to reach a minimum threshold of conducting analysis and developing horizontal information products useful to the decision process of protecting critical technology and US interests.

FY 2001 Accomplishments:

• Established the initial Initial Operational Capability (I2OC) site. I2OC provides a capability to exploit the JCAG tools and data in a classified operational environment, identifying JCAG system design and operational problems and solutions before IOC, respond to dynamic, real world tasking, and produce technology protection products.

• Consolidated the Beta sites into a single Technology/Operations Beta site to assess, integrate, and test the applicability of technologies in conducting analysis to support the protection of critical technology; evolve analytic processes, procedures, and products by assessing these technologies in an operational environment; and implement Spiral Development process of hardware and software automation tools and capacity to support both JCAG and C3I initiatives.

FY 2002 Program:

• Completes the design and build out of the IOC site.

• Establishes JCAG IOC. Planned products include Horizontal Critical Technology Profiles, Horizontal Risk Assessments, and Tailored Information Products.

• Establishes JCAG Full Operational Capability (FOC). FOC will add a spiral development effort to insert new technologies, capabilities, and data sources into the JCAG Automated Information System (AIS) to provide refinement of JCAG products.

• Continues Technology/Operations Beta site activities to provide the capability to assess, integrate, and test the applicability of commercial and government technologies that support the JCAG mission, and provide to the analysts the ability to evaluate potential analytical tools and evolve analytical processes.

- Classified Platform Harvest initiative supports sensitive data acquisition and conversion activity in areas such as Blue Weapons data and

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **C3I INTELLIGENCE PROGRAMS** **PE 0305190D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.950	16.684	75.682	163.862	225.038	232.028	239.014	Continuing	Continuing
C3I Intelligence Programs	24.950	16.684	75.682	163.862	225.038	232.028	239.014	Continuing	Continuing
DERF Increase	0	0	47.800	39.800	41.500	28.400	26.800		

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: 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. Funding includes resources and manpower in support of projects managed by the Intelligence Systems Support Office (ISSO) as directed by the ASD(C3I). ISSO provides oversight and technical support to DoD activities and initiatives requiring assistance in technology areas ranging from concept development through demonstration of full operational capability. This program is funded under BA-6, Operational Systems Development, because it supports intelligence efforts that involve engineering development.

Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Intelligence Mission Support ($14.577 million)

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

	February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **C3I INTELLIGENCE PROGRAMS** **PE 0305190D8Z**

- Support activities of the National Security Space Architect (NSSA) organization responsible for the integration of space system architectures, elimination of vertical stove-piped space systems, and achieving efficiencies in acquisition and future operations through space program integration. ($10.373 million)

FY 2002 Plans:

- Intelligence Mission Support ($11.684 million)

- Provides funding for the Miniaturized Wireless system to initiate a university-industry program to utilize advances in three-dimensional chip scale packaging and high temperature super-conducting transceiver performance, to reduce the size, weight, power consumption and cost of advanced wireless communication systems for covert military and intelligence operations. ($5.000 million)

FY 2003 Plans:

- Supports counterintelligence activities ($15.000 million)
  - Continue Technology Operations Beta Site activities to provide the capability to assess, integrate, and test the applicability of commercial and government technologies that support the JCAG mission, and provide to the analysts the ability to evaluate potential analytic tools and evolve analytical processes.
  - Continue to add spiral development effort to insert new technologies, capabilities, and data sources into the JCAG automated information system (AIS) to produce new leading technologies and produce horizontal critical technologies and risk assessments for the Department to protect against, identify and neutralize terrorist activities and other clandestine or covert threats to DoD assets.

- Supports intelligence information operations activities ($.007 million)

- Horizontal Fusion: This project provides Joint Force Commanders and their Battle Staffs with the capability for increasing the speed of Command of widely dispersed Joint Forces. Capabilities provide for improved situational awareness, more rapid integration of operational-intelligence planning,

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **C3I INTELLIGENCE PROGRAMS** **PE 0305190D8Z**

- capability for incorporating video information on-line, collaborative planning and modern mission rehearsal utilizing high fidelity simulation and improved data interoperability. Funding will be used to support time sensitive, network-centric collaborative operations among operational and selected elements of a Coalition/Joint Task Force, reachback ISR and other Combat support organizations. More specifically, funds will support the selection, procurement, and deployment of leading edge commercial Information Technology (IT) components (hardware and software), security services, procedures, and training. Certain IT component will be integrated into ongoing programs or platforms selected for their durability and compatibility with the Global Information Grid (GIG) network-centric architecture. ($59.986 million)
- The Hard and Deeply Buried Targets (HDBT) project is a non-add in this program because it is funded in the DERF to support technological advances in analysis tools, particularly quantum improvements in computing (super computing). Procurement funding will be used to obtain and test sensors and sensor ingress/egress tools and capabilities. Sensor testing will be conducted by DoD and National Laboratories. ($3.200)
- The Information Operations project is a non-add in this program because it is funded in the DERF to provide for the recapitalization and modernization of electronic warfare (EW) capabilities. Details are classified and will be provided separately. ($25.000)
- The Information Operations project is a non-add in this program because it is funded in the DERF to provide funding for analysis of the potential for wars, their deterrence, dissuasion, and termination courses of action, to include: modeling of economic, political and social vulnerabilities to peace; displays information on a geospacial grid that includes infrastructure cohesive forces; and facilitates early preventive action that will cost less than war and reconstruction. Funds also enable more effective creation of US policies and actions as follows: drives collaboration with other government agencies, non-government organizations, global business and allies; enhances public communication of our national intent and humanitarian nature; leverages new information technologies including psychological and information operations; improves the ability to plan and execute the shaping and engagement mission and measure effectiveness; and supports combat planning and preparation should deterrence fail. ($9.000)
- The Horizontal Fusion Analysis project is a non-add in this program because it is funded in the DERF to be used to transform intelligence analysis processes currently based on broadcast and platform-centric systems; to make necessary modifications to broadcast and other critical intelligence systems. When implemented, horizontal fusion will enable time-sensitive, net-centric, collaborative operations, but the intelligence and warfighting communities will not be able to take advantage of edge computing capabilities without new doctrine, tactics, techniques, and procedures. These new processes are essential to facilitate the publication of intelligence data and analysis products that can be "pulled" from the net on demand by the warfighters. To be effective, the new processes must be co-evolved with modifications to existing systems and integration of new commercial IT components. ($5.600)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **C3I INTELLIGENCE PROGRAMS** **PE 0305190D8Z**

- The Coalition-Intelligence Information Sharing (CENTRIX) is a non-add in this program because it is funded in the DERF to sustains a common interoperable coalition intelligence information exchange capability based on the current JDISS International baseline adjusted to the command system and network standards in support of the Global Counter Terrorism Forces (GCTF) Mission at CENTCOM, PACOM, SOUTHCOM and EUCOM. Leverages the existing USEUCOM Linked Ops-Intel Centers Europe, the NATO Battlefield Information Collection Exploitation Systems network, and the PACOM Coalition Wide Area Network (COWAN) and exploits existing telecommunications. Provides a standing coalition mechanism for quickly exchanging crucial intelligence information between the Theater CINC's, their components, Allied/Coalition partners, and US Embassies. Establishes cross command CGGS/13 coalition interoperability with partners. Procures common COTS hardware and software in conjunction with DII/COE and JDISS International standards. ($5,000)

B. Program Change Summary	FY2001	FY2002	FY2003	Total Cost
Previous President's Budget	24.950	10.552	11.825	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reductions				
b. Rescission/Below threshold Reprogramming, Inflation Adjustments		-.068		
c. Other		6.200	63.857	
Current President's Budget	24.950	16.684	75.682	Continuing

Change Summary Explanation:

Funding: FY 2002: Non-pay purchase inflation adjustments -.068; Congressional adds of $6.200 million.
FY 2003: Non-pay purchase inflation adjustments -.018; Increase to support IO efforts of $75,700 million; Increase to support IO efforts for internal realignment of $5.932 million.

Schedule: N/A
Technical: N/A

R2a Exhibit RDT&E Budget Item Justification							DATE February 2002
APPROPRIATION/BUDGET ACTIVITY 07					Program Element (PE) Name and No. **PE 0305190D8Z C3I Intelligence Programs (ISSO)**		

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total Cost
Project Cost	24.950	10.484						Continuing
RDT&E Articles QTY								

A. Mission Description and Budget Item Justification:

ISSO includes all resources and manpower in support of projects managed by the Intelligence Systems Support Office (ISSO) as directed by the ASD(C3I). ISSO provides a full spectrum of Program Oversight and support to DoD activities and initiatives requiring assistance in technology areas ranging from concept development through demonstration of full operational capability. The primary focus is on development, integration and assessment of systems or applications in support of non-traditional and contingency warfare.

Note: ISSO project is transferred to Air Force beginning in FY 2003. Other project support is internally realigned beginning in FY 2003.

B. Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Continued Mission Support ($24.950 million)

FY 2002 Plans:

- Mission Support ($10.484 million)

FY 2003 Plans: n/a

C. Acquisition Strategy: N/A

D. Schedule Profile: N/A

E. Customers and Products:

Customers include OSD, JCS, the Services and their subordinate commands, the Unified Commands and their components, joint task forces, intelligence agencies, federal executive departments, other federal and state government agencies and US allies.

R2a Exhibit RDT&E Budget Item Justification							DATE February 2002
APPROPRIATION/BUDGET ACTIVITY 07					Program Element (PE) Name and No. **PE 0305190D8Z C3I Intelligence Programs (ISSO)**		

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Total Cost
Project Cost	24.950	10.484						Continuing
RDT&E Articles QTY								

A. Mission Description and Budget Item Justification:

ISSO includes all resources and manpower in support of projects managed by the Intelligence Systems Support Office (ISSO) as directed by the ASD(C3I). ISSO provides a full spectrum of Program Oversight and support to DoD activities and initiatives requiring assistance in technology areas ranging from concept development through demonstration of full operational capability. The primary focus is on development, integration and assessment of systems or applications in support of non-traditional and contingency warfare.

Note: ISSO project is transferred to Air Force beginning in FY 2003. Other project support is internally realigned beginning in FY 2003.

B. Program Accomplishments and Plans:

FY 2001 Accomplishments:

- Continued Mission Support ($24.950 million)

FY 2002 Plans:

- Mission Support ($10.484 million)

FY 2003 Plans: n/a

C. Acquisition Strategy: N/A

D. Schedule Profile: N/A

E. Customers and Products:

Customers include OSD, JCS, the Services and their subordinate commands, the Unified Commands and their components, joint task forces, intelligence agencies, federal executive departments, other federal and state government agencies and US allies.

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER **C3I INTELLIGENCE PROGRAMS/PE 0305190D8Z/P481**

A. Project Cost Breakdown ($ in Millions)

Project Categories	FY 2001	FY 2002	FY 2003
a. Salaries/Benefits	2.375	2.224	.000
b. Primary Hardware Development	.050	.050	.000
c. Ancillary Hardware Development	.020	.020	.000
d. Development Support Equipment Acquisition	4.468	3.673	.000
e. Research Support Equipment Acquisition	3.000	.090	.000
f. Software Development	.330	.310	.000
g. Licenses			
h. Systems Engineering	.861	.895	.000
i. Training Development	.100	.030	.000
j. Integrated Logistics Support	.359	.312	.000
k. Quality Assurance	.050	.050	.000
l. Reliability, Maintainability & Availability			
m. Configuration Management	.319	.325	.000
n. Technical Data			
o. Development Test & Evaluation	.800	.800	.000
p. Operational Test & Evaluation			
q. Contractor Engineering Support	7.913	.510	.000
r. Government Engineering Support	.455	.505	.000
s. Program Management Support	3.309	.460	.000
u. Travel	.489	.230	.000
v. Research Personnel			
w. Miscellaneous (less than 15%)	.052		
Total	**24.950**	**10.484**	**.000**

R-1 ITEM NO.

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER **C3I INTELLIGENCE PROGRAMS/PE 0305190D8Z/P481**

B. Budget Acquisition History and Planning Information Not Applicable

Performing Organizations

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to PY	Budget PY	Budget CY	Budget BY1	Budget PY2	Budget to Complete	Total Program
Product Development Organization											
Support and Management Organizations											
Test and Evaluation Organizations											
Government Furnished Property											

Contractor or Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Total Prior to PY	Budget PY	Budget CY	Budget BY1	Budget PY2	Budget to Complete	Total Program
Product Development Property											

R-1 ITEM NO.

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE October 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE/PE NUMBER/PROJECT NUMBER **C3I INTELLIGENCE PROGRAMS/PE 0305190D8Z/P481**

C. Funding Profile Fiscal Year actual and planned obligations and expenditures
($ in Millions)

Funds Profile	FY2001	FY 2003	FY2003	FY 2001 Exp	FY 2002 Exp	FY 2003 Exp
PYQ1	2.579			1.920		
PYQ2	6.623			1.550		
PYQ3	5.917			2.637		
PYQ4	6.286			1.435		
PYTot	**21.405**			**7.542**		
CYQ1	2.014	1.283		2.157	.550	
CYQ2	.690	1.954		1.654	.720	
CYQ3	.841	2.112		1.548	1.637	
CYQ4		2.847		2.852	1.435	
CYTot	**3.545**	**8.196**		**8.211**	**4.342**	
BY1Q1		.594	0.000	1.473	1.089	0.000
BY1Q2		.922	0.000	2.914	1.654	0.000
BY1Q3		.840	0.000	2.841	.911	0.000
BY1Q4			0.000	1.201	.852	0.000
BY1Tot		**2.356**	**0.000**	**8.417**	**4.506**	**0.000**
BY2Q1			.000	.768		0.000
BY2Q2			.000		1.636	0.000
BY2Q3			.000			.000
BY2Q4						.000
BY2Tot			**0.000**	**.768**	**1.636**	**0.000**
BY2+1Q1						
BY2+1Q2						
BY2+1Q3						
BY2+1Q4						
BY2+1Tot						
Total of fiscal year	**24.950**	**10.552**	**5.893**	**24.938**	**10.484**	**0.000**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **TECHNOLOGY DEVELOPMENT** **PE 0305191D8Z**

COST *(In Millions)*	FY2000	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost			4.738	120.458	241.647	108.692	94.398	60.151	Continuing	Continuing
Technology Development (DERF)			0	110.500	25.500	25.500	25.500	25.500		

A. Mission Description and Budget Item Justification

Brief Description of Element: 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.

Program Accomplishments and Plans:

FY 2001 Accomplishments: n/a

FY 2002 Plans:

- Mission Support ($4.738 million)

FY 2003 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **TECHNOLOGY DEVELOPMENT** **PE 0305191D8Z**

- Mission Support ($120.458 million)
- Technology Development (Special Access Program) is a non-add in this program because it is funded in the DERF. Details of the program are classified.

B. Program Change Summary	FY2001	FY 2002	FY2003	Total Cost
Previous President's Budget		40.000	20.773	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reductions		-35.262		
b. Rescission/Below Threshold Reprogramming, Inflation Adjustment			14.781	Continuing
c. Other			84.904	
FY 2003 Budget Estimates Submission		4.738	120.458	Continuing

Change Summary Explanation:

FY 2000 and FY 2001 funding maintained by Navy. $20 million transferred to OSD in FY 2002 and out.
FY 2002: Adjustments for FFRDC reductions (Section 8032) -35.000; Cross-cutting congressional adjustments (Section 8123) -.262
FY 2003: Program adjustment of $14.781 million. Non-pay purchase inflation adjustments -.096. Program increase for Technology development $85 million.

C. Other Program Funding Summary Cost: N/A

D. Schedule Profile: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE, Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **National Security Space Architect (NSSA)** **PE 0305917D8Z**

COST *(In Millions)*	FY2001	FY2002	FY2003	FY2004	FY2005	FY2006	FY2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	11.185	12.820	13.140	13.162	13.416	Continuing	
Project Name/No. and Subtotal Costs – National Security Space Architect (NSSA)	0	0	11.185	12.820	13.140	13.162	13.416	Continuing	Continuing

NOTE: In FY 2001, the National Security Space Architecture (NSSA was in PE 0305190D8Z (C3I Intelligence Programs). In FY 2001, the NSSA was moved to PE 0605116D8Z (Support to C3I). From FY 2003 and out, the NSSA will be reported in PE 0305917D8Z.

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: In July 1998, a Memorandum of Understanding (MOU) was signed by the Secretary of Defense (SECDEF) and Director of Central Intelligence (DCI) to incorporate the architectural activities of the National Reconnaissance Office (NRO) and the DoD Office of the Space Architect under the organizational title, National Security Space Architect (NSSA). The NSSA reports to ASD (C3I) and works to integrate space system architectures, eliminate unnecessary vertical stove-piping of space programs, and achieve efficiencies in acquisition and future operations through space program integration, thereby improving space support to a variety of customers. The NSSA obtains direct support from various space planning and development organizations across the federal government and industry for space architecture planning and development. Funding in this document incorporates DoD requirements only. The NSSA has a secondary reporting to the DDCI/CM for Intelligence Community requirements. Intelligence Community requirements and funding to support the NSSA efforts are not included in this program element. This program is funded under Budget Activity 7, Operational System Development, because it supports engineering development of an RDT&E program.

Program Accomplishments and Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **National Security Space Architect (NSSA)** **PE 0305917D8Z**

FY 2001 Accomplishments: N/A

FY 2002 Plans: N/A

FY 2003 Plans:

- Architecture Engineering and Capabilities Analysis Tools and Studies ($3.359 million)
- Integrated Intelligence, Surveillance, and Reconnaissance and Wide Area Surveillance Architectures Development ($3.213 million)
- National Security Space Plan and Program Assessment ($1.980 million)
- Architecture Hierarchy Development and Assessments ($2.133 million)

B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget				
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reductions				
b. Rescission, Below threshold Reprogramming, Inflation Adjustment			11.215	Continuing
c. Other			-.030	
Current President's Budget			11.185	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **National Security Space Architect (NSSA)** **PE 0305917D8Z**

Change Summary Explanation:

FY 2001: Funding for the NSSA was contained in PE 0305190D8Z.

FY 2002: NSSA funding was transferred to PE 0605116D8Z.

FY 2003: Non-pay purchase inflation adjustments -.030

C. Other Program Funding Summary:

Additional funding is appropriated to support the NSSA and is included in the classified Intelligence Community Budget.

D. Acquisition Strategy:

RDT&E funds will be used to obtain infrastructure support and direct support from various space planning and development organizations across the DoD and industry, including Federally Funded Research & Development Centers (FFRDCs) and contracted System Engineering and Technical Assistance in direct support of DoD space architecture planning and development. Funds will be applied to existing contract vehicles.

- As primary support, the Space Architect plans to use three Space & Missile Center (SMC) contracts for technical support:
  - -- Engineering, Analysis, Design and Development Contract; Science Applications International Corporation (SAIC)
  - -- Engineering, Analysis, Design and Development Contract; Computer Sciences Corporation (CSC)
  - -- Engineering, Analysis, Design and Development Contract, SPARTA, Inc

- These contracts currently provide support to the Air Force SMC long-range planning, conceptual development, and engineering analysis and assessment efforts.

D. Schedule Profile:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/Budget Activity 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **National Security Space Architect (NSSA)** **PE 0305917D8Z**

	FY 2001				FY 2002				FY 2003			
	1	2	3	4	1	2	3	4	1	2	3	4
Initiate Integrated Spectral Architecture Tracking						*						
Initiate MIM Architecture Tracking					*							
Complete I-ISR Strategy Study						*						
Initiate I-ISR Architecture Development Team (ADT)							X					
Initiate Wide Area Surveillance (WAS) ADT					*							
Initiate Space Situational Awareness ADT					*							
Initiate National Security Space Plan and Program Assessment					*							
Complete Space Situational Awareness ADT								X				
Initiate Architectural Hierarchy Development and Assessment									X			
Complete I-ISR and WAS ADTs												X

* = Completed event
X = Planned event

Exhibit R-3 Cost Analysis (page 1)												Date: February 2002
APPROPRIATION: RDT&E, DW BUDGET ACTIVITY : 7			PROGRAM ELEMENT 0305917D8Z									
Cost Categories	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Engineering, Analysis Tools & Studies	Various	Various	0	0	N/A	0	N/A	3.889	Various	Cont	Cont	
Architectures	Various	Various						3.203	Various	Cont	Cont	
Plan and Program Assessments	Various	Various						1.970	Various	Cont	Cont	
Architecture Hierarchy Development	Various	Various						2.123	Various	Cont	Cont	
Subtotal Product Development								11.185				
Remarks: Funding for the National Security Space Architect was moved to this PE in FY 2003.												
Total Cost								11.185		Cont.	Cont.	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	R-1 ITEM NOMENCLATURE Commercial O&S Savings Initiative **PE 0604805D8Z**

COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9.541	22.735	10.320	10.517	10.737	10.970	11.196	Continuing	Continuing
Commercial O&S Savings Initiative/P805	9.541*	22.735	10.320	10.517	10.737	11.970	11.196	Continuing	Continuing

*Beginning in FY 2001, this pe transfers BA 5 to BA 7.

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT

The Commercial Operations and Support Savings Initiative (COSSI) uses commercial technology to increase the reliability and reduce the operations and support costs of legacy weapon systems. As systems age, O&S costs increase. In addition, older technology often tends to be less reliable than newer technology. COSSI uses technology insertions to lower O&S costs and increase reliability. COSSI also promotes the use of open system standards allowing DoD to take advantage of commercial technology cycles and modernize equipment faster. Adapting commercial technologies for use in military equipment typically requires non-recurring engineering, testing and qualification. COSSI provides the funds for this engineering and testing. If the testing is successful and the cost savings validated, the items are purchased as retrofits. All COSSI projects must have an endorsement by a military customer and be linked to an existing military system. Project proposals must include a plan for transitioning from prototype development to production.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	**R-1 ITEM NOMENCLATURE** Commercial O&S Savings Initiative **PE 0604805D8Z**

COST *(In Millions)*	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9.541	22.735	10.320	10.517	10.737	10.970	11.196	Continuing	Continuing
Commercial O&S Savings Initiative/P805	9.541*	22.735	10.320	10.517	10.737	11.970	11.196	Continuing	Continuing

(U) Project Number and Title: P805 Commercial O&S Savings Initiative

(U) PROGRAM ACCOMPLISHMENTS AND PLANS

(U) FY 2001 Accomplishments:

(U) COSSI funds were used to support four projects: an electronic propeller control system for C-130 aircraft, an advanced symbol generator for the AN/AVS-7 night vision imaging system/heads-up-display, a new propeller deicing system for P-3 and C-130 aircraft and qualification testing of a new signal processor for the F-16 Fire Control Radar. The electronic propeller control system for the C-130 is a spin-off of a similar COSSI project for the P-3 started in FY 2000. The project is modifying the propeller control system currently used on ATR 42 and ATR 72 regional civil aircraft for use on the C-130. An electronic propeller control and electronic valve housing will replace the mechanical valve housing and synchrophaser. The project is expected to reduce propeller maintenance costs from approximately $19/flight hour to approximately $2/flight hour. The advanced symbol generator project is a follow-on to a previous COSSI project that developed active matrix electroluminescent flat panel displays for Army aviator night vision goggles. The project is replacing the current signal data converter (SDC) with a new one that is smaller, lighter, and less expensive to buy and maintain. The new SDC will be almost $10,000 less expensive to buy than the one being replaced. The propeller deicing project is developing a propeller mounted generator similar to the one designed for the Beech 1900D civil aircraft. The new design eliminates the carbon brushes currently used to transfer electrical power to the propellers. Having a generator mounted directly on the propeller will eliminate the need to clean the propeller and replace the brushes every 50 flight hours. Maintenance costs will be reduced by

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	R-1 ITEM NOMENCLATURE Commercial O&S Savings Initiative **PE 0604805D8Z**

approximately $5 million/year. The new signal processor for the F-16 Fire Control Radar will increase reliability by more than 60 percent. COSSI funds are supporting the flight testing needed to qualify the processor. ($ 9.541 Million)

(U) FY 2002 Plans

Six projects will be initiated in FY 2002. Digital Electronic Warfare (EW) Receiver for the F-22 ($12.000 million) Recent technological advances have permitted analog based EW components to be converted to digital electronics. Digital receivers are expected to reduce supportability costs and increase combat performance. This project will complete the requisite systems software development, design, and test of a digital receiver and two associated modules for the F-22. Electronic Characterization and Diagnostics (ECAD) of Wiring in Aircraft and Submarines ($3.000 million) DoD spends a considerable amount of time, money and effort maintaining the wiring and cables in aircraft and submarines. Often, wiring and cable failures can only be detected through a process of elimination as maintenance personnel troubleshoot a system failure. In some cases, electronic components are removed and tested when in fact the failure is due to faulty wiring and not the component itself. This project will modify a technology originally developed for the nuclear power industry and apply it to determine the condition of wiring in military systems. Synthetic Instrumentation for Automated Test Systems ($3.320 million) Automated test equipment (ATE) used by the military is often based on 1980s technology and is comprised of a collection of individual instruments with unique interfaces. Because ATE was developed in the 1980s, it is experiencing widespread obsolescence problems. Recent commercial technology allows for the development of synthetic instruments that can be configured in real time to perform various test functions. Signals are converted into digital representations which are then analyzed using high speed digital signal processing techniques. As a result, a single "synthetic" instrument can replace numerous single function instruments thereby reducing the logistics footprint and solving obsolescence problems. Health and Usage Monitoring System for U.S. Army Special Forces' Aircraft ($1.215 million) This project will install a Health and Usage Monitoring System Processor Module on the U.S. Army Special Forces fleet of MH-47D and MH 47E helicopters. The module will provide the capability to perform embedded diagnostics including rotor track and balance, performance monitoring, exceedance detection, and vibration monitoring. This on board capability will significantly reduce the labor and test flight hours needed for rotor track and balance. Other benefits include a reduction in scheduled and unscheduled maintenance actions, an expected reduction in accidents, and accurate tracking of aircraft usage of flight hours from HUMS data instead of pilot logs. Integrated Malaria Augmentation Package ($2.000 million) Malaria constitutes a serious infectious disease threat in many parts of the world.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	R-1 ITEM NOMENCLATURE Commercial O&S Savings Initiative **PE 0604805D8Z**

Some U.S. forces contracted malaria during Operation Restore Hope (Somalia) and Operation Uphold Democracy (Haiti). The current method for diagnosing malaria involves microscopic examination of a blood sample and does not lend itself to rapid in-theater diagnosis. This project will modify an existing commercial malaria test and treatment kit for field use and perform the testing needed for Food and Drug Administration (FDA) approval. Although the kit is currently available outside the U.S., FDA approval for sales within the U.S. is required before it can be used by our military personnel. The kit uses test strips instead of microscopic examination and can be deployed in the field. Support for the Modernization of the STANDARD Missile Common Guidance System ($1.200 million) The STANDARD Missile (SM) is the principal surface ship defense weapon for the Navy. There are several variants of the SM and each one has its own guidance system. This project will support the development of a common, high reliability guidance system that can be used on all variants. Six unique plates will be replaced by two common plates based on an open commercial standard, resulting in a higher reliability guidance system. Many of the obsolescence problems currently being experienced will also be eliminated. ($22.735 million)

(U) FY 2003 Plans:

(U) As in the past, DoD will issue a call for projects in February, with project proposals due in May. The proposals will be evaluated and the best ones selected for the funding available. Based on previous experience, proposals are expected to pertain to upgrading electronics and computers. Some FY 2003 funds will be used to perform flight testing of the C-130 electronic propeller control developed with FY 2001 funds ($1.900 million) and to complete the Health and Usage Monitoring System for U.S. Army Special Forces' Aircraft started in FY 2002 ($1.721 million) and the STANDARD Missile Common Guidance System started in FY 2002 ($1.800 million)..($ 10.320 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	R-1 ITEM NOMENCLATURE Commercial O&S Savings Initiative **PE 0604805D8Z**

(U) B. Program Change Summary	FY 2001	FY 2002	FY 2003	Total Cost
Previous President's Budget Submit	0.000	0.000	10.348	
Delta	9.541	10.805	0.028	
FY 2002 Amended President's Budget Submit	9.541	10.805	10.320	
Appropriated Value	9.629	22.805	0.000	Continuing
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	0.000	-0.070	0.000	
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	-0.088	0.000	0.000	
c. Other	0.000	0.000	0.000	
Current President's Budget	9.541	22.735	10.320	Continuing

Change Summary Explanation:

(U) **Funding**: FY 2001 reductions reflect Section 8086 reductions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2002
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 7	R-1 ITEM NOMENCLATURE Commercial O&S Savings Initiative **PE 0604805D8Z**

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

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

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

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

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