UNCLASSIFIED

Department of Defense FY 1999 Amended Budget Estimates

February 1998

DTIC QUALITY INSPECTED 3

RESEARCH, DEVELOPMENT, TEST AND EVALUATION, DEFENSE-WIDE

Volume 3 - Office of the Secretary of Defense

UNCLASSIFIED

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Office of Secretary/Defense
FY 1999 RDT&E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test & Eval Defwide

Date: FEB 1998

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 1997	FY 1998	FY 1999	Sec
1	0601101D8Z	In-House Laboratory Independent Research	1	3,074	1,513	2,173	U
3	0601103D8Z	University Research Initiatives	1	208,656	222,628	216,320	U
4	0601105D8Z	Gulf War Illness	1			19,646	U
5	0601111D8Z	Government/Industry Cosponsorship of University	1		7,393	9,870	U
		Basic Research		211,730	231,534	248,009	
9	0602227D8Z	Medical Free Electron Laser	2	19,432	20,103	9,706	U
10	0602228D8Z	Historically Black Colleges and Universities	2	10,594	11,080		U
11	0602234D8Z	Lincoln Laboratory Research Program	2	19,561	17,708	19,641	U
20	0602787D8Z	Medical Technology	2	7,981	8,669	9,239	U
		Applied Research		57,568	57,560	38,586	
22	0603002D8Z	Medical Advanced Technology	3	3,187	2,672	2,136	U
23	0603104D8Z	Explosives Demilitarization Technology	3	11,189	11,711	11,650	U
24	0603120D8Z	Demining	3	13,256	15,918		U
25	0603121D8Z	Alternative to Landmines	3		2,856	4,753	U
26	0603122D8Z	Counterterror Technical Support	3	24,599	39,036	35,813	U
28	0603160D8Z	Counterproliferation Support - Adv Dev	3	61,840	65,212		U
30	0603225D8Z	Joint DoD-DoE Munitions Technology Development	3	17,261	16,909	13,447	U
31	0603232D8Z	Automatic Target Recognition	3	4,391	6,487	5,081	U
33	0603704D8Z	Special Technical Support	3	16,785	11,224	11,337	U

Office of Secretary/Defense
FY 1999 RDT&E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test & Eval Defwide

Date: FEB 1998

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 1997	FY 1998	FY 1999	Sec
37	0603716D8Z	Strategic Environmental Research Program	3	52,770	57,115		U
38	0603727D8Z	Joint Warfighting Program	3		8,761	23,700	U
39	0603728D8Z	Agile Port Demonstration	3	4,500	4,778		U
40	0603729D8Z	Rocket Launch Facility Upgrades	3	9,433			U
41	0603730D8Z	Airfield Surface Traffic Monitoring	3	1,382			U
42	0603738D8Z	Cooperative DoD/VA Medical Research	3	23,809	14,421		U
46	0603750D8Z	Advanced Concept Technology Demonstrations	3	57,070	77,455	116,330	U
47	0603752D8Z	Commercial Technology Insertion Program	3	9,500	19,105		U
49	0603755D8Z	High Performance Computing Modernization Program	3	119,092	143,176	140,927	U
59	0603832D8Z	Joint Wargaming Simulation Management Office	3	56,945	61,460	70,696	U
		Advanced Technology Development		487,009	558,296	435,870	
63	0603228D8Z	Physical Security Equipment	4	23,095	17,939	31,792	U
64	0603708D8Z	Integrated Diagnostics	4	9,255	6,257	3,436	U
65	0603709D8Z	Joint Robotics Program	4	27,972	27,085	16,217	U
66	0603714D8Z	Advanced Sensor Applications Program	4	24,683	17,655	15,147	U
67	0603736D8Z	CALS Initiative	4	15,105	5,525	1,863	U
68	0603790D8Z	NATO Research and Development	4	9,312	8,245		U
70	0603851D8Z	Environmental Security Technical Certification	4	21,021	14,566	17,051	U
84	0603892D8Z	ASAT	4	48,736			U
85	0603920D8Z	Humanitarian Demining	4			17,234	U
		Demonstration and Validation		179,179	97,272	102,740	

Appropriation: 0400 D Research Development Test & Eval Defwide Date: FEB 1998

Line No	Program Element Number	Item	Act	FY 1997	FY 1998	FY 1999	Sec
				Thousands of Dollars			
90	0604160D8Z	Counterproliferation Support - EMD	5	2,300			U
92	0604709D8Z	Joint Robotics Program - Eng Dev	5			11,307	U
94	0604771D8Z	Joint Tactical Information Distribution System	5	42,238	53,266	30,512	U
95	0604805D8Z	Commercial Operations and Support Savings	5			13,410	U
		Engineering and Manufacturing Development		44,538	53,266	55,229	
99	0603858D8Z	Unexploded Ordnance Detection and Clearance	6			1,273	U
100	0604942D8Z	Assessments and Evaluations	6		4,655	3,916	U
101	0605104D8Z	Technical Studies, Support and Analysis	6	29,583	29,178	30,021	U
102	0605110D8Z	USD(A&T)--Critical Technology Support	6	2,608	2,584		U
104	0605117D8Z	Foreign Material Acquisition and Exploitation	6	39,300	35,996	35,035	U
105	0605122D8Z	Industrial Capabilities Assessments	6			2,937	U
108	0605128D8Z	Classified Program USD(P)	6	10,822	8,720		U
110	0605160D8Z	Counterproliferation Support	6	8,346	6,768		U
112	0605502D8Z	Small Business Innovative Research	6	26,667			U
114	0605710D8Z	Classified Programs - C3I	6	2,164	343	439	U
115	0605790D8Z	Small Business Innovation Research Administration	6	1,541	1,669	1,820	U
121	0305190D8Z	C3I Intelligence Programs	6			1,657	U
		RDT&E Management Support		121,031	89,913	77,098	
140	0305154D8Z	Defense Airborne Reconnaissance Program	7	454,411			U

Office of Secretary/Defense
FY 1999 RDT&E Program

Exhibit R-1

Appropriation: 0400 D Research Development Test & Eval Defwide

Date: FEB 1998

Line No	Program Element Number	Item	Act	Thousands of Dollars FY 1997	FY 1998	FY 1999	Sec
144	0305190D8Z	C3I Intelligence Programs	7	6,767	5,978	8,015	U
145	0305204D8Z	Tactical Unmanned Aerial Vehicles	7		52,148	37,192	U
146	0305205D8Z	Endurance Unmanned Aerial Vehicles	7		184,380	178,668	U
147	0305206D8Z	Airborne Reconnaissance Systems	7		188,445	162,666	U
148	0305207D8Z	Manned Reconnaissance Systems	7		26,581	10,840	U
150	0305208D8Z	Distributed Common Ground Systems	7		36,022	34,985	U
151	0305209D8Z	DARP Integration and Support	7		7,216	15,701	U
159	0909999D8Z	Financing for Cancelled Account Adjustments	7	7,378			U
160	1001017D8Z	Partnership for Peace Activities	7			1,957	U
		Operational Systems Development		468,556	500,770	450,024	
Total		Office of Secretary/Defense		1,569,611	1,588,611	1,407,556	

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1				R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	3.074	1.513	2.173	2.068	2.057	2.142	2.141	Continuing	Continuing
ILIR/P503	3.074	1.513	2.173	2.068	2.057	2.142	2.141	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. This program facilitates the recruitment and retention of faculty, supports state-of-the-art capabilities for training military medical students, and allows the collection of pilot data by the University's faculty researchers. Pilot data allow the faculty to secure research funds from non-DoD sources (est. $20-$20 million annually). Approximately 80 to 100 intramural research projects (20-25 new starts) are awarded each year, 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), Military Operational Medicine (MOM), and Nuclear, Biological and Chemical Medical Defense (NBC). The portfolio of research projects will vary annually because this research is investigator-initiated. Examples of typical research efforts are:

- Combat Casualty Care: ischemia and reperfusion injury, traumatic brain and peripheral nerve injury, cryopreservation and substitution of blood and blood components, endotoxic shock, inflammation and wound healing.
- 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, gonorrhea, streptococcus, hepatitis A, Venezuelan equine encephalitis (VEE), malaria, and bartonellosis.
- Military Operational Medicine: military and medical training and readiness
- Nuclear, Biological and Chemical Defense: basic research questions concerning nerve agent intoxication and treatment.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	3.074	1.513	2.173	2.068	2.057	2.142	2.141	Continuing	Continuing
ILIR/P503	3.074	1.513	2.173	2.068	2.057	2.142	2.141	Continuing	Continuing

(U) **Project Number and Title: P503/ILIR**

(U) **PROGRAM ACCOMPLISHMENTS AND PLANS**

(U) **FY1997 Accomplishments:**

(U) **Combat Casualty Care:** Generally one of the two largest areas of this program, 41 separate projects in Combat Casualty Care were supported in FY1997. The following are highlights of the accomplishments from a few of the funded protocols: a) Determined that a reliable predictor of organ failure resulting from endotoxic shock may be the profound and rapid inability of cells to regulate their internal calcium; b) Experimentally identified those antibiotics that are optimal for intravenous use for the two most common pathogens in infectious complications from traumatic eye injury; c) Determined that crosslinked hemoglobin blocks the normal vasodilation resulting from nitrous oxide administration, important knowledge for anesthesia administration in a combat theater where blood substitutes may be used; d) Confirmed that levels of certain cytokines, a class of biochemicals released by injured tissue, are increased as a result of traumatic brain injury, and that a signaling molecule, activin, may play a role in nervous system injury by regulating expression of the gene for cytokines; a long-term goal of this effort is to mitigate injury in wounding and to enhance the healing process. ($ 1.153 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

(U) **Infectious Diseases:** There were 36 projects funded in FY1997 to address basic research questions in Infectious Diseases, one of the areas of highest interest within the University. Highlights from the final reports or interim progress reports from these efforts include the following: a) Found that one of the key sites on the gene that produces the shiga-like toxins in *E. coli* is affected by temperature, strongly suggesting that it is controlled by transcriptional factors that could be used to mitigate disease transmission; b) Showed that in a population where an emergent disease, bartonellosis, is endemic but where the population is still asymptomatic, bacteremia rates may be low, but still significant enough to require prophylaxis and/or treatment; c) Initiated a study to determine cross-immunogenicity of two FDA approved, hepatitis A, inactivated vaccines for comparison in humans; results from this study could significantly reduce the cost of implementing this vaccine in U.S. troops; d) Determined that regulation of key, functional proteins on the outer membrane of gonococcus is sensitive to pH, suggesting a means of treatment and prophylaxis. ($ 1.023 Million)

(U) **Military Operational Medicine:** FY1997 funds supported 20 projects in Military Operational Medicine. Representative accomplishments are as follows: a) Examined the sensitivity of the brain-pituitary system in detecting feedback signals from dexamethasone, a powerful anti-inflammatory agent, and how the sensitivity to this signal affects the immune response to exercise. Results suggest a means to screen for individuals whose immune response is more or less affected by exercise; b) Found initial indicators that there are biological predictors of the psychological symptoms resulting from trauma; c) Initiated a review of all hospitalized, heat illness cases at Beaufort Naval Hospital to evaluate factors related to severity of illness, duration of hospitalization, and separation from the military. ($ 0.588 Million)

(U) **Nuclear, Biological and Chemical Medical Defense:** There were 11 projects supported in FY1997 in the NBC area. Representative accomplishments are: a) One protein within a class of proteins, the synectins, was further characterized for its role in the release of neurotransmitter for nerve-to-nerve communication, a process that is compromised during nerve agent poisoning; b) The dependency of breakdown rates on 1,4-benzodiazepines, such as valium, was measured to better understand the use of this drug to counteract the central nervous system treatment of nerve agent poisoning. ($ 0.310 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

(U) **FY1998 Plans:**

(U) **Combat Casualty Care:** This program is currently supporting 27 projects in Combat Casualty Care for FY1998. The following are examples of the objectives of a few highlighted protocols: a) Investigate the vascular effects of biochemicals that cause inflammation related to wounding and wound healing; b) Continue the investigation of the potential regulation of calcium in endotoxic shock; c) Examine how estrogen regulates growth factors in veins and arteries in order to enhance healing; d) Examine the effects of neurocytokines, biochemicals that are released upon nerve damage, in peripheral nerve injury; e) Investigate the use and effects of cross-linked hemoglobin in traumatic brain injury. ($ 0.499 Million)

(U) **Infectious Diseases:** Thirty-two (32) projects addressing basic research questions in Infectious Diseases are being funded for FY1998. Highlights from the plans of these projects include: a) Continue the investigation of Venezuelan equine encephalitis (VEE) by examining the role of white blood cells in the development and sequence of this disease; b) Continue to investigate how the pH-regulated outer membrane proteins in gonococcus affect acute and chronic infections of this sexually transmitted disease; c) Investigate the role of free radicals in group B streptococcus; d) Determine the susceptibility of another species of mosquito, *Anopheles vestipennis,* in Belize to the malaria parasite, *Plasmodium vivax*; e) Study the gene regulation of the shiga-like toxins coming from enterohemorrhagic *Escherichia coli*; f) Continue data collection for the comparison of two inactivated hepatitis A vaccines for their cross-immunogenicity and efficacy. ($ 0.605 Million)

(U) **Military Operational Medicine:** FY1998 funds are supporting 20 projects in Military Operational Medicine. Goals of a few representative proposals are as follows: a) Investigate means of increasing military readiness of medical personnel by studying skill-based treatment of pathological anxiety; b) Continue to investigate the training practices impacting exertional heat illness in Marine Corps basic training, as well as to study how immune function is affected by exercise; c) Attempt to derive the correlation of health outcomes and job performance to substance use in the military. ($ 0.272 Million)

(U) **Nuclear, Biological and Chemical Medical Defense:** There are 11 projects that are currently in progress in FY1998 in the NBC area. Representative research efforts in this area are: a) Continue to characterize the breakdown of 1,4-benzodiazepines, such as valium, used as an antidote to central nervous system effects of nerve agent poisoning; b) Initiate a study of the pattern of sensory input to the frontal cortex for treatment of head injury; c) Initiate study of the organism *Deinococcus radiodurans* to understand the mechanism of its extraordinary resistance to radiation. ($ 0.137 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

(U) **FY1999 Plans:**

(U) **Combat Casualty Care:** The objective of this program is to provide support for a significant number of new and continuing projects in Combat Casualty Care for FY1999. The program will continue to investigate various aspects of wounding and wound healing and the roles that inflammatory mediators play in these processes. Projects to elucidate cellular and molecular mechanisms in endotoxic shock and its treatment will also continue to be an important area of research. Another major thrust area is peripheral nerve injury and traumatic brain injury with the use of animal models and nerve cells in culture. Included in this program is the investigation of low power laser therapy to decrease programmed cell death when motor nerves are severed. ($ 0.826 Million)

(U) **Infectious Diseases:** This broad area will continue to be one of emphasis within the USUHS with plans for support of 30-35 protocols. Militarily relevant bacterial threat agents such as *E. coli* and its toxins, gonococcus, and streptococcus will garner significant available resources. Mobilization of macrophages and antibody production will continue to be studied within the context of Venezuelan equine encephalitis. An initiative to study typhoid fever is planned with the development of an animal model. Research is also planned to continue the study of bartonellosis in Peru by examining the vector and the animal reservoir, and by performing studies of the epidemology of this parasitic disease. The study of the comparison of two inactivated hepatitis A vaccines should be brought to completion with the final results impacting the decision for vaccination of military personnel. ($ 0.739 Million)

(U) **Military Operational Medicine:** Plans for FY1999 funds are to provide support for research in training and military readiness as a critical area within Military Operational Medicine. Training practices and their effects on exertional heat illness of Marine Corps basic training recruits will continue to be examined, as well as the study of the effects of exercise and exertion on the immune system. New studies in smoking cessation and dysfunctional eating habits will be initiated. Other studies addressing different aspects of military training and readiness are anticipated. ($ 0.391 Million)

(U) **Nuclear, Biological and Chemical Medical Defense:** Support for multiple basic research projects in this threat area are planned. Analysis of the chemical breakdown of different isomers of 1,4 benzodiazepines, such as valium, used as antidote to central nervous system effects of nerve agent poisoning, will continue. Study of the pattern of sensory input to the frontal cortex will also receive support. The organism that exhibits extraordinary resistance to ionizing radiation, *Deinococcus radiodurans*, will continue to be examined to better understand what gives it this unique ability. ($ 0.217 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 1	R-1 ITEM NOMENCLATURE In-House Laboratory Independent Research PE 0601101D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	3.099	2.169	2.212	Continuing	Continuing
Appropriated Value	3.099	1.569		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.056)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.025)				
c. Other			(0.039)	Continuing	Continuing
Current President's Budget	3.074	1.513	2.173	Continuing	Continuing

Change Summary Explanation: Funding changes are due to program budget adjustments and congressional undistributed reductions.

(U) **Funding:** Not Applicable

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1				R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	208.656	222.628	216.320	220.522	214.219	218.563	242.246	Continuing	Continuing
URI/P103	192.456	203.992	206.320	210.522	204.219	208.563	232.246	Continuing	Continuing
DEPSCoR/P104	16.200	18.636	10.000	10.000	10.000	10.000	10.000	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 our 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, in conjunction with the other project within this program element, competitively supports programs at universities nationwide in three interrelated categories:

- Research. The main thrust of the URI is multidisciplinary research, supported under the multidisciplinary research program of the University Research Initiative (MURI). The MURI 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. In addition, the URI supports single-investigator research efforts performed by outstanding scientists and engineers early in their independent research careers; this support is provided under Young Investigator Programs (YIP) through FY 1997 and the new Presidential Early Career Awards for Scientists and Engineers (PECASE) beginning in FY 1997.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

- Education. The URI promotes graduate education in science and engineering for U.S. citizens through the National Defense Science and Engineering Graduate Fellowship Program. Through FY 1998, the URI also supports the Augmentation Awards for Science and Engineering Research Training (AASERT) program, which awards research traineeships for graduate students and also supports laboratory experiences for undergraduate students on defense research projects.

- Infrastructure. URI support for the development of research infrastructure responsive to defense needs includes three programs. The Defense University Research Instrumentation Program (DURIP) allows researchers to purchase more costly items of research equipment than typically can be acquired under single-investigator awards. The URI Support Program (URISP) broadens the base of academic institutions participating in defense research by involving institutions that historically have not received much defense funding. The third program is the Defense Experimental Program to Stimulate Competitive Research in project P104.

(U) P 104, Defense Experimental Program to Stimulate Competitive Research (DEPSCoR). The DEPSCoR further helps to build national infrastructure for research and education in defense-critical fields by involving institutions of higher education in states that historically have not received much Federal research funding. It is executed in coordination with state committees formed for the National Science Foundation's Experimental Program to Stimulate Competitive Research.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

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

(U) **FY1997 Accomplishments:**

(U) Programmatic accomplishments:

- Research. A MURI competition was conducted by the Services, DARPA, and the Science and Technology Directorate of the Ballistic Missile Defense Organization (BMDO), resulting in 13 new starts in eleven high-priority areas of multi-Service interest: cluster engineered materials; quasi-optic power combining; design and control of smart structures; dendritic polymers for functional materials; air-plasma ramparts; cognitive workload; intelligent agents for wireless computing; advanced acoustic processors; photonics for radio-frequency systems; thermoelectric materials for cooling and power generation; and heterogeneous information systems. Multiyear MURI efforts initiated in prior years also were continued, but approximately seven-and-one-half, rather than twelve, months of funding were provided, in order to eliminate forward financing and move anniversary dates for annual funding increments to the first quarter of each subsequent fiscal year. Following this one-time adjustment, twelve months of funding will be required in FY 1998 and FY 1999, to maintain the same level of effort for those continuing programs. The final year of funding was provided for Young Investigator Programs and the first awards were made in the Presidential Early Career Awards for Scientists and Engineers program. ($79.266 Million)

- Education. Under the National Defense Science and Engineering Graduate Fellowship Program, 93 new graduate fellowships were competitively awarded for study leading to advanced degrees in science and engineering fields of importance to national defense. A competition under the AASERT program led to the award of research traineeships for more than 400 graduate students; the awards also support laboratory experiences for more than 100 undergraduate students in defense-critical fields. ($ 61.026 Million)

- Infrastructure. More than 270 new awards were made under the FY 1997 DURIP competition, enabling the purchase of research instrumentation needed to sustain universities' capabilities to perform cutting-edge defense research. Under the URI Support Program, efforts initiated in prior years continued in areas such as electronic and magnetic materials, image analysis, micromanufacturing, and neurodynamics. The FY 1997 competition under the DEPSCoR program resulted in 55 new awards. ($ 68.364 Million)

(U) Selected technical accomplishments:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

- Researchers in consortia involving Stanford University, Texas Tech University and the Universities of California-Berkeley, Maryland, New Mexico, California-Davis, and Michigan made major advances in physics, material science, and computer science underpinning high-power and conventional microwave sources that are central to many types of military systems, including radar, communications, electronic warfare, and directed energy weapons. Results included:

    - A demonstration that oxide cathodes made by plasma deposition have ten times more current density of thermionic emission and, therefore, ten times more microwave pulse energy than conventional oxide cathodes. They also are projected to be longer lived and have lower life-cycle cost than earlier oxide cathodes.
    - The first use of an intelligent subsystem in conjunction with a microwave source, to sense output characteristics (e.g., power and bandwidth) and adjust cavity characteristics in real time to optimize and maintain them. Extension of this groundbreaking feedback method to adjust other input characteristics (e.g., cathode temperature or electron-beam profile) promises more stable and reliable operation of microwave sources in the future.
    - The first results leading to an understanding the basic physics of high-frequency breakdown inside a microwave-source cavity, a problem that prevents sources from operating at high powers and long pulse lengths. The researchers made the first quantitative measurements of the effects of coating materials and roughness of the cavity surface; demonstrated the first optical streak camera measurements of subnanosecond evolution of breakdown in insulators and window materials, as well as the first intracavity spectroscopic diagnosis of plasma density, temperature, and ionic species; and assessed the effects on breakdown of secondary electron emission from surfaces bombarded by primary electrons.

- Researchers at the University of Arizona and California Institute of Technology demonstrated ultra-bright organic light emitting diodes (LEDs) and plastic color displays that are light, compact, and flexible. The high brightness and durability of the new devices should help to accelerate the availability of rugged and compact displays for military applications. The LEDs are twice as bright as earlier organic LEDs (about two-hundred times as bright as a standard computer screen), and their quantum efficiency of 3% is comparable to the best previously achieved; these advances are due to a dopant used in the light-emitting layer and a thin insulating layer under the cathode that creates an internal electric field to boost the injection of electrons by tunneling. The devices have aluminum cathodes, making them less sensitive to oxidation and therefore more stable than earlier organic LEDs with calcium or magnesium cathodes.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

- A URI Young Investigator Program awardee at Johns Hopkins University discovered that people need at least six hours after learning a motor skill to consolidate their memory of that skill. Learning a second related motor task immediately after learning the first skill disrupts performance of the first task. However, people can learn and remember both motor tasks if training on the second motor task takes place after the consolidation period. Application of these seminal results will improve the design of: (1) remotely operated systems used to carry out military missions, by establishing the minimal requirements for the fidelity of the display used by the remote operator; and (2) virtual-reality systems used for simulation-based training and mission rehearsal. The results also shed light on theories of motor behavior that are critical to the control of robotic systems.

- Scientists at the University of Michigan developed a high-resolution imaging device for measuring short water waves responsible for microwave scattering from the sea surface, as well as a comprehensive theoretical scattering model for calculating radar backscatter from arbitrarily shaped water waves. The results of this work are leading to an improved understanding of the influence of breaking waves on the ocean's radar reflectivity. These waves are ubiquitous in shallow water and in regions of strong current gradients; understanding the waves and their signature is important to a variety of military missions, such as planning of amphibious assaults, detecting surface vessels and submarines, and designing and operating vessels to gain efficiency and to avoid detection. The imaging device is the first instrument with fast (400 Hertz) frame rate and millimeter spatial resolution, allowing the scientists to separate linear and non-linear breaking waves and study new radar scattering processes. The theoretical model used to interpret the experiments includes effects of multiple scattering and edge diffraction due to sharply crested waves.

(U) **FY1998 Plans:**

- Research. New MURI activities, to be announced in January 1998, will address areas relevant to four Strategic Research Objectives identified in the DoD's corporate Basic Research Plan: nanoscience, biomimetics, compact power sources, and mobile wireless communications. Fundamental advances in these areas will enable the development of new technologies applicable to a broad range of future military systems. The multidisciplinary nature of these areas, and their multi-Service relevance, make them ideally suited for inclusion under the multidisciplinary element of the URI. In addition to the new MURI efforts, multidisciplinary and PECASE programs begun in prior years will continue, with new competitive awards for PECASE programs. Planned funding for this program category is more in FY 1998 than in FY 1997 largely because seven-and-one-half, rather than twelve, months of funding were provided for ongoing multidisciplinary research efforts in FY 1997, to eliminate forward financing and move anniversary dates for annual funding increments to the first quarter of each subsequent fiscal year. Following the one-time adjustment, twelve months of funding are required in FY 1998, to maintain the same level of effort for those continuing programs. ($ 117.433 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

- Education. Approximately 90 new awards are anticipated to be announced in April, 1998, as the result of a competition under the National Defense Science and Engineering Graduate Fellowship program. The FY 1998 competition for the AASERT program led to the award of research traineeships for more than 125 graduate students and support for the involvement of more than 50 undergraduate students in defense research. ($ 35.319 Million)

- Infrastructure. Under the FY 1998 DURIP competition, more than 230 new awards were made to support research instrumentation critical to defense research. New awards also will be made under the DEPSCoR program. Efforts begun in prior years under the URI Support Program are continuing. ($69.876 Million)

(U) **FY1999 Plans:**

- Research. Topics for new MURI starts will be selected in high-priority research areas such as advanced communications; information processing; and novel materials, devices, and structures concepts. Multidisciplinary and PECASE programs begun in prior years will continue, with new competitive awards under the PECASE program. ($122.922 Million)

- Education. A FY 1999 competition will be conducted to award approximately 190 graduate fellowships under the National Defense Science and Engineering Graduate Fellowship Program, as the separate AASERT program of graduate research traineeships is discontinued. ($25.079 Million)

- Infrastructure. FY 1999 competitions will be conducted for new awards under the DEPSCoR and DURIP programs. Efforts begun in prior years under the URI Support Program will continue. ($68.319 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE UNIVERSITY RESEARCH INITIATIVE PE 0601103D8Z

	FY1997	FY1998	FY1999	To Complete	Total Cost
(U) **B. Program Change Summary**					
Previous President's Budget	214.696	237.788	247.188	Continuing	Continuing
Appropriated Value	220.235	230.788		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(10.541)	(8.160)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(1.038)				
c. Other			(30.868)	Continuing	Continuing
Current President's Budget	208.656	222.628	216.320	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Funding changes due to program budget adjustments.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/ BA 1				R-1 ITEM NOMENCLATURE Gulf War Illnesses Research PE 0601105D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	0.000	19.646	19.515	19.443	19.353	0.000	Continuing	Continuing
Gulf War Illnesses Research/P105	0.000	0.000	19.646	19.515	19.443	19.353	0.000	Continuing	Continuing

* In FY97 and FY98, Gulf War Illnesses research is supported under multiple Defense-wide and Army RDT&E program elements, as well as by the Defense Health Program.

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) This program element supports research addressing the causes, treatments, and follow-up of Gulf War Illnesses (GWI). These studies are required to support the diagnosis and proper treatment of afflicted Gulf War veterans, and to provide the Department with essential information for proactively managing troop health and exposure issues prior to and during future military operations.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/ BA 1	R-1 ITEM NOMENCLATURE Gulf War Illnesses Research PE 0601105D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	0.000	19.646	19.515	19.443	19.353	0.000	Continuing	Continuing
Gulf War Illness Research/P105	0.000	0.000	19.646	19.515	19.443	19.353	0.000	Continuing	Continuing

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

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

(U) **FY1997 Accomplishments:**

(U) None reported under this program element. This is a new program element, with funding beginning in FY99. ($ 0.000 Million)

(U) Note: Prior to FY99, GWI research is supported under multiple Defense-wide and Army RDT&E program elements, as well as by the Defense Health Program

- In FY97, DoD's total investment in GWI efforts was greater than $32 million:
  - PE0603738D, Cooperative DoD/VA Medical Research Program included research on:
    - Health effects of combat stress and post-traumatic stress disorder, and GWI-related conditions such fibromyalgia. ($5.000 million).
    - Symptoms, hospitalizations and reproductive outcomes between Gulf War veterans and non-deployed veterans of the same era. ($2.000 million)
    - Historical war syndromes, including factors which produce chronic, non-specific symptoms and physiological outcomes. ($4.977 million).
    - Multi-disciplinary studies of neurotoxic Gulf War-related illnesses leading to diagnosis and treatment. ($3.000 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/ BA 1	R-1 ITEM NOMENCLATURE Gulf War Illnesses Research PE 0601105D8Z

- Army medical RDT&E program included research on GWI-related infectious disease efforts (i.e. leishmaniasis). ($2.000 million)
- Defense Health Program account supported peer-reviewed, extramural research concerning exposure to chemical warfare agents and other toxins, and possible health effects of combinations of inoculations and investigational new drugs. ($10.000 million); development of an anti-bacterial treatment for GWI-affected veterans ($3.4 million); development of on troop location information, toxicology, mycoplasma, sleep disorders, and clinical data analyses. ($2.000 million).

(U) **FY1998 Plans:**

(U) None reported under this program element. This is a new program element, with funding beginning in FY99. ($ 0.000 Million)

(U) Note: Prior to FY99, GWI research is supported under multiple Defense-wide and Army RDT&E program elements, as well as by the Defense Health Program

- In FY98, DoD's planned investment in GWI efforts is $20 million:
  - PE 0601103D, University Research Initiative Program, will include extramural, peer reviewed research on GWI: factors which produce chronic, non-specific symptoms and physiological outcomes typical of the undiagnosed illnesses of some GW veterans; toxicity of environmental chemicals, prophylactic drugs and military materiel; and long-term health consequences associated with exposure to subclinical levels of chemical warfare agents. ($8.000 million)
  - PE 0603738D, Cooperative DoD/VA Medical Research Program will include research on symptoms, hospitalizations and reproductive outcomes between Gulf War veterans and non-deployed veterans of the same era; feasibility of establishing an active-surveillance birth defects registry. ($3.500 million)
  - Army medical RDT&E program will include GWI clinical trials ($4.500 million) and research on GWI-related infectious disease efforts (i.e. leishmaniasis). ($2.000 million)
  - Defense Health Program will continue the development of on troop location information, toxicology, mycoplasma, sleep disorders, and clinical data analyses. ($2.000 million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/ BA 1	R-1 ITEM NOMENCLATURE Gulf War Illnesses Research PE 0601105D8Z

(U) **FY1999 Plans:**

(U) GWI research efforts will address topics relevant to identifying the etiology and treatment of GWI, increasing our understanding of issues pertinent to military operations health, and enhancing the protection of Service members from deployment-related health disorders following future military operations. Specific research questions will be based on information emerging from earlier GWI studies, and guidance from GWI advisory groups (e.g. Persian Gulf Veterans' Coordinating Board). Examples of potential research topics area including epidemiological studies of health outcomes, possible health effects of very low-level exposure of stress and cognitive/emotional/physical factors leading to client, non-specific symptoms and other physiological outcomes. Research contracts will be awarded the following competitive, external peer-review. ($ 19.646 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/ BA 1	R-1 ITEM NOMENCLATURE Gulf War Illnesses Research PE 0601105D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	0.000	0.000	0.000	Continuing	Continuing
Appropriated Value	0.000	0.000	0.000	Continuing	Continuing
Adjustments to Appropriated Value				0.000	0.000
a. Congressionally Directed undistributed reduction	0.000	0.000	0.000	0.000	0.000
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000	0.000	0.000
c. Other	0.000	0.000	19.646	Continuing	Continuing
Current President's Budget	0.000	0.000	19.646	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY 1999 establishes a separate PE for Gulf War Illness Research

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
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)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	7.393	9.870	9.667	9.691	9.736	10.691	Continuing	Continuing
GICUR/P111	0.000	7.393	9.870	9.667	9.691	9.736	10.691	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) A shared commitment between industry and Government is being 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. 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. The complex circuits area will be the first one to be implemented. It meets the program criteria and is vital to DoD needs. The two subtopics of highest priority in this area are "Design" and "Interconnect". Design research is aimed at concepts for breakthroughs to enable rapid, correct, verifiable, manufacturable 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 the present vision. These areas require truly innovative research.

(U) Within government, DoD has taken the lead in establishing GICUR efforts on these topics. An additional effort will now be directed at other area: complex adaptive networks. This will be strongly co-sponsored by industry in GICUR programs.

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COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	7.393	9.870	9.667	9.691	9.736	10.691	Continuing	Continuing
GICUR/P111	0.000	7.393	9.870	9.667	9.691	9.736	10.691	Continuing	Continuing

(U) **Project Number and Title: P111 GICUR**

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

(U) **FY1997 Accomplishments:**

(U) Not applicable - new program. ($ 0.000 Million)

(U) **FY1998 Plans:**

(U) Implement semiconductor electronics program covered under MOA between industry and DoD. Finalize goals and management structure of the GICUR program in semiconductor electronics, especially on interactions between DoD and the industrial consortium. Jointly choose the first subareas for research and determine the selection criteria for proposals. Establish multi-university, multi-investigator programs for the two initial focus topic. Establish agreements with other area already of interest to industry, (compact power sources and large scale complex networks), come to terms via MOAs, gain agreement as to the nature and involvement of the industrial research consortia to be used, and then proceed with processes similar to that described for the semiconductor electronics area. Indication from industry shows that co-sponsorship of the complex adaptive networks (via a consortium, EPRI) area is approved, once details can be arranged. ($ 7.393 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 1	R-1 ITEM NOMENCLATURE Government/Industry Co-sponsorship of University Research PE 0601111D8Z

(U) **FY1999 Plans:**

(U) Evaluate operations of first industry-driven consortia, the research programs supported and set further directions. Plan for a new thrust in smart structures reliability suitable for university-performed consortium-teamed research. Identify organizations, industry groups, existing consortia, other government agencies, etc. interested in the GICUR concept for further program development. ($ 9.870 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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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	FY1997	FY1998	FY1999	Cost to Complete	Total Cost
Previous President's Budget	0.000	14.713	15.544	Continuing	Continuing
Appropriated Value		7.713		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(.320)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment					
c. Other		0.000	(5.674)	Continuing	Continuing
Current President's Budget	0.000	7.393	9.870	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY 1988 changes are due to Congresssional directed reductions. FY1999 changes are the result of program budget adjustments.

(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 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2				R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	19.432	20.103	9.706	4.879	4.861	4.838	4.824	Continuing	Continuing
MFEL/P483	19.432	20.103	9.706	4.879	4.861	4.838	4.824	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) The Medical Free Electron Laser (MFEL) program seeks to develop advanced, laser-based applications for military medicine and electonic 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 applications.

(U) The majority of this program (80%) is focused on developing advanced procedures for the rapid diagnosis and treatment of battlefield casualties. Specific applications under investigation include soft tissue repair, hard tissue surgery, therapies for thermal burns and chemical burns, and enhanced medical imaging. Laser applications will be clinically tested in unique MFEL medical centers, leading to FDA approval. There is high dual use for civilian medicine.

(U) A much smaller part of this program (20%) is focused on electronic materials research. In these studies, the high energy FEL beam is being exploited for improved processing applications including more effective dopants, surface cleaning and modification of transport properties of microelectronic substrates.

(U) The program is executed extramurally. Performers include 5 major medical centers and approximately 20 applications groups. Awards are made competitively, following solicitation and peer review, for performance periods of 2 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 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	19.432	20.103	9.706	4.879	4.861	4.838	4.824	Continuing	Continuing
MFEL/P483	19.432	20.103	9.706	4.879	4.861	4.838	4.824	Continuing	Continuing

(U) **Project Number and Title: P483 MFEL**

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

(U) **FY1997 Accomplishments:**

(U) At the Vanderbilt University FEL center, medical research on FEL applications in ophthalmology and neurosurgery continued and studies in otolaryngology were phased out. The FEL was demonstrated to be superior to conventional methods for precise ablation of structures of the eye. A clinical facility was equipped for neurosurgery on human subjects and an application to the Food and Drug Administration for the first human trials of the FEL was initiated. Advances were made in laser beam reliability, in the output performance of the FEL, in the production of monochromatic X-rays for enhanced medical imaging, in understanding the structure of the cytoskeleton, and in the photoluminescence of amorphous silicon. ($ 4.173 Million)

(U) At the Duke University FEL center, medical research on FEL applications in opthalmology and neurosurgery continued and new efforts were initiated in neurosurgery, orthopedics and wound repair. Wavelength parameters for laser incisions minimizing collateral tissue damage of the brain were defined. Advances were made in the development of the vacuum ultraviolet FEL, and the device successfully lased for the first time in November, 1996. Plans for a new building, supported in part by the Keck Foundation, for expanding preclinical research capabilities were completed; construction will be completed in FY98. ($ 8.133 Million)

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(U) At Massachusetts General Hospital, laser-based methods for relieving vascular spasm following head injury, for computer-guided removal of tissue damaged by thermal or chemical burns, and for selective cell killing were developed . These advances will improve surgical treatment of combat casualties, including chemical warfare casualties. ($ 2.924 Million)

(U) At the Stanford University FEL center advances were made in measuring the temporal shape of a mid-infrared FEL optical pulse, the ground state recovery times of the mid-infrared transitions in quantum dots, and in understanding vibrational relaxation of molecules in glassy materials and the vibrational dynamics of carbon monoxide at the active site of myoglobin. These studies are key to predicting the behavior of electronic materials and biological molecules in response to FEL radiation. ($ 1.900 Million)

(U) At the Beckman Laser Institute, University of California, Irvine, studies were conducted on photodynamic therapy for sterilization of wound beds, development of animal models for laser surgery, and enhancement of light absorption by tissue. These studies will advance fundamental approaches to laser surgery of combat injuries. ($ 0.602 Million)

(U) Development efforts for compact FELs suitable for use in a medical setting and improved beam delivery devices for medical applications were continued at Rutgers University, the Food and Drug Administration , the Naval Research Laboratory and the University of Central Florida. ($ 1.100 Million)

(U) The technique of optical coherent tomography imaging was extended at MIT and Mass General Hospital to animal studies using an endoscope. This technique allows real-time imaging of living tissue at the cellular level ("optical biopsy"), helping the surgeon to identify and remove only pathological material. ($ 0.300 Million)

(U) Alteration of gene expression by laser light was demonstrated in cell culture and in animals at Children's Hospital, Los Angeles. The techniques used will allow characterization of FEL effects at the molecular level, particularly in the context of wound healing. ($ 0.300 Million)

(U) **FY1998 Plans:**

(U) Research on surgery of the eye and the brain, on monochromatic X-ray imaging, and on improved electronic materials will continue at Vanderbilt University. The mid-infrared FEL will be compared with a new prototype optical parametric mid-infrared laser for incision quality and the first human trials of the FEL will be conducted provided FDA approval is granted. ($ 2.226 Million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D8Z

(U) Research on surgery of the eye, the brain, the skin, nerves and bone will continue at Duke University. Performance of the vacuum UV laser will be enhanced and the preclinical research facilities will be completed. ($ 3.882 Million)

(U) Research on surgical applications of lasers in wound repair, neurosurgery and burn treatment will continue at Mass General Hospital. Collaborations will be conducted with the Army Institute of Chemical Defense on chemical burn treatment. ($ 3.961 Million)

(U) Research on wound sterilization and bone surgery will continue at the Beckman Laser Institute. A new doppler imaging device for guiding laser usage by burn surgeons will be developed. ($ 0.993 Million)

(U) Research on biomolecular and tissue absorption characteristics of FEL radiation will continue at Stanford University, as will effects of FEL radiation on microelectronic and energetic materials. ($ 2.155 Million)

(U) Research to develop compact FELs, optical fibers and waveguides for use in hospitals and battlefield settings will continue. ($ 2.034 Million)

(U) Studies on the interaction of photons with biomolecules, cells, tissues and materials will be continued. ($ 4.852 Million)

(U) **FY1999 Plans:**

(U) Develop and test new procedures for treatment and diagnosis of medical conditions of particular pertinence to military medicine. Program funds also will be devoted to the transition of laser hardware technology developments to field applications. FEL and FEL-related technologies will be explored for novel applications to chemical and biological warfare defense. ($ 9.706 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Free Electron Laser 0602227D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	19.934	20.841	21.640	Continuing	Continuing
Appropriated Value	19.934	20.841	21.640	Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.738)	0.000		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.502)				
c. Other			(11.934)	Continuing	Continuing
Current President's Budget	19.432	20.103	9.706	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Changes are due to Congressional and program budget adjustments.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2				R-1 ITEM NOMENCLATURE Historically Black Colleges & Universities & Minority Institutions PE 0602228D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	10.594	11.080	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
HBCU/P489	10.594	11.080	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) This PE provides infrastructure support in fields of science and engineering that are important to national defense. This competitive program provides support through grants or contracts for research, collaborative research, education assistance, instrumentation purchases, and technical assistance. The research grants are to further the knowledge in the basic scientific disciplines through theoretical and empirical activities. Collaborative research allows university professors to work directly with military laboratories or other universities. Education assistance funds are used by the selected institutions to strengthen their academic programs in engineering, science and mathematics, thereby increasing the number of under-represented minorities obtaining undergraduate and graduate degrees in these fields. Funds for instrumentation allow institutions to increase their capability to perform research of interest to the Department. Technical assistance funds are used to design programs to enhance the ability of minority institutions to successfully compete for future Defense funding.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Historically Black Colleges & Universities & Minority Institutions PE 0602228D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	10.594	11.080	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
HBCU/489	10.594	11.080	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P489 HBCU**

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

(U) **FY1997 Accomplishments:**

(U) Awards were made under the DoD Infrastructure Support Program for HBCU/MIs. In one solicitation the Army, Navy and Air Force as group made a total of forty-two Instrumentation awards. In a separate solicitation the Air Force made nine Instrumentation awards. The Instrumentation Program provides for the acquisition of research and educational-use instrumentation. Emphasis is on instrumentation which will enhance the ability of HBCU/MIs to perform research which is of interest to DOD and to increase the number of underrepresented minority graduates in the fields of science, engineering, and mathematics. The Navy continued funding for eight education centers. The Education Centers Program is designed to (a) enhance programs and capabilities at HBCU/MIs in scientific disciplines critical to the national security function of DoD and (b) to increase the number of underrepresented minority graduates in the fields of science, mathematics and engineering. ($ 10.594 Million)

(U) **FY1998 Plans:**

(U) Continue evaluation of the awards made with the prior year funds. In FY 1998 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 from proposals submitted under the "Infrastructure Support Program for HBCU/MIs: FY98" broad agency announcement distributed in August 1997. ($ 11.080 Million)

(U) **FY1999 Plans:**

(U) The FY1999-FY2003 program was divided among the Army, Navy, and Air Force to execute based on the Defense Reform Initiative. ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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(U) B. Program Change Summary	FY1997	FY1998	FY1999	Cost to Complete	Total Cost
Previous President's Budget	10.876	11.485	14.664	Continuing	Continuing
Appropriated Value	10.876			Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.405)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.282)				
c. Other			(14.664)	Continuing	Continuing
Current President's Budget	10.594	11.080	0.000	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY 1997/1998 funding changes are due to Congressional undistributed reductions and program budget adjustments. The Defense Reform Initiative directed that the FY 1999-2003 program be dispersed equally to the Services (Army-PE 0601102A, Navy-PE0601153N and Air Force-PE0601102F).

(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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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2				R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	19.561	17.708	19.641	19.574	19.252	19.599	19.909	Continuing	Continuing
Lincoln Laboratory/P534	19.561	17.708	19.641	19.574	19.252	19.599	19.909	Continuing	Continuing

(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 the 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.

(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 Lincoln Lab line supported programs leading to the Joint Surveillance Target Attack Radar (JSTARS) system, the Milstar communications satellute, as well as to solid-state devices and processes of major importance to the military industrial base. In addition to being the foundation for many new LL programs, this program also supports other ongoing Laboratory programs with state-of-the-art technology developments. The program has the following 4 research elements:

- Target surveillance and recognition, with emphasis on fundamental bounds for target recognition and the implications on sensor design of those bounds

- Military communications for high-connectivity, low-cost military global defense, with emphasis on new antennas, RF technology, network protocols, high speed and optical communications systems. This research will promote 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;

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D8Z

- Advanced combat support technologies for combat identification (CID), battlefield surveillance and compact biological agent detection systems. The focus in biological agent detection is in developing technology for compact, lightweight, real-time biological-agent sensors with extremely high sensitivity (> 1 particle per liter of air) and with strong background clutter rejection for extremely low false-alarm rate (> 1 per week).

- Revolutionary, advanced optical electronic technology, with specific emphasis on optical sampling for direct analog-to-digital conversion for radar and electronic intercept; 3-D imaging focal-plane arrays (FPAs) 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; and solid state, low-light imagers for improved night vision under starlight illumination.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	19.561	17.708	19.641	19.574	19.252	19.599	19.909	Continuing	Continuing
Lincoln Laboratory/P534	19.561	17.708	19.641	19.574	19.252	19.599	19.909	Continuing	Continuing

(U) **Project Number and Title: P534 Lincoln Laboratory**

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

(U) **FY1997 Accomplishments:**

(U) **Target Surveillance and Recognition:** ($ 5.343 Million)

(U) **Surface Surveillance**

(U) Continued the advanced processing technology program to detect and identify time-critical targets. Completed and tested an airborne, multi-frequency data collection system. Demonstrated improved human interpretability of operational Synthetic Aperture Radar (SAR) data using high-definition imaging (HDI). Demonstrated preliminary application of classification bounds to a sensor design trade. These activities have had direct impact on R&D programs such as Dynamic Data Base (DDB), Moving and Stationary Target Acquisition and Recognition (MSTAR) and Semi Automated Image Processor SAIP (all Defense Advanced Research Project Agency; DARPA); and have significance for agencies such as National Imagery and Mapping Agency (NIMA), Defense Airborne Reconnaissance Office (DARO), and National Reconnaissance Organization (NRO), that must plan next-generation surveillance exploitation and sensing systems.

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

(U) **Space Surveillance**

(U) Continued the advanced electro-optical (EO) technology program in support of the Air Force space control mission. Expanded the effort to include advanced EO seekers for Ballistic Missile Defense. Large, 1960 x 2560 pixels, back illuminated charge coupled device (CCD) arrays have been fabricated and tested and will be used as detectors in the Air Force's Ground-Based Electro-Optic Deep Space Surveillance (GEODSS) Upgrade Program. Initiated development of avalanche photo-diode (APD) array for 3-D laser radar imaging for advanced BMD interceptor seeker concept. Test APD sub-arrays have been fabricated and tested.

(U) **Military Communications:** ($ 3.512 Million)

(U) Continued to investigate globally networked military communications systems that will enable the free flow of information between systems at rates from tens of kilobits per second to tens of gigabits per second (gbps). Technology is under development for both free-space optical communications and terrestrial fiber communications, as well as for tactical theater communications. These technologies will be particularly relevant to forces on the move, and for the interconnection of satellite communications (SATCOM), terrestrial and wireless systems into a global defense network. The laboratory successfully demonstrated optical transmitter and receiver technology, leading toward a space flight demonstration of optical communications. Application to world-wide relay of high-rate surveillance data. The laboratory also continued development and demonstration of optical technology for ultra-high rate local and metropolitan area networks (LANs and MANs). Demonstrated 150 Gbps optical memories and all-optical semiconductor switches. Finally, the laboratory continued development of steered phased array antenna for a tactical satellite terminal. An 8 GHz receive array is under development, following last year's successful completion of a 4-element transmit array. Created an architecture for integration of transmit and receive arrays.

(U) **Combat Support Technology**: ($ 3.264 Million)

(U) Developed, evaluated, and transferred advanced techniques and technologies. New Ultra High Range Resolution (UHRR) systems for air vehicle identification were developed. A parametric analysis of emitter detection in the presence of air traffic was completed. These activities have led to various CID-related program improvements.

(U) A preliminary design was completed for a 15-cm Micro Air Vehicle (MAV) and associated subsystems which will be capable of providing covert, high-resolution imaging capability. Wind tunnel tests and preliminary flight tests were completed.

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(U) **Advanced Electronics Technology:** ($ 7.442 Million)

(U) The objective of this program is to conceive, demonstrate, and provide advanced electronic devices, circuits and subsystems for DoD systems. Technology exploited from this program includes Infra red (IR) focal planes used by the U.S. Army Theater High-Altitude Area Defense (THAAD) program; bio-detectors used by U.S. Army Edgewood Research Development and Engineering Center, vacuum microelectronics used by the Navy, and avalanche photo diodes used in 3-dimensional (3-D) radars. Technology transfer is being accomplished through direct DoD support (imaging sensors, vacuum microelectronics, IR countermeasures, Charge Coupled Device (CCD) CCD signal processing, complementary metal oxide semiconductor (CMOS)/ Silicon On Insulator (SOI) circuits, and superconductive materials) and through cooperative research development agreements (CRDAs) (headmount displays, lithography technology, and diamond display technology).

(U) The laboratory had a number of accomplishments; a list of some of the more significant work follows: (1) Demonstrated large range (80 decibel dynamic range) optical sampling; (2) Designed merged CMOS/CCD process for focal-plane with integrated analog-digital (A/D) converter; (3) Designed high-accuracy, low-power CCD A/D converter for focal planes; (4) Fabricated 1.55-μm-wavelength ridge-waveguide amplifiers enabling demonstration of an ultrafast nonlinear interferometer used for demultiplexing 40 Gbps optical data streams; (5) Grew high-quality material and supplied samples to industry for characterization and device development; (6) Demonstrated advanced CCD imager for improved night vision; (7) Successfully demonstrated application of biologically-motivated data fusion algorithms on multi-platform and multi-sensor surveillance imagery; (8) Demonstrated geiger-mode avalanche photo diode array for 3-D radar; (9) Extended development of mid-IR semiconductor lasers; (10) Continued development of miniature IR, visible and ultra-violet (UV) lasers for ranging and biodetection; (11) Successfully operated superconductive circuits at >2 GHz rates for use in data switching and networking subsystems; and (12) Demonstrated compact superconductive resonators with >10kW circulating power for use in transmitter filters; (13) Developed powerful new techniques for detecting unauthorized user activity and system intrusions exploiting key internet services.

(U) **FY1998:**

(U) **Target Surveillance and Recognition**: ($ 4.903 Million)

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(U) **Surface Surveillance:**

(U) Continue advanced processing technology program to identify time-critical targets. Continue development of high definition video imagery (HDVI) techniques with improved EM models, consistent with constraints of operational and foliage penetration sensors. Use airborne data collection system to collect SAR and moving target indicator (MTI) data on ground targets for developing automatic target cueing techniques and for understanding moving-ground-target tracking capabilities for existing and planned operational surveillance sensors.

(U) **Space Surveillance**:

(U) Continue advanced focal plane technology work with emphasis on high quantum efficiency FPAs. Continue 3-D laser radar technology development with fabrication of advanced focal plane array technologies for both passive and active IR sensors leading to new ballistic missle defense (BMD) interceptors with much-needed improvements in detection, acquisition and discrimination. Both the Army and Navy Theater BMD Programs will gain advanced interceptor capabilities from these technologies.

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(U) **Military Communications**: ($ 2.906 Million)

(U) Continue to investigate technology for high-rate military communications at rates from tens of megabits to gigabits, including optical communications and tactical theater communications (particularly to Army forces on the move). Continue development of 100 Gbps LAN technology for processing surveillance data. Demonstrate networking techniques and protocols for interconnection of disparate military comm systems. Develop the future architecture for Extreme High Frequency (EHF) satellite communications beyond 2005, including sophisticated, agile and narrow RF beam steering, advanced low-power on-board signal processing, and new network architectures to incorporate efficient computer communications into future EHF military satellite communications. Complete work in tactical satellite terminal receive arrays.

(U) **Combat Support Technology**: ($ 2.722 Million)

(U) Continue to develop, evaluate and transfer technology to support combat forces. FY98 efforts address three areas: Hyperspectral Sensing, Biological Agent Detection, and Microsystems. In Hyperspectral Sensing, explore and demonstrate the unique concept of combining active illumination with hyperspectral imaging for a range of military applications. A compact baseline 4-D hyperspectral system, including a unique high-brightness "white light laser" will be developed. Emphasis of potential applications will be target/clutter phenomenology, Interrogation friend and foe (IFF) and enhanced vision systems.

(U) Work on the microfluidic biofilter module will be somewhat redirected to complement the DARPA efforts in rapid identification of biological agents. Advanced laser and optical technology will be pursued to reduce the size and power consumption of the UV fluorescence-based biological-agent sensor. These technology developments will flow into an Army demonstration on biological sensing and into the Joint Biological Remote Early Warning System (JBREWS) Advanced Concept Technology Demonstration (ACTD).

(U) Complete the detailed design of the MAV airframe and subsystems defined in FY97. Following completion of preliminary tests in 1997, continue wind tunnel and flight tests will continue to further refine the aerodynamic configuration. Internal combustion engine tests will continue.

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(U) **Advanced Electronics Technology**: ($ 7.177 Million)

(U) In support of DARPA advanced sensors, demonstrate direct RF optical sampling at 3-GHz with A/D conversion at 100 MHz bandwidth and 80 dB dynamic range for digital radar receiver resulting in 2x improvement in bandwidth and no need for down conversion. Continue development of high-power superconductive microwave filters for data transmission and commence development of tunable superconductive RF filters for frequency-agile receivers. Demonstrate 4-GHz bandwidth receiver incorporating superconductive chirp filters and CMOS/SOI high-speed electronics for electronic intelligence. Explore micromechanical RF tuning structures for electronically reconfigurable microwave integrated circuits for use in future Army or DARPA communications architectures. Improve noise and explore wavelength tunability of 1.3-um tapered lasers for RF links for DoD antenna remoting applications. Begin development of controlled-impedance multi-chip-module technology (MCM) for high performance electronics. Continue development of vacuum microelectronic field-emission cathodes and evaluation of performance in microwave power tubes in support of Navy programs. Improve backside illumination processes and develop CMOS-based versions of visible, UV and IR focal planes. Demonstrate avalanche photodiode arrays for use at eye-safe wavelengths in 3-D ranging/imaging applications. Demonstrate more compact, networked bio-detectors in support of DoD-wide biodefense programs. Demonstrate high-brightness mid-IR lasers for dual wavelength countermeasure of missile seekers. Continue development of real-time host and network intrusion/anomalous behavior detection techniques, with emphasis on improved generalization capabilities and characterization of aberrant user activity. Transition new techniques to Service Information Warfare Centers. Continue development of robustness technology for distributed C^4I systems, with emphasis on reliable software distribution, reconfigurable protocols, and scalable crypto key exchange strategies.

(U) **FY1999 Plans:**

(U) **Target Surveillance and Recognition**: ($5.385Million)

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(U) **Surface Surveillance:**

(U) Continue the advanced processing technology program to detect and identify time-critical targets. Test HDVI, coupled with target cueing and moving-target imaging techniques, with instrumentation and operational sensor data in operationally meaningful testbed environments. Collect data with airborne data collection system to support algorithm transition to operational sensors. Employ airborne data collection system in concert with operational sensors to support early development of robust multi-platform surveillance architectures incorporating both SAR and MTI. Extend realism and scenario domain of fundamental ATR bound formalism. In addition to being directly applicable to ongoing R&D programs such as DARPA's DDB, MSTAR, MTE, and SAIP, and to the planning and development activities of NIMA, DARO, and NRO, this activity will develop and prove concepts that are crucial to creation of a true joint integrated air/ground picture.

(U) **Space Surveillance**:

(U) Continue the development of advanced focal plane arrays in both visible and IR wavebands. On-focal-plane processing, specifically in-pixel, on focal plane signal processing will be developed. Continue the development of 3-D laser radar for advanced seeker applications. The on-FPA processing technologies for both passive and active laser radar (LADAR) sensors promise significant improvements in performance and reductions in development and life cycle costs for future BMD interceptor systems. More capable versions of THAAD and Navy Theater Area Defense and Theater Wide Defense with increased affordability will result from these technology advancements.

(U) **Military Communications**: ($ 3.465 Million)

(U) Continue to investigate technology for global high-rate military communications and networking, including optical communications in space and fiber, future EHF satellite communications architecture and technology, and tactical theater communications (particularly to Army forces on the move). Continue development and demonstration of networking techniques and protocols for interworking among disparate networks. Complete 100 Gbps optical LAN testbed (application to surveillance data processing). Complete demonstration of integrated transmit/receive phased array antenna system, and begin design of prototype system for future MILSATCOM applications. Continue development of MILSATCOM signal processing technology; begin laboratory demonstrations of on-board demodulation, switching, and routing techniques for next-generation EHF MILSATCOM.

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(U) **Combat Support Technology**: ($ 3.200Million)

(U) Continued development of the 4-D hyperspectral system to include near infrared (NIR) and mid wave IR broad spectrum, high brightness ("white laser") illuminators to provide next generation active/passive hyperspectral sensing capability. Applications emphasis will be on surface mine detection, moderate standoff counter camouflage, concealment and deception (CC&D) and robotic navigation.

(U) Continue chamber and field measurements with UV sensor and initiate tests with microfluidic biofilter module. Begin to integrate UV fluorescence-based sensor with microfluidic biofilter module to demonstrate combined detection and identification in a compact package. Extend networking and data-fusion work to hardware implementation of data-fusion and simulation of tactical communications network. This work will be exploited by the Army ERDEC ATD development of two prototype highly miniaturized sensors and will also flow into the JBREWS ACTD.

(U) MAV subsystems will be fabricated and assembled for individual testing. A flight test of the final airframe configuration will be conducted. Internal combustion engine development will focus on noise signature control.

(U) **Advanced Electronics Technology**: ($ 7.591 Million)

(U) Improve direct RF optical sampling and A/D conversion to 1 GHz bandwidth for digital receivers in discrimination radars. Demonstrate highly integrated low-noise/low-light visible imager with direct high-dynamic-range digital output. Demonstrate 3-D radar subsystem incorporating a geiger-mode photodiode array, integrated timing electronics, and compact laser illuminator. Continue development of advanced silicon digital and analog integrated circuits to support emerging DoD systems, with an emphasis on low-power/high-speed subsystems in MCMs. Demonstrate tunable low-noise tapered lasers in the 1.3-um region for wavelength division multiplexed RF links. Demonstrate micromechanically reconfigurable microwave ICs for frequency-agile receivers. Continue development of bio-detector technology with emphasis on discrimination and identification methodologies. Continue development of GaN power FETs. Transition mid-IR semiconductor laser technology to industry for dual-wavelength IRCM systems. Continue development of advanced techniques for real-time network monitoring and intrusion detection, with focus on multi-site attack correlation. Transition new techniques to services, and DoD agencies charged with protection of the Defense Information Instructions. Continue development of robustness technology for distributed C^4I systems, with emphasis on combating denial-of-services through information attack.

(U) **ACQUISITION STRATEGY:** Not applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 2	R-1 ITEM NOMENCLATURE Lincoln Laboratory PE 0602234D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	19.554	20.474	21.147	Continuing	Continuing
Appropriated Value	19.554	18.474		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.766)	(0.596)		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.493)				
c. Other	0.000		(0.910)	Continuing	Continuing
Current President's Budget	19.061	17.708	19.641		Continuing

Change Summary Explanation:

(U) **Funding:** Changes in 1997, 1998, and 1999 are based on Congressionally directed reduction and program budget changes.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2				R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.981	8.669	9.239	9.206	9.047	9.210	9.419	Continuing	Continuing
Radiation Injury Assessment and Therapeutic Approaches /P505	7.981	8.669	9.239	9.206	9.047	9.210	9.419	Continuing	Continuing
Molecular Cellular Radiation Biology/ P511	0.000	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) This program supports applied 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, either alone or in combination with other BW/CW toxicants. The premise is that DoD must be ready to conduct tactical, humanitarian or counter terrorism missions within radiation environments. Development of protective and therapeutic strategies will enable military forces to operate, when required, in nuclear or radioactive combat environments, while minimizing both short- and long-term risks of adverse health consequences. Advancements in tools to measure radiation exposure to military personnel will be used in triage, treatment decisions and risk assessment. Accurate models to predict casualties, particularly in combined NBC environments, will promote effective command decisions and force structure planning to ensure mission success.

(U) The program has three primary goals: (1) to understand the pathological consequences of radiation injury and radiological hazards in order to provide a rational basis for prophylactic and therapeutic drug development; (2) to develop novel biological markers and delivery platforms for rapid, field-based individual dose assessment; (3) to define any interactions between radiation and BW or CW agents that cause more severe injury and the drugs used to protect against them -- with the goal of developing new models to predict casualties.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) This program is executed by the Armed Forces Radiobiology Research Institute (AFRRI) which, because of its multidisciplinary staff and facility resources, is uniquely qualified to carry out this mission. AFRRI's radiation sources allow the simulation of any radiological environment that might be encountered. Because national laboratories operated by the Department of Energy no longer support research efforts relevant to military medical radiobiology, the AFRRI is currently the sole laboratory with the combined capabilities needed to conduct this research.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.981	8.669	9.239	9.206	9.047	9.210	9.419	Continuing	Continuing
Casualty Management P505	7.981	8.669	9.239	9.206	9.047	9.210	9.419	Continuing	Continuing

(U) **Project Number and Title: P505 Casualty Management**

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

(U) **FY1997 Accomplishments:**

(U) Demonstrated in animal studies that a three- or four-drug combination administered prophylactically (prior to exposure) can increase survival by 30-50% when the animals are challenged with lethal doses of radiation. The pharmacological phenomenon of combinational synergy at the low dose levels used leads to a significant improvement in radioprotective index (i.e., maximum protective effective can be reached well below dose levels that are toxic) ($ 1.065 Million).

(U) Showed in animal study that an experimental antioxidant drug used in clinical radiotherapy for treating tumors can prevent alterations in specific oncogene expression that are associated with increased cancer risk. This finding demonstrates in principle that risk of radiation-induced cancers can be eliminated or reduced by appropriate therapeutic drug treatment. The ability to measure oncogenic markers for cancer risk is a powerful tool for rational therapeutic drug discovery ($ 0.915 Million).

(U) Characterized radiation-induced changes in molecular patterns of pro-inflammatory immune system elements. This information provides the basis for rational therapeutic drug development because it identifies specific molecular elements of the immune system as targets for therapy. The outcome enhances prospects for significant improvements in the ability to treat severe life-threatening consequences of bacterial infections that complicate medical management of radiation injuries. ($ 1.160 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) Incorporated important upgrades in the optical hardware and computer software of an automated microscopic imaging platform designed to locate and measure chromosomal damage caused by radiation. The specific chromosomal damage measured is a well-defined biological marker for radiation dose assessment. The automated system under development will provide the standardization and operational simplicity needed to allow more widespread use of the procedure in clinical and reference laboratories and a 10-fold increase in rate of patient throughput will be achieved. These enhancements in radiation dose assessment will enable improved medical management in situations involving large numbers of casualties. ($ 0.778 Million).

(U) Initiated studies to identify DNA sequence-based molecular targets having the potential to be highly accurate biological markers of radiation dose that can be measured more rapidly with great precision. Novel biodosimetry markers based on specific DNA sequences can be analyzed using advanced electronic instruments that are rapid, mobile and easy to operate. These electronic platforms are being used elsewhere to develop DNA-based detection and identification methods for infectious agents, and efforts are being coordinated to develop a single operational platform serving both medical radiological and medical biological defensive measures. ($ 0.375 Million).

(U) Initiated studies to optimize and automate a biological marker assay for white blood cells that measures exposure to chemical agents. The assay is being designed to measure the level of toxic exposure for any one of a broad range of chemical warfare agents, including blister agents and aflatoxin. The assay will help differentiate radiological versus chemical exposure in combined injuries and lead to improved medical treatment decisions. This effort is coordinated with the medical chemical defense research program. ($0.424 Million).

(U) Extended studies on the interactions of radiation with biological threat agents, demonstrating an increased susceptibility to infection. Measured changes in synergistic interactions when the interval between exposure to radiation and to biological agent was varied. Demonstrated synergistic interactions of radiation on susceptibility to infection with infectious agents that cause anthrax (*Bacillus anthracis*, Sterne strain) and diarrhea (*Shigella sonnei*). Preliminary data suggest that radiation and *S. sonnei* together cause greater incapacitation and performance decrement than exposure to either one alone. These data will be used to improve computer models for predictions of casualties from combined exposures ($0.967 Million).

(U) Initiated studies on the potential pathological consequences from interactions of radiation and chemical agents or their countermeasures. Agents under investigation are blister agents (mustards) and pyridostigmine (the nerve agent prophylactic). Interactions between radiation and CW agents are expected because of the similarities in the biological processes targeted by each alone. These data will be used to develop improved computer models for predicting casualties from combined exposures ($ 0.890 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) Determined that depleted uranium (DU) from fragments imbedded in muscles of pregnant female rats distributes to the fetus but does not result in overt physiological or anatomic abnormalities in the newborn pups. These studies are being pursued further through an Army- funded project to assess more thoroughly both the short- and long-term health effects of DU on offspring exposed *in utero* to DU as a consequence of redistribution from maternal tissues. Other studies indicate that DU may adversely affect certain types of white blood cells, raising a concern about DU's potential for compromising immune system function in military personnel with DU fragment injuries. These studies are leading to development of improved risk estimates and treatment strategies for managing DU injuries ($ 0.712 Million).

(U) Demonstrated that exposure to DU increases cellular levels of biochemical indicators associated with the development of tumors. This is the first determination that exposures to DU may present a risk of cancer ($ 0.695 Million).

(U) **FY1998 Plans:**

(U) Improve treatment protocols for injuries arising from radiation exposure, and establish principles for drug selection, combinations, and delivery routes. Screen and select for further evaluation, candidate drugs (or drug combinations) with high radioprotective indices and distinct modes of action ($ 1.214 Million).

(U) Improve treatment protocols through a rational drug design and selection approach, based on understanding of basic mechanisms of injury at the cellular and molecular levels. Initiate studies on the effectiveness of conventional- or slow-release radioprotectants to block late effects of radiation, including cancer and chronic suppression of the immune system ($ 1.618 Million).

(U) Enhance preventive treatments against radiation-associated infections with stimulators of the immune system. Assess combinations of antibiotics and immunomodulators on infections following radiation exposure ($ 1.300 Million).

(U) Improve automation and accuracy of clinical bioassays to provide a capability for radiation exposure assessment in individual patients. To assess exposure levels in cases of prior or chronic low-dose exposures, improve assays on persistent markers ($ 0.685 Million).

(U) Assess new approaches for detection of radiation exposure to provide simple and easy-to-use forward-field screening tools. Initial efforts will focus on establishing quantitative and rapid assays. This capability needs to be available as far forward as possible to allow appropriate treatment decisions by medical-care providers on the battlefield ($ 0.679 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) To improve models to predict casualties from radiation/ BW agent interactions and better simulate militarily relevant scenarios, refine experimental model to expose mice to a bacterial strain for anthrax through the lungs. Since viral agents are likely to show similar interactions with radiation as bacterial agents, establish experimental systems to evaluate radiation/virus interactions. Initiate studies to determine if radiation modifies the efficacy of vaccine for a viral threat agents ($ 1.087 Million).

(U) To provide data for models predicting casualties from combined radiation/CW agent exposures, assess mortality and changes in white blood cells (susceptibility to infection) in initial studies on interactions of radiation and blistering agents. Determine the interactions of radiation with countermeasures for nerve agents (pyridostigmine) on body functions with the aim of understanding how a radiation exposure will affect military personnel taking the protective agent ($ 0.991 Million).

(U) Initiate studies on whether DU can cause cancer in laboratory animals. Initiate comprehensive studies on effects of embedded DU fragments on the immune system and on previously described changes in brain activity ($ 0.817 Million).

(U) Evaluate whether a pilot study should be initiated to determine the biological toxicity associated with heavy metals proposed as substitutes for DU munitions prior to fielding these munitions ($ 0.278 Million).

(U) **FY1999 Plans:**

(U) Develop and test second generation of radioprotective treatments with sustained effectiveness. Assess efficacy of newly synthesized drug prototypes for protection from acute radiation injury ($ 1.405 Million).

(U) Design, synthesize, and provide initial testing of drug prototypes to treat immune system deficiencies after radiation exposure ($ 1.432 Million).

(U) Continue development of simple, self-administered drug delivery systems for radiation protection and treatment. Evaluate transdermal skin patches, oral administration, and autoinjector systems ($ 1.406 Million).

(U) Continue development of clinical bioassays to provide rapid assessment of radiation exposure from a broad spectrum of doses and different radiation qualities (gamma, neutron, etc.). Optimize analysis to allow automation and thereby to reduce personnel expertise requirements and increase sample throughput ($ 0.750 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) Continue development of new assays to detect radiation exposure to provide simple and easy-to-use forward-field screening exposure-assessment tools. Measure effects of incremental doses and time-course of radiation to evaluate the practical utility of candidate assays ($ 0.781 Million).

(U) Extend radiation/BW agent interaction studies to include incapacitation with combined exposures at a variety of doses in order to add this endpoint to models predicting casualties. Continue studies on effects of radiation on immunization strategies for viral BW agents ($ 1.226 Million).

(U) To provide data for models predicting casualties, quantitate radiation/blistering agent interactions over a range of doses. To determine how interactions of radiation and nerve agents will affect military personnel, initiate studies on combined exposures ($ 1.223 Million).

(U) Continue studies on cancer risk of DU in laboratory animals to refine recommendations for treatment of military personnel wounded by DU. If previous evaluations indicate, initiate studies on the toxicity of other heavy metals to be potentially substituted for DU in munitions. Assess how long-term exposure to embedded DU fragments affects the immune and nervous systems ($ 1.016 Million).

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	7.981	8.669	9.239	9.206	9.047	9.210	9.419	Continuing	Continuing
Molecular Cellular Radiation Biology /P511	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P511 Molecular and Cellular Radiation Biology**

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

(U) **FY1997 Accomplishments:**

(U) This project has been combined with P505 ($ 0.000 Million)

(U) **FY1998 Plans:**

(U) This project has been combined with P505 ($ 0.000 Million)

(U) **FY1999 Plans:**

(U) This project has been combined with P505 ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 2	R-1 ITEM NOMENCLATURE Medical Technology PE 0602787D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	7.985	8.987	9.810	Continuing	Continuing
Appropriated Value	7.985	8.987		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(0.004)	0.000	0.000		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	(0.318)	0.000		
c. Other	0.000		(0.571)	Continuing	Continuing
Current President's Budget	7.981	8.669	9.239	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Changes are due to Defense Program Review adjustments

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	3.187	2.672	2.136	2.075	2.129	2.166	2.212	Continuing	Continuing
Risk Assessment and Biomedical Applications/P506	3.187	2.672	2.136	2.075	2.129	2.166	2.212	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) This program supports efforts in advanced technology development to provide biomedical strategies for preventing, treating, assessing and predicting casualties from ionizing radiation, either alone or in combination with BW/CW agents. It is directed at the need for DoD to be prepared to execute military missions within radiation environments, to manage radiation crises associated with terrorist activities, and for consequence management in the event of nuclear weapons detonation. The DoD is ethically committed to protection of Service members from the adverse health effects of ionizing radiation to the fullest extent consistent with operational requirements. The program incorporates findings from basic and applied research into highly integrated and focused advanced technology development studies to produce: (1) protective and therapeutic strategies, (2) tools to measure radiation exposure to military personnel, and (3) accurate models to predict casualties, particularly in combined NBC environments. This program is executed by the Armed Forces Radiobiology Research Institute (AFRRI) which, due to its multidisciplinary staff and exceptional laboratory and radiation facilities, is uniquely qualified to carry out this mission. Because national laboratories operated by the Department of Energy no longer support advanced research relevant to military medical radiobiology, AFRRI is currently the sole laboratory in existence with the combined capabilities needed to conduct this research.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	3.187	2.672	2.136	2.075	2.129	2.166	2.212	Continuing	Continuing
Risk Assessment and Biomedical Applications/P506	3.187	2.672	2.136	2.075	2.129	2.166	2.212	Continuing	Continuing

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

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

(U) **FY1997 Accomplishments:**

(U) Demonstrated a four-fold decrease in radiosensitivity using a preventive treatment strategy coupling pre-exposure prophylaxis with post-exposure therapeutic interventions that were developed in applied research studies. The new strategy can potentially prevent fatality from acute radiation injury, and reduce the number and severity of injuries sustained. ($ 0.630 Million).

(U) Demonstrated in advanced studies that efficacy of post-exposure treatments can be improved by combining conventional therapies with recombinant blood system stimulators to reduce the two major life-threatening risks associated with acute radiation exposure; systemic infection and uncontrolled bleeding ($ 0.545 Million).

(U) Conducted preliminary validation analysis of the automated imaging platform for radiation dose assessment. Testing was done on human blood samples obtained from victims exposed in a radiation accident. Assessing radiation dose by measuring radiation-induced effects on biological markers can provide a more accurate diagnosis of injury leading to better-informed medical treatment decisions ($ 0.812 Million).

(U) Improved upon the methods for assessing high-dose and partial body radiation exposures by extending the application to include neutron radiation. This research expands the utility of the methods by broadening the dose range and kinds of radiation that can be measured in operational situations, and it will improve decision-making for medical treatment ($0.506Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z

(U) Provided a new first-generation model to predict casualty levels due to the synergistic effects of radiation and BW agents. Current models significantly underestimate the number of personnel killed or injured in military scenarios involving radiation and BW or CW agents. Realistic operational and medical planning require more accurate projection of increased casualty rates resulting from agent interactions ($ 0.544 Million).

(U) Established treatment recommendations for military personnel wounded by DU based on animal data from applied research studies and studies to monitor patients injured by DU fragments ($ 0.150 Million).

(U) **FY1998 Plans:**

(U) To improve efficacy of treatment with preventive drugs, develop a therapeutic drug monitoring assay to correlate blood concentrations of radioprotectants with subsequent levels of radioprotection achieved. Continue to optimize combined (prophylaxis/therapeutic) treatment modality for survival following acute, lethal irradiation ($ 0.641 Million).

(U) Explore feasibility of using implanted capsules to provide sustained and effective delivery of radioprotective drugs. Determine efficacy of implanted, slow-release radioprotectants for acute bone marrow injury associated with either prompt and protracted radiation exposures ($ 0.383 Million).

(U) Simplify procedures to assess exposure to radiation at high doses to allow fielding at advanced medical treatment facilities. Complete studies extending application of radiation dose measuring protocols to incremental doses of fission neutrons ($ 0.500 Million).

(U) Validate new biodosimetry methods to measure radiation exposure through collaboration with clinical radiotherapy centers to provide rapid screening tools at forward field operations ($ 0.590 Million).

(U) Improve models predicting casualties from exposures to radiation and BW agents by incorporating data for lung exposures to a strain of anthrax bacteria and for oral exposure to a diarrheal agent ($ 0.280 Million).

(U) Use data from applied research studies to model how uranium from DU fragments will distribute throughout the bodies of wounded military personnel. The new model will allow assessment of the risks associated with exposure to DU fragments to guide the degree of medical treatment required ($ 0.095 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z

(U) Continue development of a simple method to measure uranium in urine of military personnel to provide a rapid field-based clinical assay for DU exposure ($ 0.183 Million).

(U) **FY1999 Plans:**

(U) Initiate development of preventive treatments for the long-term health consequences associated with chronic radiation exposure. Optimize combined prophylaxis/therapeutic treatments for chronic radiation injury. ($ 0.247 Million)

(U) Design and assess slow-release preventive drug treatments (radioprotectants & therapeutics) -- delivered by implanted capsules -- for chronic radiation injury with either near- or long-term health consequences ($ 0.259 Million).

(U) Further validate biological marker assays for radiation exposure by determining their performance characteristics in measuring (1) exposure to gamma rays at low-dose rates and (2) prior radiation exposures. The availability of a prior-exposure assessment is essential to permit dose assessment when analysis is delayed or when exposures are protracted ($ 0.370 Million).

(U) To provide an integrated system for measurement of radiation exposures, develop software tools to manage biodosimetric data for field use. Test screening assays for measuring radiation exposure using blood samples from radiotherapy patients with the goal of providing diagnostic information on individual exposure levels as far forward as possible ($ 0.505 Million).

(U) Expand models predicting casualties to include both incapacitation and mortality resulting from exposures to radiation and BW bacterial agents. This will provide operational planners with an improved tool for targeting and consequence assessment ($ 0.322 Million).

(U) Provide final treatment recommendations to physicians for treatment of injuries from DU fragments based on long-term studies in animals. Continue development of test for uranium in urine ($ 0.433 Million).

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	3.276	2.778	2.191	Continuing	Continuing
Appropriated Value	3.276	2.778		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(0.089)	(0.106)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	0.000	0.000	0.000		
c. Other	0.000	0.000	(0.055)	Continuing	Continuing
Current President's Budget	3.187	2.672	2.136	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Changes are due to Congressional and program budget djustments

(U) **Schedule:** Not Applicable

(U) **Technical:** Not Applicable

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Medical Advanced Technology Program PE 0603002D8Z

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	11.189	11.711	11.650	11.563	11.414	11.632	11.993	Continuing	Continuing
JDTP/P486	11.189	11.711	11.650	11.563	11.414	11.632	11.993	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, such as, 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 2004. This is a budget activity 3 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 1998
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/Technical Centers, DOE National Laboratories, industry, and academia. The joint program is integrated through the Joint Ordnance Commanders Demilitarization Subgroup and leverages support from the Environmental Security Technology Certification Program (ESTCP), the Strategic Environmental Research and Development Program (SERDP), the Joint DoD/DOE Munitions Program, and the Services. Each of the projects is sponsored by a specific federal laboratory with peer review by the Joint Working Group. Assessment and review of demilitarization requirements are provided by the Demilitarization Users Group for use in planning new investments for this program. Technology transfer opportunities are enhanced by supporting an annual Global Demilitarization Symposium which focuses on technical review and data evaluation from current projects and ongoing 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 investments areas. Recent annual reports; FY 1996-Joint Service Explosives Demilitarization Technology Program (14 Aug. 96) and the FY 1997-Department of Defense Joint Demilitarization Technology Program (13 Mar 97).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost To Complete	Total Cost
Total Program Element (PE) Cost	11.189	11.711	11.650	11.563	11.414	11.632	11.993	Continuing	Continuing
JDTP/486	11.189	11.711	11.650	11.563	11.414	11.632	11.993	Continuing	Continuing

(U) **Project Number and Title: P486 Explosives Demilitarization Technology**

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

(U) **FY1997 Accomplishments:**

(U) Seven Tunnel Demonstrations have been performed at the Nevada Test Site during FY 1997. The detonation series consisted of four demonstrations ranging from 100 pounds net explosive weight (NEW) (575 pounds total weight), 500 pounds NEW (2,295 pounds total weight) to 1,000 pounds NEW (5,675 pounds total weight). These were conducted with fragment producing 155 mm High Explosive (HE) projectiles set up as a field production type open detonation. The rocket burn series consisted of three events of 1,210, 1,500 and 3,000 pounds of multiple propellant types. The items burned were Nike Hercules and Hawk rocket motors. EPA Standard Methods were used in the analysis of regulated chemicals. In addition to the measurement of effluents, the temperature and pressure histories in the test chamber were recorded to provide data for numerical modeling for use in future enhancements to these processes. Additionally, related work was performed including in-situ Tunable Diode Laser (TDL) development, propellant conversion and analysis, tactical rocket motor contained burn and joint system integration. Performers include Army, Navy, Air Force, DOE National Labs, Nevada Test Site (NTS), Bechtel Nevada, Radian Corp., Parsons Brinkerhoff, UNLV and others. ($ 6.689 Million)

(U) Development of a propellant removal and processing system for hazard class (HC) 1.1 large rocket motors continued during FY 1997. This project uses cryowashout, base hydrolysis and Hydrothermal Oxidation (HTO). Performers are USAF Brooks Lab, General Atomics, Thiokol, Naval Air Warfare Center-China Lake and others. Washout of a Minuteman II Stage 3 rocket motor was successfully performed. Check-out testing on the HTO unit operating at 500-570 degrees C and 4,000 PSI were conducted with results being used for system refinement and optimization. 750 pounds of propellant have been processed in this unit. ($ 2.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z

(U) The Critical Fluid Removal/Reclamation process utilizing liquid ammonia has been transferred from Alliant TechSystem, Magna, UT to Redstone Arsenal, AL. Facility design is complete and is configured for Hazard Class 1.1 or 1.3 solid propellants. The system accepts propellant materials in any size-reduced configuration either at the extractor vessel or pan filter system. The system to date has processed 300 pounds of HC 1.3 propellant. Performers include Redstone Test and Evaluation Center, Missile Research, Development and Engineering Center, Corps of Engineers, Alliant TechSystems, Rust Engineering and others. ($ 1.500 Million)

(U) A system for breakdown of cyclotetramethylene (RDX/HMX) based high energy propellants and explosives from warheads and other munitions is being developed by the Navy in conjunction with TPL, Inc., and University of Missouri, Rolla. This system links waterjet technology, mechanical reprocessing of the energetics, extracting the energetics, processing the by-products and packaging reformulated specialty products for the energetics market. Initial tests have been successful and scale-up is being prepared. ($ 1.000 Million)

(U) **FY1998 Plans:**

(U) The Tunnel demonstration program will continue with follow-on detonations and burns which closely resemble depot-type field operations. At least seven additional events will be conducted at the fragment producing 1,000 pounds NEW level. The data collected from these events will be used to develop less intrusive methods for munitions demilitarization, such as improved loading configurations, containment chamber, and noise limitations. Capability at Dugway Proving Ground (DPG) will be used to develop emissions profiles. Molten Salt technology will be investigated as waste stream treatment and joint integration work will continue. ($ 6.711 Million)

(U) The Air Force Propellant Removal and Processing Program will emphasize further HC 1.1 propellant behavior studies utilizing thermal cycling results from cryowashout. The program will also develop removal and processing characteristics for advanced propellant formulations. The HTO system will be further demonstrated on these energetics as operating parameters are better defined. Conversion studies from ammonia to sodium hydroxide as the hydrolysis media will be completed. ($ 2.000 Million)

(U) The Critical Fluid Program will begin in depth studies of the Multiple Launch Rocket System (MLRS) for demonstration of propellant removal and breakdown. Removal and breakdown residence periods will be established and operating pressure defined. The extractor vessel and pan dryer will be operated at rates to minimize ammonia evaporation and to improve reduction rates. ($ 1.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z

(U) The waterjet and R3 system will continue development on processing of 40 mm HE rounds with an eventual goal of providing slugged-out energetics for feed into the mechanical reprocessing system. Feed system work on the unit will also continue with an emphasis on the safety properties of the size reduced material. ($ 1.000 Million)

(U) The Portable Propellant/Explosive Analyzer Program will develop a dedicated field screening test for recovered propellants. Frequently these materials do not have known stabilizer levels. This results in hazards to both the work force and the facility. This program will develop uncomplicated analytical procedures for screening and for specific data. Near infrared, Thin Layer Chromatography (TLC) and Gas Chromatography/Mass Spectrometry (GC/MS) will be used to provide expedited field stability data. During FY 1998, design and installation of ruggedized miniature field instruments will be accomplished by Lawrence Livermore National Laboratory, Armament Research, Development and Engineering Center and Geocenters ($ 1.000 Million)

(U) **FY1999 Plans:**

(U) The Tunnel Demonstration Program will continue in FY 1999. It will focus on additional detonations and burns to allow benchmarking events to be compared with improved procedures that will reduce both safety and environmental concerns. Design criteria will be developed for facility fragment and noise containment as well as reduced EPA regulated emissions. Related work at DPG will be continued for emission families. Additionally, the Contained Burn Chamber development will continue, along with Molten Salt Oxidation, and joint integration. ($ 7.350 Million)

(U) The Propellant Removal and Treatment Process will be relocated to an additional user facility. Operating parameters for the cryowashout, hydrolysis, and HTO will be developed for tactical and conventional munitions applications. In particular, system pressurization and residence times will be explored on materials related to other than the Minuteman system. Use of the HTO on advanced energetics will be studied for the fielded system. ($ 1.000 Million)

(U) The Critical Fluid system will be operated at lower pressures with expanded use of the removal module. Initial feasibility study of a transportable system with mechanical removal capability will begin. Chiller systems will be demonstrated, and HC 1.1 and 1.3 propellants will be processed in limited quantities. The MLRS will remain the initial system target. ($ 0.500 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z

(U) Following demonstrations in FY 1998 of removal and mechanical process capabilities, FY 1999 waterjet and R3 system work will address the challenges of scale up, advanced controllers, and varied energetic feed streams. A feed stream such as Composition A3 will be selected for initial development tests. Pertinent data will be collected to assist in cost and efficiency modeling. ($ 1.500 Million)

(U) Field study of the Portable Propellant/Explosive Analyzer and other propellant studies will continue in FY 1999. Both the Near Infrared and TLC/GC-MS systems will be tested in demilitarization operations and on recovered bulk materials. System protocols and procedures for use will also be developed. Specific demonstrations will be conducted with single, double, and triple base propellants concentrating initially on those most prevalent in the Demil Inventory. ($ 1.000 Million)

(U) Catalytic Hydrotreating uses a liquid stream containing the energetic material which is combined with hydrogen, heated, and contacted with a catalyst. This catalytic reduction with hydrogen provides the flexibility of recovering valuable chemical or fuel resources. Primary focus will be on the reaction chemistry and product separation operations. This work will build on the Explosive D work performed for the Navy to determine viability of the process for energetics. ($ 0.300 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Explosives Demilitarization Technology PE 0603104D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	11.754	12.259	12.541	Continuing	Continuing
Appropriated Value	11.754	12.259	12.540	Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	0.000	(0.508)	0.000		
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.565)	0.000	0.000		
c. Other	0.000	(0.040)	(0.890)	Continuing	Continuing
Current President's Budget	11.189	11.711	11.650	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY 1997-FY1999 funding changes are due to Congressional reductions and program budget adjustments.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA3				R-1 ITEM NOMENCLATURE Demining PE 0603120D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	13.256	15.918	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Demining/P547	13.256	15.918	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) This humanitarian demining R&D program focuses on development, testing, and evaluation of equipment to reduce the time and costs associated with demining while improving operational safety of deminers. This program is not a basic research program. This program adapts commercial-off-the-shelf equipment and mature technologies to rapidly demonstrate and transition equipment for landmine detection, landmine clearance, protection of deminers, and mine awareness training to the international demining community. The program seeks to leverage past and current R&D project activity in related areas including tactical countermine, unexploded ordnance clearance, and foreign development programs. There are four areas of emphasis currently being addressed by this technology development program: equipment to locate mined and mine-free terrain; clearers specialized for demining agricultural areas and neutralization devices to destroy individual mines without moving them; tools for the deminer to enhance safety; and various media to facilitate mine awareness and deminer training. Humanitarian demining needs and sustainment issues originate with information from the United Nations, international groups, Non-Government Organizations (NGOs), and contractors experienced in demining operations. The National Security Council's Interagency Working Group R&D Demining Subcommittee reviews a prioritized project list, and the program is subsequently authorized for execution by the Assistant Secretary of Defense for Special Operations and Low Intensity Conflict.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA3	R-1 ITEM NOMENCLATURE Demining PE 0603120D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	13.256	15.918	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Demining/P547	13.256	15.918	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P547 Demining**

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

(U) **FY1997 Accomplishments:**

(U) Developed and successfully demonstrated large area mechanical clearance equipment specialized for demining agricultural areas and individual mine extraction/excavation for subsequent disposal. Developed and demonstrated enhanced chemical systems that are simple, affordable, and safe to use for in-situ neutralization of individual land mines. Completed development and initiated demonstration of a wide area landmine detection and minefield mapping system; and concluded a demonstration of a stand-off ground based mine detection system specific for surface and shallow buried mines. Initiated development of a hand-held detector based on adaptation of a commercial mining application. Produced low cost improvements to existing techniques of manual probing, vegetation clearance and hand-held metal detectors. Initiated improvements to the blast and fragment containers to reduce weight and cost while maintaining equivalent operational performance as previously demonstrated: Initiated development of a simple and robust alternate power source for deminers to reduce the logistics problems caused by the thousands of batteries currently required in the harsh environments and limited facilities associated with humanitarian demining operations. The landmine and fuze data module, medical training module, the mine injury model, and templates for mission planning were developed/enhanced and integrated into the Demining Support System (a suite of multi-media, audio-visual computer equipment to facilitate mine awareness education) - this enhanced system was subsequently deployed to eight countries. ($13.256 Million)

(U) **FY1998 Plans:**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA3	R-1 ITEM NOMENCLATURE Demining PE 0603120D8Z

(U) Continue development of enhanced/commercial mechanical and large area clearance equipment specialized for demining agricultural areas. Complete development of equipment to neutralize individual mines. Initiate development and demonstration of new alternatives for in-situ mine neutralization that are simple, affordable, and expendable. Continue development of multi-lingual demining training modules for the demining community. Conclude development and demonstration of wide area detection and mapping system. Develop and demonstrate ground-borne systems capable of detecting, discriminating, and mapping individual landmines. Continue design and development of simple hand tools for use in excavation and neutralization of individual landmines. Initiate development of individual protective ensembles and mine remediation support tools for deminers. Develop and demonstrate hand-held mine detection enhancements that integrate state of the art technologies for usage in mine marking, battery charging and solar panel energy collection. ($ 15.918 Million)

(U) **FY1999 Plans:**

(U) Program was transferred to PE0603920D (Humanitarian Demining) ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA3	R-1 ITEM NOMENCLATURE Demining PE 0603120D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	14.369	7.663	7.592	Continuing	Continuing
Appropriated Value	14.369	16.663		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.745)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(1.113)				
c. Other			(7.592)	Continuing	Continuing
Current President's Budget	13.256	15.918	0.000	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY 1997 and FY 1998 changes due to program budget adjustments and congressionally distributed reductions. Funding for FY 1999 through FY 2003 was realigned to PE 0603920D because the program is more properly classified as Demonstration and Validation.

(U) **Schedule:** (total PE or Project, as applicable) Not Applicable

(U) **Technical:** (total PE or Project, as applicable) 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 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Alternatives to Antipersonnel Landmines PE 0603121D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	2.856	4.753	0.000	0.000	0.000	0.000	0.000	7.853
Alternatives to Antipersonnel Landmines/P121	0.000	2.856	4.753	0.000	0.000	0.000	0.000	0.000	7.853

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) P121, Alternatives to Anitpersonnel Landmines (APL). This program element develops, tests, and evaluates area denial systems to replace anti-personnel landmines (APL). APL alternatives include surveillance systems, command and control systems, and overwatch fires which will be evaluated and developed in parallel. Non-lethal technologies will also be evaluated for applicability. During the first phase, various concepts will be defined in detail and examined with emphasis placed on leveraging existing programs. A process to select viable aternatives for further evaluation will be conducted using modeling and simulation along with advanced warfighting experiments. Selected approaches will then enter a prototype development and evaluation phase.

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	2.856	4.753	0.000	0.000	0.000	0.000	0.000	7.853
Alternatives to Antipersonnel Landmines/P121	0.000	2.856	4.753	0.000	0.000	0.000	0.000	0.000	7.853

(U) **Project Number and Title: P121 Alternatives to Antipersonnel Landmines**

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

(U) **FY1997 Accomplishments:**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA 3	R-1 ITEM NOMENCLATURE Alternatives to Antipersonnel Landmines PE 0603121D8Z

(U) Not Applicable. ($ 0.000 Million)

(U) **FY1998 Plans:**

(U) The FY 1998 program will be finalized based on Presidential Directives, DoD guidance, and the results of ongoing evaluations. The Department conducted a study to quantify the military utility of APL and assess potential alternatives. The APL alternatives considered included: force structure; tactics, techniques, and procedures; and technology options. Industry was given the results of the study and solicited for proposals. The top industry candidates have been awarded purchase orders in order to develop formal proposals of their alternatives which are due to the Department in March 1998. ($ 2.856 Million)

(U) **FY1999 Plans:**

(U) The final FY 1999 program will be developed after the receipt of the industry proposals cited in the FY 1998 paragraph, the identification of the candidate developmental items, and warfighting experiments. In addition to the industry proposals, alternatives such as revised/innovative force structure, tactics, techniques, procedures, and other technology options will be examined. ($ 4.753 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide / BA 3	R-1 ITEM NOMENCLATURE Alternatives to Antipersonnel Landmines PE 0603121D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	0.000	2.990	4.977		
Appropriated Value		2.990			
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.124)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment		(0.010)			
c. Other		0.000	(0.224)	0.000	7.853
Current President's Budget	0.000	2.856	4.753	0.000	7.853

Change Summary Explanation:

(U) **Funding:** New start line item

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT &E, Defense Wide / BA 3				R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.599	39.036	35.813	39.223	41.381	42.696	38.431	Continuing	Continuing
Counterterror Technical Support (CTTS)/P484	20.233	33.500	30.495	33.792	35.848	37.069	32.704	Continuing	Continuing
Explosive Ordnance Disposal/ Low Intensity Conflict (EOD/LIC)/P206	3.152	3.992	3.983	4.066	4.142	4.213	4.287	Continuing	Continuing
Special Operations/Low Intensity Conflict (SO/LIC) Analytical Support/P205	1.214	1.544	1.335	1.365	1.391	1.414	1.440	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) P484, Counterterror Technical Support (CTTS). This program develops technology and prototype equipment that address needs and requirements that have direct operational application in the national effort to combat terrorism. It integrates Defense advanced development efforts with government-wide and international efforts to combat terrorism. Projects support antiterrorism and counterterrorism 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 (chemical, biological, nuclear, and radiological) devices; conduct surveillance and tracking of terrorist; conduct threat and event assessments; and process and disseminate information. The Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict directs the CTTS Program which addresses combating terrorism requirements identified by the interagency Technical Support Working Group (TSWG).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) The TSWG is a multi-agency R&D working group under the aegis of the National Security Council's Interagency Working Group on Counterterrorism. As such, the CTTS program supports, and is integrated into, the national interagency response to terrorism. Also, it conducts a cooperative international R&D program, and is executing projects with three countries.

(U) The CTTS program develops technologies and state-of-the-art prototype equipment that have direct operational application in the national effort to combat terrorism. Projects address the highest priority needs as dictated by current threat assessments. Documented activities and capabilities show that terrorists continue to be technologically and tactically sophisticated, which poses new challenges to our capability to respond. The CTTS program supports measures against chemical and biological terrorism and is fully coordinated with the Chemical/Biological Defense Program and the Counterproliferation Support Program. Current priorities are the detection and neutralization of terrorist-built explosive devices, countermeasures for chemical and biological terrorism, and the detection and surveillance of terrorists.

(U) Projects are structured to address numerous technical focus areas. Capabilities to be pursued include: equipment used to prevent and respond effectively to a chemical/biological agent release in an urban area; building a national capability to detect and disable large-vehicle bombs; methods and systems used to detect improvised terrorist devices from stand-off distances; a national infrastructure assurance and protection; systems for improved audio and video surveillance of terrorists; effective detection of ammonium nitrate-based explosives; more effective post-blast forensic analysis; and equipment and systems assisting DoD units and other response agencies in dealing with consequence management following a terrorist attack. These areas address deficiencies cited in response to questions about the adequacy of counterterrorism R&D posed in Presidential Decision Directive 39 (PDD-39).

(U) All national and international projects are distributed among eight counterterrorism mission categories: Tactical Operations Support; Explosives Detection and Disposal; Weapons of Mass Destruction Countermeasures; Personnel Protection; Surveillance, Collection, and Operations Support; Physical Security; Infrastructure Protection; and Investigative Support and Forensics. This program is a non-system advanced technology development project used to demonstrate the utility or cost reduction potential of technology when applied to different types of defense equipment or techniques. It includes technology development and proof-of-principle demonstrations in field applications for new and improved systems. Coordination and planning efforts with the participating agencies facilitate technology transition from development to operational use. The demonstrations strive to evaluate integrated technologies in a realistic operating environment to assess the performance in actual mission scenarios and the cost reduction potential of advanced technology.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) P206, Explosive Ordnance Disposal/Low-Intensity Conflict (EOD/LIC). The EOD/LIC project is a rapid prototyping effort to provide technology and equipment to military operators who are confronted with explosive threats. Tasks focus on detection, countermeasures, and neutralization of explosive threats. Requirements submitted by the Joint Service EOD community and other LIC-oriented military users are prioritized by the OSD EOD/LIC Coordination Group.

(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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.599	39.036	35.813	39.223	41.381	42.696	38.431	Continuing	Continuing
Counterterror Technical support (CTTS)/P484	20.233	33.500	30.495	33.792	35.848	37.069	32.704	Continuing	Continuing

(U) **Project Number and Title: P484 Counterterror Technical Support (CTTS)**

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

(U) **FY1997 Accomplishments:**

(U) **TACTICAL OPERATIONS SUPPORT.** Continued development of Specialized Access Tools. Continued development of a high-speed, personnel delivery boat. Continued development of a rifle-fired 40mm grenade with a controlled fragmentation pattern for use in close quarters battle scenarios. Continued development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. ($ 1.250 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **EXPLOSIVES DETECTION & DISPOSAL** Completed development of a large volume trace explosives detection system that can be used for screening luggage, vehicles, and cargo at various chokepoints or border crossings. Completed development of marking agent materials and processes specifically for identifying the presence of concealed detonation cord. Completed development of a series of biosensor detection and canine olfactory projects. Completed development of a system capable of identifying aircraft passengers whose hands have had contact with explosives. Completed development of a safe, non-flammable simulant for both x-ray and trace detection of detasheet. Continued development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Continued to research factors that affect the capabilities of explosives detection through biological schemes. Continued development of a portable, suitcase-sized detection system with selectivity and sensitivity equal to or better than fixed systems. Continued development of a field-portable x-ray system for imaging the contents of suspect baggage/containers when access to only one side is possible. Continued development of enhanced techniques for using Raman light spectroscopy for the detection, characterization, and identification of explosive residues. Started development of the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Started development of an interactive, computer-based improvised explosive device neutralization training system. Started the development of a safer initiating system for various explosive disruption robots. Started development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. ($ 2.580 Million)

(U) Continued development of the Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS) to non-intrusively determine materials present in large shipping containers. ($ 4.577 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES.** Completed development of a tool used to assist analysts and operations officers in identifying and assessing terrorism related events, personnel, activities, hardware, and transactions. Completed development of a non-toxic, non-corrosive, environmentally safe, foam-based system which uses catalytic enzymes for the decontamination of chemical/biological agents. Completed development of a blast protective suit with combined chemical and biological agent protection. Completed development of chemical agent decontaminants for use in foam matrices, as well as the development of better techniques for high-volume foam generation and use. Continued development of chemical/biological masks for first responders. Continued development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Continued to develop a low-cost, throw-away protective mask to provide sufficient levels of protection from a chemical/biological threat while egressing a contaminated area. Continued development of the Biological Agent Test Kit. Continued development of a ruggedized and downsized capability to determine the contents of closed containers. Continued development of an improved, in-field capability to detect nuclear materials. Started integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Started development of a handheld reader for immunochromatographic assays for the detection of biological agents. ($ 3.900 Million)

(U) **PERSONNEL PROTECTION.** Completed development of a fieldable prototype and data package for an enhanced armored passenger vehicle. Continued development of flexible body armor that resists penetration and slashes from knives and other sharp edged instruments. ($ 0.600 Million)

(U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT.** Completed development of a pattern recognition/neural network program to identify the terrorist groups most likely responsible for specific incidents. ($ 0.500 Million)

(U) **PHYSICAL SECURITY.** Continued development of a high quality, unmanned system to identify human targets for day and night operations at long ranges. Continued development of a system to nonintrusively analyze human vital signs in order to determine unusual degrees of agitation or anxiety. Started development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Started the development of a non-intrusive, mobile inspection system of parked suspect vehicles. Started the development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. Started the development of an interagency blast mitigation test program. ($ 4.851 Million)

(U) **INFRASTRUCTURE PROTECTION.** Continued development of an automated infrastructure analysis database ($ 0.250 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **INVESTIGATIVE SUPPORT & FORENSICS.** Completed development of a method to improve the detection of TNT extracted from the debris of an explosion for detailed forensic analysis and identification. Completed effort to provide explosive standard reference materials that are certifiable and are acceptable for investigative and evidentiary purposes. Completed development of techniques to recover and analyze DNA found on material evidence. Completed development of improved methods for recovering latent fingerprints from problematic surfaces of terrorist-related items. Completed development of standard methods to identify post-blast explosive residue for use in forensics analysis to better prosecute terrorists. Started development of an enhanced version of the CarBomb CAD analysis tool, which is a system that aides post-blast analysis of vehicle bombs. ($ 1.725 Million)

(U) **FY1998 Plans:**

(U) **TACTICAL OPERATIONS SUPPORT.** Complete development of a high-speed, personnel delivery boat. Complete development of a rifle-fired 40mm grenade with a controlled fragmentation pattern for use in close quarters battle scenarios. Continue development of specialized access tools. Continue development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. Start development of a coherent fiber optic bundle for use with standard night vision goggles. ($ 1.515 Million)

(U) **EXPLOSIVES DETECTION & DISPOSAL.** Complete development of a field-portable x-ray system for imaging the contents of suspect baggage/containers when access to only one side is possible. Complete development of enhanced techniques for using Raman light spectroscopy for the detection, characterization, and identification of improvised explosive device residues. Complete development of a portable, suitcase-sized detection system with selectivity and sensitivity equal to or better than fixed systems. Continue development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Continue development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. Continue to research factors that affect the capabilities of explosives detection through biological schemes. Continue to develop the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Continue to develop an interactive, computer-based improvised explosive device neutralization training system. Continue development of a safer initiating system for various explosive disruption robots. Start development of an enhanced, integrated explosive detection and diagnostics system. ($ 5.880 Million)

(U) Continue development of the Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS) to non-intrusively determine materials present in large shipping containers. ($ 3.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES.** Complete the development of a low-cost, throw-away protective mask to provide sufficient levels of protection from a chemical/biological threat while egressing a contaminated area. Complete the development of a ruggedized, downsized capability for operators to determine the contents of closed containers. Complete development of the Biological Agent Test Kit. Complete development of chemical/biological masks for first responders. Complete the development of an improved, in-field capability to identify nuclear materials. Continue the integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Continue development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Continue to develop a handheld reader for immunochromatographic assays for the detection of biological agents. Start the development of a real-time, highly selective and sensitive, portable chemical warfare agent detection system based on time-of-flight mass spectrometry and high-speed gas chromatography. Start the development of a rapid detection system for pathogenic chemical and biological agents in food. ($ 6.105 Million)

(U) Start development of an Anti-Biological Device (ABD) to non-intrusively destroy biological agents in situ. ($ 3.000 Million)

(U) **PERSONNEL PROTECTION.** Complete development of flexible body armor that resists penetration and slashes from knives and other sharp edged instruments. Start development of advanced body armor. Start modeling explosive effects on occupants of fully armored vehicles. Start development of multilayered, lightweight, energy-absorbing, composite armor for vehicles. ($ 1.845 Million)

(U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT.** Start development of advanced tagging systems. Start development of hostage barricade surveillance systems. ($ 1.500 Million)

(U) **PHYSICAL SECURITY.** Complete development of a high quality, unmanned system to identify human targets for day and night operations at long ranges. Complete development of a non-intrusive, mobile inspection system of parked suspect vehicles. Complete development of a system to nonintrusively analyze human vital signs in order to determine unusual degrees of agitation or anxiety. Continue the development of an interagency blast mitigation test program. Continue development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Continue development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. Start structural blast mitigation analysis of pre- and post-construction. Start development of portable blast containment devices. Start development of a system to provide an intelligent vulnerability, risk, and threat assessment tool to assist security professionals in making effective and cost-sensitive facility security decisions. ($ 8.790 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **INFRASTRUCTURE PROTECTION.** Continue development of an automated infrastructure analysis database. Start development of a security infrastructure model that analyzes potential threats and response capabilities and processes. Start development of a means of modeling the effects of economic and information warfare terrorism. ($ 0.695 Million)

(U) **INVESTIGATIVE SUPPORT & FORENSICS.** Continue development of an enhanced version of the CarBomb CAD analysis tool, which is a system that aides post-blast analysis of vehicle bombs. Start development of an enhanced handwriting analysis system. Start development of a personal attribute determination by fingerprints capability. Start the development of a system to detect and recover fingerprints on water soaked surfaces. Start development of a document copies tagging system. Start development of chemicals to tag devices and documents with micro-tracer particles. ($ 1.170 Million)

(U) **FY1999 Plans:**

(U) **TACTICAL OPERATIONS SUPPORT.** Complete development of an enhanced diversionary device. Complete development of night vision goggles that mitigate the effects of "burn-out" and blooming when bright lights are encountered. Continue development of specialized access tools. Continue development of a coherent fiber optic bundle for use with standard night vision goggles. ($ 1.141 Million)

(U) **EXPLOSIVES DETECTION & DISPOSAL.** Complete development of an interactive, computer-based improvised explosive device neutralization training system. Complete development of a system for the detection of terrorist bombs from standoff distances under a variety of conditions. Complete development of a safer initiating system for various explosive disruption robots. Complete development of a single-sided antenna for use with nuclear quadrupole resonance explosive detection methods. Continue researching factors that affect the capabilities of improvised explosive device detection through biological schemes. Continue development of an enhanced, integrated improvised explosive detection and diagnostics system. Continue to develop the full spectrum of response requirements for large vehicle bombs, including detection, analysis, access, and disablement. Start development of a robotic system for the stand-off detection and identification of improvised explosive devices. Start the development of a single-sided neutron interrogation unit for the detection of vehicle bombs. ($ 5.622 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **WEAPONS OF MASS DESTRUCTION COUNTERMEASURES.** Complete integration of a gas chromatograph with an existing, handheld chemical agent monitor to perform separation of contaminants to reduce false alarms. Complete development of a standoff system for detection and characterization of chemical and biological agents using a non-nuclear source. Complete development of a real-time, highly selective and sensitive, portable chemical warfare agent detection system based on time-of-flight mass spectrometry and high-speed gas chromatography. Complete development of a handheld reader for immunochromatographic assays for the detection of biological agents. Continue development of a rapid detection system for pathogenic chemical and biological agents in food. Start development of chemical agent suppression polymers. ($ 5.025 Million)

(U) **PERSONNEL PROTECTION.** Complete development of multilayered, lightweight, energy-absorbing, composite armor for vehicles. Continue development of advanced body armor. Continue modeling explosive effects on occupants of fully armored vehicles. ($ 1.850 Million)

(U) **SURVEILLANCE, COLLECTIONS, & OPERATIONS SUPPORT.** Continue development of advanced tagging systems. Continue development of hostage barricade surveillance systems. Start development of tagging and detection methods. ($ 1.530 Million)

(U) **PHYSICAL SECURITY.** Complete development of portable blast containment devices. Continue the development of an interagency blast mitigation test program. Continue development of a rapid inspection system for the detection of bulk explosives at facility chokepoints. Continue development of different detection systems and response plans to better meet the dynamics associated with a chemical agent release in non-battlefield scenarios. Continue structural blast mitigation for pre- and post-construction. Continue development of a system to provide an intelligent vulnerability, risk, and threat assessment tool to assist security professionals in making effective and cost-sensitive facility security decisions. Start development of structural component testing for large blast effects damage. ($ 13.083 Million)

(U) **INFRASTRUCTURE PROTECTION.** Complete development of an automated infrastructure analysis database. Continue development of a security infrastructure model that analyzes potential threats and response capabilities and processes. Continue development of a means of modeling the effects of economic and information warfare terrorism. ($ 0.800 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **INVESTIGATIVE SUPPORT & FORENSICS.** Complete the development of a system to detect and recover fingerprints on water soaked surfaces. Complete development of a document copies tagging system. Complete development of an enhanced version of the CarBomb CAD design tool, which is a system that aides post-blast analysis of vehicle bombs. Continue development of a personal attribute determination by fingerprints capability. Continue development of chemicals to tag devices and documents with micro-tracer particles. Start development of an enhanced handwriting analysis system. ($ 1.444 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.599	39.036	35.813	39.223	41.381	42.696	38.431	Continuing	Continuing
Explosive Ordnance Disposal/Low Intensity Conflict (EOD/LIC)/P206	3.152	3.992	3.983	4.066	4.142	4.213	4.287	Continuing	Continuing

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

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

(U) **FY1997 Accomplishments:**

(U) Completed development of a wearable 60-series computer. ($ 0.075 Million)

(U) Continued development of an autonomous search vehicle. Continued development of special operations forces vehicle ballistic protection. Continued development of an imaging ordnance locator. Continued development of a high resolution diver sonar. Continued development of a standoff dearmer with laser sight. Continued development of non-explosive cartridges. Continued development of dry-process x-ray film. ($ 1.677 Million)

(U) Started development of a clandestine underwater transponder. Started development of improvised explosive device visualization capability. Started development of a remote field disassembly system. Started development of a limpet mine detection system. Started development of EOD ballistic/fragmentation protection. ($ 1.400 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **FY1998 Plans:**

(U) Complete development of an autonomous search vehicle. Complete development of special operations forces vehicle ballistic protection. Complete development of an imaging ordnance locator. Complete development of a high resolution diver sonar. Complete development of a standoff dearmer with laser sight. Complete development of a clandestine underwater transponder. Complete development of a dry process x-ray film. Complete development of an improvised explosive device visualization capability. Complete development of EOD ballistic/fragmentation protection. ($ 0.680 Million)

(U) Continue development of non-explosive cartridges. Continue development of a remote field disassembly system. Continue development of a limpet mine detection system. ($ 0.581 Million)

(U) Start development of a support craft command and control system. Start development of an integrated mission planning and evaluation system. Start development of an integrated diver display mask. Start development of an improved underwater demolition charge. Start development of a limpet mine neutralization tool. Start development of a hull acoustic navigation system for diver search. Start development of an EOD incident site command control and communications system. Start development of an advanced EOD tactical information system. Start development of a small munitions/boobytrap disrupter. Start development of a long range disrupter. ($ 2.731 Million)

(U) **FY1999 Plans:**

(U) Complete development of non-explosive cartridges. Complete development of a remote field disassembly system. Complete development of a limpet mine detection system. Complete development of a long range disrupter. ($ 0.307 Million)

(U) Continue development of a support craft command and control system. Continue development of an integrated mission planning and evaluation system. Continue development of an integrated diver display mask. Continue development of an improved underwater demolition charge. Continue development of a limpet mine neutralization tool. Continue development of a hull acoustic navigation system for diver search. Continue development of an EOD incident site command, control and communications system. Continue development of an advanced EOD tactical information system. Continue development of a small munitions/boobytrap disrupter. ($ 3.218 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) Start development of systems for improving the detection of explosives through the range of EOD/LIC requirements, the neutralization of unexploded ordnance, and the safety of countermeasures equipment. ($ 0.458 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	24.599	39.036	35.813	39.223	41.381	42.696	38.431	Continuing	Continuing
Special Operations/Low Intensity Conflict (SO/LIC) Analytical Support/P205	1.214	1.544	1.335	1.365	1.391	1.414	1.440	Continuing	Continuing

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

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

(U) **FY1997 Accomplishments:**

(U) Projects included: Counterproliferation Capabilities Table Top Exercise; Strategic Psychological Operations; Targeting Sub-State Political Groups; Estimating Future Operations and Support Costs of New Systems; AC-130 Force Structure Requirements, and Cyclone Class Patrol Craft Self-Defense. ($ 1.214 Million)

(U) **FY1998 Plans:**

(U) Projects include: Analysis of Potential Cost Effectiveness of Using Air National Guard to Meet Conventional Requirements of the AC-130 Gunship; Analysis of Special Operations Forces Information Warfare Requirements and Capabilities; the Future of Intra-State Conflict; Support for the United States Special Operations Command's Future Concepts Working Group; Development of Analytical Tools for Operations Other Than War; Enhanced Psychological Operations; Readiness of Joint Service Explosive Ordnance Disposal Units for the 21st Century; and Effectiveness of Psychological Operations in Bosnia and Potential for Increased Utility of Psychological Operations Support of Future Peace-Type Operations. ($ 1.544 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) **FY1999 Plans:**

(U) The FY 1999 program will be finalized in August 1998, ensuring that study projects are timely and responsive to the requirements of DoD policy makers. ($ 1.335 Million)

(U) **ACQUISITION STRATEGY** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	21.098	34.863	37.057	Continuing	Continuing
Appropriated Value	21.098	40.862		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(0.548)	(1.694)		Continuing	Continuing
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	4.049	(0.132)			
c. Other			(1.244)	Continuing	Continuing
Current President's Budget	24.599	39.036	35.813	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** *Congress added $3.0M in FY1998 for Pulsed Fast Neutron Analysis (PFNA) Container Inspection System (CIS) and for the Anti-Biological Device (ABD) project. Other adjustments in FY1997, 1998 and 1999 were based on Congressionally directed reductions as well as program budget decision.

(U) **Schedule:** (Total PE or Project, as applicable) Not Applicable

(U) **Technical:** (Total PE or Project, as applicable) Not Applicable

(U) C. **Other Program Funding Summary Cost** Other Appropriation Funds: Department of State

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Counterterror Technical Support PE 0603122D8Z

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

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

DATE: January 1998

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603160D8Z Counterproliferation Advanced Technology Development

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	61840	65212	0	0	0	0	0	0	0	212551
P160 Consequence Management ACTD (Bio 911)	5297	0	0	0	0	0	0	0	0	5297
P535 Countering BW/CW	8882	0	0	0	0	0	0	0	0	20188
P535 SOF Counterproliferation Support	0	11697	0	0	0	0	0	0	0	11697
P539 Counterforce	47661	53515	0	0	0	0	0	0	0	175369

Mission Description and Budget Item Justification:

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and US Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

The FY 1998 Defense Reform Initiative (DRI) directed the establishment of the Defense Threat Reduction and Treaty Compliance Agency (DTRTCA) effective 1 October 1998. The DTRTCA will be formed through the consolidation of three existing agencies: the Defense Special Weapons Agency (DSWA), the On-Site Inspection Agency (OSIA), and the Defense Technology Security Administration (DTSA). In addition, several functions from the Office of the Secretary of Defense (OSD) and Washington Headquarters Services (WHS) currently involved in the management of associated programs will transfer to DTRTCA as well. The DTRTCA will also carry out programs to counter proliferation and reduce threats posed by weapons of mass destruction and provide nuclear weapon stockpile and related support.

As part of this budget submission, Counterproliferation Support Program funding and manpower resources programmed for FY 1999 and out are transferred to the DTRTCA. A five percent military and civilian personnel savings associated with the DTRTCA consolidation has already been applied and is reflected in the funding and personnel tranfers to DTRTCA.

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

DATE: January 1998

BUDGET ACTIVITY: 3 - Advanced Technology Development

PE NUMBER AND TITLE: 0603160D8Z Counterproliferation Advanced Technology Development

PROJECT: P160

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P160 Consequence Management ACTD (Bio 911)	5297	0	0	0	0	0	0	0	0	5297

A. Mission Description and Budget Item Justification

The Consequence Management ACTD (911-Bio) demonstrates the applicability of key biological weapon (BW) detection, modeling and simulation, individual protection, and decontamination technologies in a consequence management (CM) setting. In compliance with guidance from both the Administration and Congress, the objective of this ACTD is to enhance military capabilities in a supporting role, to respond effectively to the terrorist/paramilitary use of BW by demonstrating: Key BW consequence management technologies in a field environment, in part to validate research and development and acquisition priorities; Integrated operational concepts of the Chemical-Biological Incident Response Force (CBIRF) and the Technical Escort Unit (TEU); Ability of both DoD units to integrate their operations with other federal, state, and local agencies.

Acquisition Strategy:

FY 1997 Accomplishments:

- 4105 Conducted Consequence Management ACTD Field Exercise
- 1000 IPPOSM
- 192 Developed Hyperspectral Sensor Concept

Total 5297

FY 1998 Planned Program:

Total 0 This project completed in FY 1997

FY 1999 Planned Program:

Total 0 This project completed in FY 1997

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	0	0	0	0
Appropriated Value	6200	N/A	N/A	6200
Adjustments to Appropriated Value	-903	N/A	N/A	-903
Current Budget Submit/President's Budget	5297	0	0	5297

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE January 1998
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603160D8Z Counterproliferation Advanced Technology Development PROJECT P160

C. **Other Program Funding Summary**

Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE January 1998
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603160D8Z Counterproliferation Advanced Technology Development PROJECT P535

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P535 Countering BW/CW	8882	0	0	0	0	0	0	0	0	20188

A. Mission Description and Budget Item Justification

Project P535 - Countering Biological Weapons (BW)/Chemical Weapons (CW): This project enhances US capabilities to prevent or mitigate biological and chemical threats/attacks. The project is divided into two categories: First Responder projects and Special Operations Forces (SOF) projects.

The purpose of the First Responder projects is to quickly leverage DoD biological and chemical response, detection and mitigation technologies to crisis and consequence management response teams such as the US Army Technical Escort Unit (USA TEU), the Navy Defense Technical Response Group (DTRG), the Federal Emergency Management Agency (FEMA), the US Secret Service (USSS) and the Department of Public Health and Safety (PHS). These agencies have concepts of operation or employment doctrines considerably different from Major Theater of War (MTW) based nuclear, biological and chemical (NBC) defense doctrine. These projects are executed in conjunction with the Joint Chiefs of Staff CONPLAN 0300, the Office of the Assistant Secretary of Defense (Special Operations and Low Intensity Conflicts) and the Technical Support Working Group of the National Security Council's Working Group on Counterterrorism to ensure full interagency coordination of requirements. Specific projects are detailed below.

First Responder Projects:
Chemical/ Biological Sentry System (CBSS)--A field portable sensor that can be deployed in civilian settings or venues such as stadiums and parks. Potential users of this technology are the USA TEU, PHS and FEMA.

Chemical and Biological Explosive Ordnance Disposal Suit—An Explosive Ordnance Disposal (EOD) blast suit that is configured for users that must disable chemical or biological explosive devices. Potential users of this technology are the US Army 52ndc EOD unit and USA Technical Escort Unit (TEU). This suit is being developed jointly with the Royal Canadian Mounted Police.

Biological Detection Kit--Development of a first responder biological detection kit in conjunction with the US Army Medical Research Institute for Infectious Diseases and Navy Medical Research and Development Center. Typical users will be the USA TEU, FEMA, PHS, US Federal Drug Administration and USSS.

The SOF Projects will develop and demonstrate SOF unique devices that enable SOF and special mission units to detect, disable and neutralize Weapons of Mass Destruction (WMD) and their associated facilities under the direction of a geographic CINC in support of CONPLAN 0400. These techniques are leveraged from larger overall DoD programs. Specific details are classified.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE January 1998
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603160D8Z Counterproliferation Advanced Technology Development PROJECT P535

Acquisition Strategy:

FY 1997 Accomplishments:

•	1153	FIRST RESPONDER PROJECTS
•		Chemical/ Biological Sentry System (CBSS)--Initiated field test of sensor suite; ruggedized sensors; sensors-platform integration (443)
•		Biological Detection Kit--Fabricated prototype system; initiated sampling system development (710)
•		
•	7729	SOF PROJECTS: Efforts in support of SOF. Specific details are classified
Total	8882	

FY 1998 Planned Program:

Total	0	All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998

FY 1999 Planned Program:

Total	0	All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998

B. Project Change Summary

	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	8308	0	0	8308
Appropriated Value	7699	N/A	N/A	7699
Adjustments to Appropriated Value	1183	N/A	N/A	1183
Current Budget Submit/President's Budget	8882	0	0	8882

C. Other Program Funding Summary

Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE January 1998
BUDGET ACTIVITY 3 - Advanced Technology Development	PE NUMBER AND TITLE 0603160D8Z Counterproliferation Advanced Technology Development PROJECT P535

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P535 SOF Counterproliferation Support	0	11697	0	0	0	0	0	0	0	11697

A. Mission Description and Budget Item Justification

Project P535 - SOF Counterproliferation Support: This project enhances US capabilities to prevent or mitigate biological and chemical threats/attacks. The project is divided into two categories: First Responder projects and Special Operations Forces (SOF) projects.

The purpose of the First Responder projects is to quickly leverage DoD biological and chemical response, detection and mitigation technologies to crisis and consequence management response teams such as the US Army Technical Escort Unit (USA TEU), the Navy Defense Technical Response Group (DTRG), the Federal Emergency Management Agency (FEMA), the US Secret Service (USSS) and the Department of Public Health and Safety (PHS). These agencies have concepts of operation or employment doctrines considerably different from Major Theater of War (MTW) based nuclear, biological and chemical (NBC) defense doctrine. These projects are executed in conjunction with the Joint Chiefs of Staff CONPLAN 0300, the Office of the Assistant Secretary of Defense (Special Operations and Low Intensity Conflicts) and the Technical Support Working Group of the National Security Council's Interagency Working Group on Counterterrorism to ensure full interagency coordination of requirements. Specific projects are detailed below.

First Responder Projects:
Chemical/ Biological Sentry System (CBSS)--A field portable sensor that can be deployed in civilian settings or venues such as stadiums and parks. Potential users of this technology are the PHS and FEMA.

Biological Detection Kit--Development of a first responder biological detection kit in conjunction with the US Army Medical Research Institute for Infectious Diseases and Navy Medical Research and Development Center. Typical users will be the USA TEU, FEMA, PHS, US Federal Drug Administration, and USSS.

The SOF Projects will develop and demonstrate SOF unique devices that enable SOF and special mission units to detect, disable and neutralize Weapons of Mass Destruction (WMD) and their associated facilities under the direction of a geographic CINC in support of CONPLAN 0400. These techniques are leveraged from larger overall DoD programs. Specific details are classified.

Acquisition Strategy:

FY 1997 Accomplishments:

Total 0 Merged project begins in FY 1998--formed from P535, PE 0603160D8Z; P529, PE 0605160D8Z; and P541, PE 0605160D8Z

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FY 1998 Planned Program:

•	1828	FIRST RESPONDER PROJECTS
•		Chemical/ Biological Sentry System (CBSS)--Finalize field testing; deliver prototype unit to user (600)
•		Biological Detection Kit--Field test system; deliver prototype units to user (329)
•		Chemical Agent Recognition Training Aid—Develop a training aid that reproduces the visual and auditory signatures associated with chemical agent alarm functioning, thereby increasing individual and user confidence in detector operability (150))
•		Detection/ Electronic Diagnostics—Initiate development of modified x-ray system to minimize risk of explosive device functioning during x-ray operations (400)
•		Access—Conduct devilment of Sloth Technology equipment designed to operate/ move at speeds below sensing threshold of volumetric sensors (275)
•		Neutralization-Assess capability of explosively driven magneto-hydrodynamic generators as a means of defeating very fast firing circuits on explosive devices (50)
•		SBIR/STTR (24)
•	9869	SOF PROJECTS
•		Efforts in support of SOF. Specific details are classified (9740)
•		SBIR/STTR (129)
Total	11697	

FY 1999 Planned Program:

Total	0	Funds and activities transferred to PE 0603160BR. P535

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	0	11885	12847	Continuing
Appropriated Value	N/A	11885	N/A	N/A
Adjustments to Appropriated Value	N/A	-188	N/A	N/A
Current Budget Submit/President's Budget	0	11697	0	Continuing

C. Other Program Funding Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	To Compl	Total Cost
Not Applicable										

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COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P539 Counterforce	47661	53515	0	0	0	0	0	0	0	175369

A. Mission Description and Budget Item Justification

Project P539 - Counterforce: The purpose of this project is to develop technologies, demonstrate prototype systems in an operationally realistic environment and provide the warfighter with enhanced capabilities in response to current threat projections for potential adversaries who have the capability to develop and/or employ nuclear, biological and chemical (NBC) weapons in future regional conflicts involving the U.S. or its allies. The U.S. requires the capability to identify and characterize NBC research, production, storage and operational support facilities and be prepared to attack and neutralize them while mitigating collateral effects resulting from expulsion and release of NBC agents. The potential target set includes fixed, aboveground and underground hardened and unhardened facilities. The project started in FY95 and was structured to exploit ongoing technology programs wherever possible. Early project emphasis was applied to efforts to predict and measure target response and dispersion of agents associated with attacks against NBC facilities using existing conventional weapons. Current emphasis is to mitigate collateral effects through advanced weapon development and greatly enhanced deliberate target planning leading to optimized weapon employment. The near-term focus is the demonstration of target planning tools, weapons and sensors supporting direct attacks on an expanded set of NBC targets. In the longer-term, the project emphasis will change to stand-off penetrating weapons, collateral effects assessment and the supporting planning tools. Prototype or modified systems integrating these technologies will then be evaluated in an Advanced Concept Technology Demonstration (ACTD), and a residual operational capability provided to the warfighters.

A second counterforce CP ACTD is approved by DUSD(AT) and is awaiting signature of the management plan. The original CP ACTD has been retitled CP1 ACTD for the first CP ACTD. The second CP ACTD is called the Second Counterproliferation Counterforce Advanced Concept Technology Demonstration (CP2 ACTD). FY98 is the transition year with CP1 ACTD concluding and CP2 ACTD starting.

This project builds on previous Defense Special Weapons Agency (DSWA) projects to develop and mature sensor systems to provide additional capabilities for pre-, trans- and post-attack target characterization, and damage and collateral effects assessments. The project further develops and accelerates capabilities in collateral effects prediction, target/weapon interaction prediction, and funds the integration of these capabilities into Service/CINC target planning systems. The project also builds on Service programs in advanced weapon guidance, penetration and fuze enhancements. Service weapon development expertise will be used to integrate complementary, demonstrated technologies into prototype weapons that can improve prompt response, enhance lethality and control collateral effects. The project milestones are broken into four major product areas or subprojects, sensors, collateral effects, target planning and weapons, plus the operational demonstrations.

1. Sensors. This effort will provide improved warfighting residual capabilities for facility characterization, battle damage assessment (BDA) and collateral effects assessment against the spectrum of NBC facilities. Research and development is currently in progress at DSWA to characterize signatures from shallow underground facilities for exploitation by tactical unattended ground sensors (TUGS). Objectives of the current program include development of techniques for source identification, localization, and

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performing change detection in trans-attack signatures for weapon effectiveness analysis. Current intelligence community (IC) and Department of Energy (DOE) programs involve research and development to assess sensor performance and approaches for optimum sensor application for surface target detection and underground facility detection and characterization. Other project activities include enhancing the performance of existing forward looking infrared (FLIR) sensors and a weapon based sensor to provide high confidence BDA. This sub-project will leverage existing programs to (1) define concept of operations and sensor system (ground, air, and weapon based) architectures for BDA, collateral effects assessment and facility characterization; (2) develop and demonstrate sensor technologies and prototype sensor systems for BDA and facility characterization; (3) produce a data fusion and processing module for BDA and facility characterization to meet user requirements on existing platforms; (4) produce an integrated BDA module to support airborne sensors; (5) develop and demonstrate a man-emplaced TUGS system that includes multi-sensor arrays; (6) integrate stand-off and point chemical sensors onto an unmanned air vehicle (UAV) and an expendable mini-UAV, respectively, and demonstrate the ability to confirm, identify, and assess the release of chemical agents in support of attacks on NBC facilities. CP2 ACTD sensors and data fusion will address confirming the presence of chemical agents post attack and assist in predicting transport patterns by updating pre-strike predictions of the potentially hazardous plume with real-time data. The CP2 ACTD sensor program will leverage on-going chemical sensor efforts within the chemical and biological defense community to minimize program risk in developing chemical sensors for counterforce missions. This program will also monitor the progress of remote biological agent detectors for potential incorporation into the collateral effects assessment system.

2. **Collateral Effects.** The Collateral Effects program provides predictive tools for NBC expulsion and dispersion resulting from attacks on WMD facilities as well as acts of terrorism and hostile use of WMD for a variety of applications supporting NBC target attack planning. Requirements include high resolution weather models, weather measurement systems, and population databases. A key element in developing these collateral effects codes is chemical/biological expulsion tests and modeling. Modeling of chemical/biological expulsion sources will be based on theoretical model and empirical data. Codes will be validated from existing data, other predictive models and special collateral effects experiments. The collateral effects tools will provide pre-attack prediction and post-attack assessment. The Hazard Prediction and Assessment Capability (HPAC) is a major product that predicts the release and transport of NBC materials and the subsequent collateral effects. The high resolution weather prediction capability, another area of emphasis in the subproject, will provide timely wind, cloud, and precipitation data necessary for NBC collateral effects predictions. Weather data currently does not have the resolution or quality necessary. This weather data will also be available to other users in the theater such as Joint Warning Network (JWARN). These tools will also be integrated into the target attack planning tools to assess the consequences of attacks on WMD facilities.

3. **Target Planning.** This effort will provide a new deliberate planning combat assessment capability and a major upgrade for existing theater level planning capabilities for defeating or denying NBC facilities and capabilities. This effort builds upon the Integrated Mission Effects Assessment (IMEA) planning tool developed for CP1. IMEA provides a forward deployable target planning capability for NBC targets. IMEA is an integration of the Munitions Effects Assessment (MEA) tool providing targeting solutions using conventional weapons for a variety of structures and equipment and the HPAC developed under the Collateral Effects subproject. The current effort will produce the Integrated Target Planning Tool Set (ITPTS) that will provide a spectrum of planning capabilities from deliberate to crisis. ITPTS includes IMEA II and high resolution weather prediction. IMEA II will import target data and import attack assessment data from prior planned strikes. ITPTS will also predict weapons performance and associated NBC collateral effects, develop targeting solutions that minimize collateral effects, and provide the results through the appropriate interfaces for a variety of targets including functionally and structurally complex facilities. The major differences between IMEA and IMEA II is a greatly enhanced interface to the Intelligence community and upgrades to handle additional target types including complex facilities, to handle additional weapons and platforms, to provide more operator friendly displays, to import attack assessment data, and to efficiently interface with Service planning systems. The ITPTS interfaces include but are not limited to Global Command

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and Control System, the Service targeting and strike execution control systems, strategic and tactical intelligence and sensor systems, the weather community, and the NBC warning system. A key interface for CP applications is with the Tactical Multi-Sensor Fusion (TMSF), providing critical pre- and post-strike target characterization information. The "plug and play" architecture is required to accommodate differing CONOPS, theaters, and performers in several geographic locations. The deliberate planning capability requires significant input from the intelligence community including data regarding NBC facilities, processes, and surrounding populations. This effort will support the intelligence community in developing the necessary interfaces to provide for the efficient transfer of intelligence data. ITPTS will include IMEA II, IMEA II Prime, an advanced wind and weather prediction capability, and a "plug and play" architecture. This effort will execute a full verification and validation program for all delivered capabilities including extensive field testing at all functional levels.

4. **Weapons.** Conventional explosive-filled weapons are often relatively ineffective in destroying large underground reinforced concrete facilities. Even if the weapon detonates inside the facility, substantial interior walls and/or floors often confine the blast and fragmentation thus causing significant overpressure and venting through the penetration hole. Likewise conventional explosive-filled weapons often result in complete and uncontrolled destruction of soft buried and aboveground facilities. When these facilities protect NBC, the random use of conventional weapons greatly increases the risk of agent dispersal that may result in extensive civilian or force casualties. This sub-project will develop, integrate and demonstrate advanced conventional weapons technologies to improve mission effectiveness against NBC facilities while mitigating collateral effects. For CP1 ACTD, these technologies include improvements in adverse-weather/precision guidance, enhanced penetrating capabilities, and advanced fuzing options. Technologies that have been successfully demonstrated will be weaponized into prototype systems. Advanced fuzes will enable weapons employment options to maximize lethality and/or control collateral effects. The focus for CP2 ACTD is to provide the warfighter with a demonstrated option to attack NBC facilities in a stand-off mode. CP2 ACTD will improve on existing stand-off weapon platforms to provide enhanced penetration, advanced fuzing, and enhanced payloads that can reduce collateral effects by neutralizing agents before they are released or reducing the amount released. Stand-off weapons to be enhanced include the conventional Tomahawk Land Attack Missile (TLAM-C) and the Conventional Air Launched Cruise Missile (CALCM). Enhanced payloads will explore alternate warhead options to conventional blast/fragmentation with the objectives of mitigating collateral effects associated with dispersal of NBC materials while also minimizing the number of weapons required to functionally defeat WMD facilities.

5. **Operational Demonstrations.** The Counterproliferation ACTD will improve the operational capability for holding NBC targets at risk with minimum collateral effects. The objective is to integrate available or near-term technologies for sensors, weapons, collateral effects prediction and target planning tools, evaluate the technologies in an operational context, and transition improved capabilities rapidly to warfighters. Specifically, this project will enhance and accelerate existing programs to provide integrated target planning to include collateral effects prediction codes and sensors for facility characterization and BDA, and advanced weapons development programs to meet NBC target defeat requirements. This project will also support demonstration operations to include system operational concept, demonstration planning, scenario development, execution of the ACTD and post-demonstration analysis. Planning and execution of the ACTDs uses a time phased approach to screen candidate technologies for maturity, develop prototype systems and demonstrate enhancements in military capability against a warfighter prioritized subset of all potential NBC target types. This approach results in a cycle of prototype development and testing followed by periods of operational demonstration.

Two operational demonstration series were defined for the CP1 ACTD. The first demonstration, named Dipole Orbit (DO), was successfully completed in February 1997. This first demonstration used new target planning tools to determine the "best" employment of current weapons with a smart fuze against simulated biological agents housed

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in soft above-ground bermed structures. The second and final demonstration series, named Dipole Jewel (DJ), is scheduled for completion in July 1998. This demonstration will assess improved capabilities in weapons, sensors, and enhanced planning tools against a simulated, hardened chemical weapons production facility in a shallow-buried, cut-and-cover structure. After the start of CP1 ACTD, the sponsoring command identified a need to understand their ability to conduct counterforce operations against soft above-ground simulated chemical production facilities using the TLAM-C. The Dipole Tiger (DT) demonstration series was added as a quick response to the users' request. DT started in April 1997 and will end in FY98.

Four operational demonstration series are planned during CP2 ACTD over the period of FY1999-2002 to provide the sponsor and participating commands with the opportunity to assess the utility of the selected technologies. The objective of the first demonstration series in CP2 ACTD, called Dipole Xeric (DX), is to employ current technology products in weapons and improved target planning tools, using new weapon delivery tactics, and operationally demonstrate their enhanced penetration capabilities against a simulated chemical agent production and storage facility considerably harder than the structure used during CP1 ACTD Dipole Jewel series. The objective of the second demonstration series, called Dipole Yukon (DY), is to exploit near-term technology by demonstrating the baseline capabilities of the Joint Air-to-Surface Stand-off Missile (JASSM) to conduct chemical/biological (C/B) counterforce missions through operationally realistic attacks against a simulated biological weapons storage facility. The objective of the third demonstration, called Dipole Zodiac (DZ), is to assess the suitability of the CALCM with a pe

netrating warhead and a Predator UAV-based stand-off sensor providing collateral effects assessment. The objective of the fourth demonstration series, called Divine Canberra (DC), is to evaluate the end-to-end set of products of the CP2 ACTD including the target planning tool, in its final operational context, a TLAM stand-off attack penetrating weapon capability, and remote combat assessment using a small expendable mini - UAV with a chemical point sensor on-board (and deployed from the Predator UAV demonstrated in DZ) against a relatively hard chemical production and storage facility. DC also includes demonstration of a weaponized enhanced payload.

The High Frequency Active Auroral Research Program (HAARP) is to develop an ionospheric research facility to study and exploit emerging ionospheric technology for DoD surveillance and communications applications. The specific application of this project is imaging of underground counterproliferation related facilities.

Acquisition Strategy:

FY 1997 Accomplishments:

- 17937 SENSORS
- Completed proof of principle tests and feature extraction software for tactical FLIR pod modification (TFPM). (2475)
- Integrated weapon borne sensor (WBS) components and conducted flight tests. (2260)
- Completed development and testing of TUGS for CP1 ACTD Phase II and started monitoring the ACTD site. (3862)
- Completed system design and initial software release, and conducted initial operational testing of the tactical multi-sensor fusion (TMSF) capability. (770)
- Expanded HAARP transmitter array. Conducted field experiments for detection/imaging of underground facilities. (6975)
- Initiated Osprey Daisy project. (350)

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- Evaluated Fiber Optic Wave Guide Bio Sensor for ACTD. (45)
- Completed first phase of Automatic Target Recognition demonstration. (1200)
-
- 7190 COLLATERAL EFFECTS
- Refined hazard source term models across all products including targeting tool. (1920)
- Delivered Advanced Weather Support IOC. (1800)
- Integrated advanced meteorological and turbulent transport models into Collateral Effects (CE) tools. (1970)
- Completed short and long range validation tests, and delivered final validation report for HASCAL version 3.0. (1500)
-
- 5370 TARGET PLANNING
- Released MEA Version 2.2 - end-to-end capability to assess attacks on WMD aboveground production facilities using current and advanced weapons and demonstrated RAAP integration. (2100)
- Completed component vulnerability models for Chem/Bio equipment and expand target/weapon types. Implemented into MEA. (1400)
- Conducted 1/2 scale tests of CP1 ACTD Phase II structure and 1/3 scale Dipole Tiger tests. (1870)
-
- 13291 WEAPONS
- Completed penetrator flight test and fabricated ACTD hardware. (4275)
- Packaged ITAG systems for initial flight test and conducted trajectory simulations. (4001)
- Completed Hard Target Smart Fuze (HTSF) component improvement, validation testing and Joint Service Certification. (1618)
- Hard Target ATACMS - Completed System Requirements Review; established warhead baseline concept; initiated design activities; completed missile/warhead interface design definition; conducted six degree of freedom simulations of missile/warhead flight; completed initial analysis of error contributors to system accuracy. (3397)
-
- 3873 OPERATIONAL DEMONSTRATIONS (FORMERLY TITLED CP ACTD)
- Completed all Dipole Orbit demonstrations and two Dipole Tiger demonstrations. (1004)
- Completed demonstration planning for CP1 ACTD Dipole Jewel. (2265)
- Initiated planning for the next ACTD (CP2 ACTD). (674)
-

Total 47661

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FY 1998 Planned Program:

10440 SENSORS
- Deliver TMSF for validation, support ACTD fielding and provide operational user manuals. (500)
- Support ACTD fielding and provide test support for TFPM. (1400)
- Deliver TUGS demonstration units, supply communications and interfaces, support validation tests and supply operational user manuals. (2200)
- Baseline performance of existing remote or standoff chemical agent detectors for the counterforce role and down-select to an appropriate candidate. (200)
- Initiate testing of existing chemical point sensors for counterforce role. (1300)
- Initiate design modifications of a mini-UAV chemical point sensor. (900)
- Initiate design modifications of the Predator UAV platform for remote sensing and delivery of a mini-UAV. (340)
- Initiate Predator UAV sensor system integration and subsystem test and evaluation. (900)
- Upgrade HAARP transmitter. Evaluate "Blind" test data. Validation analysis of ground global tomography (2700)

5900 COLLATERAL EFFECTS
- Develop high resolution weather prediction capability and weather data server. (2100)
- Collect weather data for tools validation. (1500)
- Develop a chemical precursor source term model. (800)
- Enhance population effects model. (500)
- Initiate development of HPAC 4.0 software. (1000)

10600 TARGET PLANNING
- Deliver IMEA 3.1 to reflect lessons learned from the CP I ACTD. (500)
- Generate component level weapon-target validation data. (800)
- Initiate design and development of IMEA 4.0 for Dipole Xeric. (1800)
- Define interface standards and initiate software development for the Integrated Target Planning Tool Set (ITPTS). (1200)
- CP Analysis and Planning System (CAPS) - advanced planning initiative (6300)

15512 WEAPONS
- Complete ITAG flight test and fabrication of ACTD demonstration units. (2780)
- Complete Ground Setting Unit (GSU) design and certification for HTSF. (1450)
- Procure AUPs and conduct flight tests for DX demonstration readiness. (600)
- Design and ground test a CALCM unitary penetrator. (2500)

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- Conduct TLAM penetrator systems integration. (882)
- Initiate TLAM penetrator warhead design, fabrication, and test. (3850)
- Initiate smart fuze design to meet Navy certification requirements. (1500)
- Conduct initial down-selection and lab tests of payloads to mitigate collateral effects. (850)
- Begin scale tests of selected high temperature incendiaries (HTI) and chemical neutralization agents against simulated chemical and biological agents. (550)
- Conduct modeling and simulation to support concept screening and down-select. (400)
- Develop enhanced weapon lethality models to support predictions of agent response. (150)
-
- 10205 OPERATIONAL DEMONSTRATIONS
- Execute the CP ACTD Phase II (Dipole Jewel). (5098)
- Complete Dipole Jewel post demonstration analysis. (1100)
- Initiate target construction for Dipole Xeric demonstration. (807)
- Conduct Dipole Xeric demonstration planning. (1200)
- CP Capabilities Working Group - advanced planning initiative (2000)

858 SBIR/STTR

Total 53515

FY 1999 Planned Program:

Total 0 Funds and activities transferred to PE 0603160BR. P539

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	48620	46376	42949	Continuing
Appropriated Value	49406	56376	N/A	N/A
Adjustments to Appropriated Value	-1745	-2861	N/A	N/A
Current Budget Submit/President's Budget	47661	53515	0	Continuing

C. Other Program Funding Summary

Not applicable

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COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Total Cost
Total Program Element (PE) Cost	17.261	16.909	13.447	15.290	15.306	15.454	15.800	Continuing
DoD/DoE Munitions/P225	17.261	16.909	13.447	15.290	15.306	15.454	15.800	Continuing

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

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

(U) **FY1997 Accomplishments:**

(U) This development effort has continued to improve electronic safing, arming, and firing technology, improving components, developing models, optimizing packaging and reducing production costs. Prototype units of low-voltage, miniature electronic safe/arm/fire devices incorporating new low-energy detonators and improved components have been developed. Improvement from current state-of-the-art include size reduced from 7 to 1.5 cubic inch units and cost decreased from $1000 to $500. The goal for 1999 is a 0.75 cubic inch unit for $100 to enable exploitation of the advantages of electronic safe/arm/fire technology in low-cost, mass-produced munitions. Fast charge coupled devices (CCD) were used to build a high-speed imaging (4000 frames/sec) camera with 512 x 512 pixel array for use in the visible and infrared. Performance expectations of the design for a high-speed image intensifier and high quantum efficiency GaAs intensifiers were verified. Implemented features to reduce firing energies and voltages in Safe, Low-Input Microslappers (SLIM) by changes in flyer, land, and barrel designs. The SLIM concept allows for solid-state switches to be employed with significant cost advantage. A 20-point array made with SLIM detonators is being transferred to an Air Force contractor working on a multi-mode warhead for LOCAAS. Chip slappers are being transitioned for application in the Navy Standard Missile Block IVA. This program supported a team to solve certain BAT detonator problems. ($ 4.563 Million)

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(U) Engineering and computational models predicting penetrator performance and structural response against hard targets have been developed, validated against test data, and transitioned to DoD users. For the first time, a successful constitutive model for concrete was developed and tested. The features of the model, which are essential for successful prediction of penetration and explosive effects events, are pore crush-up, progressive damage, fracture, and equation of state of damaged material. The CHEETAH code, which is the state of the art performance prediction code for high explosive formulations, is being extended to be applicable to non-ideal explosives. CHEETAH users worldwide now number over 200. Developed and transitioned a nonlinear optimization code for use in warhead design and material model development. The code, called Global Local Optimizer (GLO), enhances the effectiveness of the designer approximately 10-fold. It has been transitioned to Wright Labs at Eglin, NRL, ARDEC at Picatinny Arsenal, and several DoD contractors. ($ 2.420 Million)

(U) Method of Cells (MOC) analysis was applied to compressive and tensile loading of PBX-9501. Algorithms were developed having linear elasticity, viscoelasticity and viscoelasticity elements, increasing physics base to PBX shock response codes. A better understanding of the mechnical response and aging characteristics of HE formulations is being achieved through the exploitation of the dynamic materials laboratory developed over the last two years. ($ 2.100 Million)

(U) An advanced concept for hard target penetrators that increases velocity limits, depth of penetration, and volume available for energetic materials has been developed with testing and demonstration underway. The research supports the Air Force Miniaturized Munitions Technology Program and the assessment of a penetrating warhead for Standard Missile. The penetrator concept employs a new, high strength steel body that is cast around tungsten alloy ballast located near the nose of the penetrator. ($ 1.500 Million)

(U) A pilot scale Base Hydrolysis (BH) reactor was transferred to industry for remediation of HMX and local permitting. EPA acceptance of BH for production scale-up is underway. Solved major technical issues of scale-up of hydrothermal treatment for base hydrolysate. Design data was developed to build unit to treat products from base hydrolysis of moderate quantities of plastic bonded explosives, Com B-3, and Yellow D. Enhanced and predictive surveillance techniques are proceeding to improve munitions shelf-life reliability predictions and to support munitions life extension programs. Life cycle studies have begun leveraging ongoing research at DOE in materials aging and degradation processes. This work is applicable to conventional munitions life extension and storage. Technical areas include corrosion, aging explosives, electronic failure or breakdown, contamination, etc., for use in predicting the performance, safety and reliability of munitions fuzes, warheads and propellants. ($ 3.650 Million)

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(U) Three HE formulations were developed for testing by Special Forces as possible replacements for C-4 in concrete wall breaching. Demonstrated 40% improvement in specific performance. High-nitrogen explosive candidates were synthesized having high density, detonation, velocities, and CJ pressures, while exhibiting decreased sensitivity to drop height. Step-wise increases in production of Metastable Intermixed Composites (MIC) have moved to 20 g/hr quantities with automatic feed mechanisms introduced to permit continuous operation. Began qualification of certain MIC materials for use as green (lead-free) primers for small-arms ammo. ($ 3.028 Million)

(U) **FY1998 Plans:**

(U) Continue improvement of electronic safing, arming, and firing systems toward smarter, less costly, and more compact units. Continue the transition of this technology to developmental and fielded weapons systems. Complete the testing of the prototype high-speed camera system and complete procurement/testing of high-speed image intensifier at 532 nm. Evaluate performance of electron bombarded intensifiers. Begin development to make information processors integral with the warhead, allowing designers to fully capitalize on the emerging sensor packages, enabling a next generation of safer, more capable weapons. Develop 1 kilovolt ceramic capacitor for fireset application. Demonstrate Electronic Safe/Arm/Fire Device (ESAD) size reduction of a factor of 4. Demonstrate producability, packaging and long-term reliability of chip and semiconductor bridge (SCB) slappers. Test improved flyer shape detonators. Calibrate 2D hydrocode for finite shock initiation of explosives HNS and PETN. Continue research on integration of insensitive fuze trains with new insensitive high explosives to reduce overall weapons system vulnerability and for application to hard target penetrators. ($ 3.894 Million)

(U) Continue the development of high explosives (HE) with increased or tailored performance and decreased sensitivity. Establish basis for modeling which will support final choice of model structure. Continue development of a more energetic hard target explosive with improved survivability in penetration environments. Continue development of predictive tools for the response of energetics to abnormal environments. Acquire parameterized data set of strain fields in brittle and ductile HE to support modeling. Complete and transition to the Navy the initial code suite for use in multidimensional cookoff studies. Complete demonstration of high energy-density materials (HEDM) gains in small-scale applications. Test N_2 high energy density material for metastability at lower pressures and explore energy release mechanisms and kinetics. ($ 3.253 Million)

(U) Ongoing code development will be directed to the payoffs of greater accuracy, more physics base, extension to more classes of problems, and the associated improvement in cost effectiveness in R&D activities. Researchers will implement and test reactive- and dynamic-burn models with the Adaptive Mesh Refinement technique. Develop and extend material constitutive and failure models for incorporation into the simulation tools. Complete engineering models for high velocity penetration of concrete. ($ 3.656 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNTIONS PE 0603225D8Z

(U) Complete explosively-formed projectile (EFP) tests to evaluate powder metallurgy tantalum vs. wrought tantalum. Perform EFP tests to determine the effects of specific textures on formation and performance. Determine influence of powder processes on texture evolution. Precision measurement of shocked metal temperature will be made for model calibration. Improve Smooth Particle Hydrocode (SPH) user interface and data analysis packages, and expand the SPH materials library. Improve computational efficiency of extant plasticity and failure models. Acquire test data to validate fracture models. Transition coupled fluid/structure code to end users. An effort will be underway to evaluate EFPs in their ability to damage and perforate concrete. Tradeoffs between kinetic energy (KE) penetrators and EFPs with respect to velocity and mass, will be evaluated along with tandem EFP's and hybrid EFP/jets. To continue the dynamic analysis of liner formation and behavior, infrared thermometry using pulsed light will undergo reflector lab tests, and fluorescence techniques will be explored. ($ 2.453 Million)

(U) Complete a System Conceptual Design of hazard separation and treatment systems for broad demilitarization applicability. The concept will include a hardware design that is cost effective and can handle the recycle, treatment, and disposal of DoD weapon components. Process optimization studies will be completed on cryocycling as a method of extraction. The technology of demilitarization by supercritical water oxidation will be ready for transition for use in destruction of colored smoke, dye, and pyrotechnic compositions. Base hydrolysis will be advanced to the design stage of a pilot-scale pressure reactor, and economic and process design studies will be completed for a large-scale base hydrolysis/hydrothermal processing unit. Molten Salt Destruction efforts will focus on optimizing processes and certifying the equipment for increased production. Biological treatment of HE products in water waste streams will focus on designing a pilot plant for treating waste water contaminated with Comp B. This can result in recycle of carbon filter powder. Develop understanding and models of accelerated aging and damage of plastic bonded explosives. Explore non-destructive evaluation techniques for characterization of stockpile by acoustic and micro-electric current techniques. Determine mechanisms of aging of composite structures. Begin development of materials and systems aging predictive models and experiments based on aged stockpile sample evaluation. ($ 3.653 Million)

(U) **FY1999 Plans:**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE September 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNTIONS PE 0603225D8Z

(U) Innovate new technologies for electronic safing, arming, and firing systems based on evolving state-of-the-art science and technology. Driving need is toward smarter, less costly, and more compact units. The goal is a 0.75 cubic inch unit for $100 to enable exploitation of the advantages of electronic safe/arm/fire technology in low-cost, mass produced munitions. Expand and enhance the transition of this technology to developmental and fielded weapons systems. Advance the application of miniature integrated fuzes, putting information processors integral with the warhead, allowing designers to fully capitalize on the emerging sensor packages, and enabling a next generation of safer, more capable weapons. Continue validation of performance and establish production of chip and semiconductor bridge slappers. Continue research on integration of insensitive fuze trains with new insensitive high explosives to reduce overall weapons system vulnerability and for application to hard target penetrators. ($ 3.306 Million)

(U) Continue the development of high explosives with increased or tailored performance and decreased sensitivity. Develop a more energetic hard target explosive with improved survivability in penetration environments. Increase physics base of predictive tools for the response of energetics to abnormal environments. Advance computational tools to predict cookoff which are validated with experimental studies. Produce kilogram quantities of carbon/hydrogen or appropriate analogs and test for high energy density properties. Produce N_2 high energy density material and continue testing of metastability at lower pressures and explore energy release mechanisms and kinetics. ($ 3.200 Million)

(U) Ongoing code development will be directed to the payoffs of greater accuracy, more physics base, extension to more classes of problems, and the associated improvement in cost effectiveness in R&D activities. Suites of codes will be confined to predict slow and dynamic physical, chemical, and thermal reactions in explosives, with validity established by experiments. Validate models for high velocity penetration of concrete. ($ 3.700 Million)

(U) Produce prototypes and begin pilot production of explosively-formed penetrators (EFP) based on their ability to damage and perforate concrete and other specified hard targets. Improve kinetic energy (KE) penetrators and EFPs, along with tandem EFP's and hybrid EFP/jets, and prototype advanced concepts. ($ 2.241 Million)

(U) Complete transition of the hazard separation and treatment systems for broad demilitarization applicability. Explore new hardware designs using newly-evolved technologies. Exploit new understanding and models of accelerated aging and damage of plastic bonded explosives. Establish library of non-destructive evaluation techniques for characterization of stockpile. Apply mechanisms of aging of composite structures to new designs and improved storage and handling. Continue development of materials and systems aging predictive models. ($ 1.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNTIONS PE 0603225D8Z

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNTIONS PE 0603225D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	17.743	16.141	16.354	Continuing	Continuing
Appropriated Value	17.743	17.700		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.733)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.482)	(0.058)			
c. Other			(2.907)	Continuing	Continuing
Current President's Budget	17.261	16.909	13.447	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Funding changes in 1997, 1998 and 1999 are due to congressionally directed reductions and program budget adjustments. The program received a $1.559 plus up from Congress in 1998.

(U) **Schedule:** Not Applicable

(U) **Technical:** Not Applicable

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE JOINT DoD/DoE MUNTIONS PE 0603225D8Z

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	4.391	6.487	5.081	4.909	4.725	4.799	4.892	Continuing	Continuing
ATR/P232	4.391	6.487	5.081	4.909	4.725	4.799	4.892	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 adversaries. 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. When coupled to appropriate sensor suites, ATR allows rapid detection of individual surface and buried mines and unexploded ordinance (UXO). 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
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 algorithm processing. Additionally, improved, standardized procedures and metrics for measuring and demonstrating ATR effectiveness must be developed. 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 ATRs, as well as emerging ATR technology for the next generation of ATR systems.

(U) The ATR program is under Budget Activity 3 because this 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. Whereas 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 "best-in-class" ATR systems with confidence so that this critical technology can be fielded sooner.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	4.391	6.487	5.081	4.909	4.725	4.799	4.892	Continuing	Continuing
ATR/P232	4.391	6.487	5.081	4.909	4.725	4.799	4.892	Continuing	Continuing

(U) **Project Number and Title: P232 ATR**

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

(U) **FY1997 Accomplishments:**

(U) This program was begun in FY 1997. An Integrated Product Team, co-chaired by the Deputy DDR&E and NIMA, was chartered to develop a DoD S&T investment strategy for practical, affordable ATR through enhanced evaluation, advanced processing and advanced sensor technology. Based upon on-site surveys of Service/Agency ATR evaluation facilities, an objective evaluation program has been formulated and is being instituted. Preliminary "winstone" performance metrics have been identified to allow ATR-to-ATR comparisons and to track performance growth over time. A Virtual Distributed Laboratory, linking existing Service/Agency campus networks, is being established to facilitate ATR evaluation. Standard procedures, metrics, and data bases are being integrated into and distributed through the VDL.

(U) Weapon and Intelligence, Surveillance and Reconnaissance systems employing ATR were assessed to determine which investments in ATR, sensor, and processing technologies could provide both improved performance for the system and contribute to the overall maturation of the ATR technology. ($ 4.391 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D8Z

(U) **FY1998 Plans:**

(U) Work will continue to assess key ATR metrics to find the "best in class" and spur fielding for critical needs identified by the Defense Science Board and Joint Requirements Oversight Council. As a result of the FY97 effort, field experimentation to collect quality, reusable data using multiple sensors will be arranged. These data sets will then be available through the Virtual Distributed Laboratory as benchmark sets to assess developmental algorithm validity and utility. Additionally, the program will begin to design the concepts for subsystem feasibility and effectiveness demonstrations of the more complex ideas discussed with the JROC, to include assessment of the role of ATR in reducing cognitive overload in man-machine systems. A special emphasis will be placed upon assessment of ATR for hyperspectral intelligence systems. Subsystem modeling and simulation of sensor hardware with various ATR algorithms will be conducted to explore affordability and performance. A plan for transitioning the developed technology will be developed. ($ 6.487 Million)

(U) **FY1999 Plans:**

(U) The evaluation effort for determining "best in class" will be expanded to include more complex ATR functions such as scene analysis, and new sensor types to include hyperspectral and multi-mode sensors. During this time period more extensive subsystem technology effectiveness demonstrations will be conducted which support a broader range of system/platform applications. Humanitarian Demining Operations will be addressed through evaluation of ATR technologies developed to detect mines and UXO. More extensive multi-sensor algorithms will be evaluated. Modeling and simulation tasks will be conducted to provide software and hardware in the loop effectiveness analyses, refine design requirements and manufacturing approaches. These models and simulations will be used to expand the range of tests and provide greater confidence in ATR field tests, which by necessity are limited in scope and duration by the cost of testing the numerous factors that affect ATR and sensor performance. ($ 5.081 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Automatic Target Recognition PE 0603232D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	Cost to Complete	Total Cost
Previous President's Budget	4.716	4.789	4.746	Continuing	Continuing
Appropriated Value	4.841	6.789		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.302)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.450)				
c. Other			0.335	Continuing	Continuing
Current President's Budget	4.391	6.487	5.081	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Changes due to addition of Hyperspactral Imaging and Humanitarian Demining applications to the ATR Program.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D8Z**

COST *(In Millions)*		FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		16.785	11.224	11.337	11.320	11.234	11.441	11.698	Continuing	Continuing
Project Name/No. and Subtotal Cost Special Technology Support/P704		16.785	11.224	11.337	11.320	11.234	11.441	11.698	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: Special Technology Support to Intelligence and Light forces provides quick reaction capability to satisfy CINC Intelligence and Light Force requirements. It emphasizes the rapid prototyping of equipment and systems under initiatives that are ordinarily completed within a 12-24 month period, and cost less than a million dollars. By Congressional direction for FY 1990 and beyond, this program contains two projects previously funded under other program elements: 1) the Counter Insurgency Special Technology Program (which was part of the Force Enhancements - Active Program/PE 1110011D) and 2) a portion of the Equipment Upgrade Program/PE 0203745A). Both projects are intelligence related.

The PE is under Budget Activity 3, Advanced Development, since these initiatives result in proof of technological feasibility and technical and operational evaluations.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D8Z**

Program Accomplishments and Plans:

FY 1997 Accomplishments:

- Conclude the Advanced Secure Digital Radio ($2.2 Million)
- Special Project ($2.0 Million)
- Interoperability and crisis support to Unified Commands ($2.759 Million)
  - Sensors
  - CINCS Intelligence Reporting Systems
  - Korean HUMINT Detachment Technology Insertions
  - Clandestine communication
  - Continued development and support to vehicle tracking and sensor system
  - Surveillance system
  - Bosnia
- Develop new technology into the Counter Intelligence and HUMINT Community ($3.0 Million)
  - New surveillance cameras
  - Offensive counter measures
  - Software encryption integration
  - Advanced reconnaissance system close-out
  - Agent communications
- IR suppresser for Counter Measures ($0.4 Million)
- Data system security ($0.658 Million)
- Conclude Tiger Wall ($5.494 Million one-year RDT&E)
- SBIR contribution ($0.274 Million)

FY 1998 Plans:

- Support to Technical Surveillance Activities ($3.5 Million)
- Crisis support ($2.05 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D8Z**

- Develop compartmented technology in support of intelligence collection capabilities ($2.374 Million)
- Continue Special Project ($2.0 Million)
- Secure communications capability ($1.3 Million)

FY 1999 Plans:

- Support to Technical Surveillance Activities ($3.5 Million)
- Crisis support ($1.938 Million)
- Develop compartmented technology in suppport of intelligence collection capabilities ($2.399 Million)
- Continue Special Project ($2.0 Million)
- Secure Data Reporting Systems ($1.5 Million)

B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget (FY 1998)	17.252	11.750	11.896	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction		(.526)		
b. OSD/QDR Reductions	(.467)		(.559)	
c. Other				
Current President's Budget	16.785	11.224	11.337	Continuing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 3	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **SPECIAL TECHNOLOGY SUPPORT** **PE 0603704D8Z**

Change Summary Explanation: NA

Funding: Funding changes are the result of Congressionally directed undistributed reductions, as well as program budget adjustments.

Schedule: NA

Technical: NA

C. Other Program Funding Summary Cost

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost
Procurement Line P-1 No(s), Name(s)	Not Applicable									
Milcon Project No(s), Name(s)	Not Applicable									
Related RDT&E:	Not Applicable									

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996				FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones	Not Applicable															
Engineering Milestones	Not Applicable															
T&E Milestones	Not Applicable															
Contract Milestones	Not Applicable															
Other Program Events	Not Applicable															

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development program PE 0603716D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	52.770	57.115	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
SERDP/P470	52.770	57.115	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) The Strategic Environmental Research and Development Program (SERDP) was established by Congress 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, 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. This is a budget activity level 3 program based on the acquisition milestone process under which this research applies. Based on a Defense Reform Initiative, this program was transferred to the Army under PE 0603780A beginning in FY 1999.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program PE 0603716D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	52.770	57.115	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
SERDP/P470	52.770	57.115	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P470 SERDP**

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

(U) **FY1997 Accomplishments:**

(U) **Unexploded Ordnance (UXO) Detection:** Current UXO detection technologies suffer from high false alarm rates and poor discrimination. SERDP's efforts focus on integrating UXO detection, location, and discrimination sensor technologies for both land and underwater use. Tasks include: a) physical, biological, and chemical phenomenological impacts on sensor response; b) development/modification of data fusion capabilities; c) development/modification of UXO discrimination techniques, and d) demonstrate processing capabilities to enable detection, classification, and mapping of underwater sites contaminated with unexploded ordnance either partially or fully buried in sediment.

(U) **UWB SAR:** In a new-start project for FY 1997, the capability of a boom-mounted, low frequency ultra-wideband (UWB) synthetic aperture radar (SAR) is being assessed to detect various types of UXO under different conditions of topographical, foliage and subsurface soil conditions. Began precision data collection and analysis to support phenomenological investigations of electromagnetic wave propagation through dielectric media, which will in turn support development of algorithms for target detection.

(U) **Enhanced Harmonic Radar:** A new-start FY 1997 project adapts a UWB UHF/VHF SAR to operate in the 3rd harmonic mode. Modified an existing ground-based SAR for third harmonic operation. Began measurement of third harmonic signatures.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program PE 0603716D8Z

(U) **MUDDS:** For the multi-sensor Mobile Underwater Debris Survey System (MUDDS) platform, developed Aided Target Recognition Processor (ATRP) algorithms and are refining to run real-time. Completed data fusion and visualization subsystems design and are developing associated integration software.

(U) **Multi-sensor Data Fusion for Detection of UXO:** Continuing effort that integrates sensors and data collection efforts. Completed examination of existing data fusion algorithms. Developed GIS system to integrate multi-sensor data with topographical features and environmental data. ($ 2.410 Million)

(U) **Integrated Biotreatment Research Program: From Flask to Field:** This umbrella project represents a collective research initiative by several key government, commercial, and academic organizations supporting and investing in the development and application of innovative biotreatment technologies. The project commenced several biotreatment processes that address the remediation of predominant DoD contaminants: explosives, heavy polyaromatic hydrocarbons (PAH), chlorinated solvents, and PCBs. Established Technical Advisory Committee. Characterized TNT-degrading microbial consortia and heavy PAH degradation pathways. Continued laboratory surfactant and PCB transformation studies. Completing bench scale studies for explosives and intermediate scale studies for chlorinated solvents. ($ 2.335 Million)

(U) **DoD National Environmental Technology Test Sites Program:** This continuing project facilitates transfer of innovative, cost-saving remedial and site characterization technologies to field use by conducting tests and demonstrations at the five operational NETTS test locations. Provided controlled aqueous release facility at Wurtsmith AFB NETTS test location. Began construction of geophysical cell at Dover AFB NETTS test location. Produced entry and exit criteria and published QA/QC protocol documents for NETTS demonstrations. NETTS program has completed 42 technical demonstrations; 28 demonstrations are ongoing. 48 technical reports have been released. ($ 2.090 Million)

(U) **Accelerated Tri-Services Site Characterization and Analysis Penetrometer System Sensor Development (SCAPS):** Project completes in FY 1997. Concluded development and demonstration of cost-effective detection sensors on the Tri-Services SCAPS platform. Final demonstration of SCAPS sampling and sensor technology has provided alternative cost-effective methods to obtain site characterization and verification data. SCAPS technology reduces the cost of traditional site screening methods by up to 90%. SCAPS technology has been patented and licensed to commercial firms in the U.S. and Europe, and is presently fielded by the DoD and DOE. ($ 2.050 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program PE 0603716D8Z

(U) **Characterize Open Burning/Open Detonation (OB/OD) Emissions:** Two projects completed in FY 1997. The impact of OB/OD on soil has been characterized; real-time multi-pollutant monitoring systems developed; OB/OD methods to optimize combustion effectiveness improved; modeling of air pollutant dispersion and field verification of dispersion models completed; a mobile meteorological measuring system (MMMS) to record real time surface and upper air data has been field tested; characterization of emissions from energetic materials have been completed; and a final report on the first subsurface BangBox test has been issued. ($ 1.500 Million)

(U) **Whale Monitoring Using Integrated Undersea Surveillance Systems (IUSS):** This continuing project is providing critical environmental compliance data for long-term monitoring of marine mammal activities over ocean-basin scales and will minimize the adverse impacts, including low frequency sound effects, on marine mammals from Naval testing, training, and operational missions. In close coordination with NOAA, this project conducted a field experiment in the Pacific and will provide a report on IUSS marine mammal population and location estimates. ($ 1.500 Million)

(U) **Compact Shipboard Incinerator:** This continuing effort is developing a compact, closed-loop controlled ship-board incinerator for all types of shipboard waste, including garbage, plastics, medical wastes, and hazardous substances. Successful demonstration of waste destruction on-board ships will result in significant cost savings by avoiding the cost of waste off-loading and on-shore destruction, particularly in foreign ports. Potential of size reduction by a factor of greater than 5 was demonstrated, while significantly increasing combustion efficiency. Destruction and removal efficiency increased to above 99.999%. ($ 1.500 Million)

(U) **Aquifer Restoration by Enhanced Source Removal:** Continuing project to provide field tests of innovative processes to remediate aquifers contaminated by non-aqueous phase liquids (NAPLs) including fuels, solvents and other organic contaminants in a timely and cost-effective manner. Completed pilot-scale Light NAPL field testing at Hill AFB with side-by-side comparison of several mobilization and solubility agents. More than 90% Light NAPL removal was achieved. Constructed and initiated instrumentation of two test cells at Dover AFB for evaluation of Dense NAPL removal techniques. Conducted laboratory studies for release strategy. ($ 1.020 Million)

(U) **Fluorinated Ship-hull Coatings for Non-polluting Fouling Control:** This continuing project is developing a new non-toxic coating to resist or reduce the attachment of marine fouling organisms to ships. In FY97, this project continued the development of macromonomers as the new fouling release coating for ship-hulls in cooperation with GenCorp. The project has developed the VOC free cure chemistry and determined the stability of coatings in water, and evaluated fouling release properties. ($ 0.970 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3	R-1 ITEM NOMENCLATURE Strategic Environmental Research and Development Program PE 0603716D8Z

(U) **Clean, Agile Manufacturing of Energetics:** This FY97 completed project developed and demonstrated clean manufacturing methods for both Thermoplastic Elastomers (TPEs) and polymers - ingredients used in energetics materials, by making the monomers in water based solvent, and the polymers and TPEs in clean solvents. Additionally, the project demonstrated that the BLU-97 submunitions (Used in both the Joint Stand-Off Weapon and the Tomahawk Missile) can be loaded with a recyclable TPE explosive. TNAZ, a new, high-energy component, and TPE technologies were selected by the Navy in their Green Energetics Manufacturing program to reduce environmental life-cycle costs. ($ 0.900 Million)

(U) **Aircraft Depainting Technology:** Project completed in FY 1997. Developed environmentally friendly Flashjet™ paint removal process. Flashjet™ technology is being implemented at naval aviation depot Jacksonville, and Warner Robins Air Logistics Center and eliminates the use of traditional toxic methylene chloride based solvents and will result in 70 percent reduction in waste disposal costs and a corresponding saving of $1.2 Million per year per depot. ($ 0.900 Million)

(U) **Natural Attenuation of Explosive Contaminants:** Continuing project at Louisiana Army Ammunition Plant to characterize field samples by gene probing, assaying for degradative enzymes, radiorespirometry, stable isotope analysis, and biomass estimation by nucleic acid and phospholipid determinations. Monitors natural attenuation and establishes scientifically valid assessment criteria. Sampling protocols developed. Genes for degradative enzymes detected. Radiorespirometry analysis on lipid fractions from field samples completed. Conceptual model updated based on new grid site cone penetrometer/hydro penetrometer data. Conducting mesocosm incubations for time-series stable isotope analysis. ($ 0.850 Million)

(U) **Trichloroethylene (TCE) Risk Assessment:** Project to be completed in FY 1997. Successfully completed a dosimetry and risk assessment which encompasses Physiologically-Based PharmacoKinetic (PBPK) modeling, the development of a Biologically-Based PharmacoKinetic (BBPK) model, and the extrapolation of rodent risk to human risk. Based on information and data produced, the US EPA is now conducting a formal scientific reevaluation of the cancer and non-cancer risks posed by TCE, using an external review panel. Adoption of new TCE risk factors could greatly reduce DoD's cleanup costs. An additional result of this reevaluation may be the relaxation of the TCE drinking water standard which would further reduce TCE cleanup and compliance costs. ($ 0.750 Million)

(U) **Lead-Based Paint (LBP) Hazard Mitigation:** Continuing project that is developing and demonstrating novel vitrification technologies for the environmentally safe removal of lead-based paint. In FY 1997, demonstrated the ability to immobilize, remove, and contain lead and other heavy metals using a molten glass spray. Another technology under development uses microwave energy applied rapidly and selectively to heat a given layer of paint to debond the paint from the wooden substrate. ($ 0.600 Million)

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(U) **Non-Thermal Plasma (NTP) Technology for Reduction of Atmospheric Emissions:** Continuing project that will develop NTP reactor scaling criteria for NTP technologies and optimization models. Design of optical/laser-based plasma was completed. Lab-scale prototype reactor design and construction completed; Ion-molecule reaction pathways for NOx and reactive organic gases identified; LIF setup completed; test-case combustion fluid dynamic modeling runs completed. ($ 0.550 Million)

(U) **Rapid Detection of Explosives and other Pollutants:** This continuing project has developed assays for explosives TNT and RDX at low levels using a flow immunosensor. Two patents submitted. Achieved significant reductions in cost to less than $10 per real-time, in-field analysis. Prepared test plans, protocols, standard operating procedures for field trials. EPA Region X requested a one year demonstration (at Umatilla Army depot) as part of its formal methods validation process. Leveraged ESTCP funds for a DemVal (at Subbase Bangor, WA) for EPA and Cal EPA certification. ($ 0.430 Million)

(U) **Effects of Aircraft Overflights on Birds of Prey:** Project completed in FY 1997. Project determined the effects of aircraft overflights on threatened and endangered species, such as Peregrine Falcons and Bald Eagles by verifying and validating a noise dose-response model to predict the effects of aircraft noise. These results will support planning for future aircraft operations and environmental compliance documents. ($ 0.400 Million)

(U) **Aircraft Maintenance Chromium Replacement:** Project completed in FY 1997. The non-chromated technologies developed as part of this project replaced all uses of chrome acid anodizing (CAA), resulting in a reduction of 3 tons/year in chromated waste per maintenance facility. For prepainting applications, sulfuric/boric acid anodizing (SBAA) and thin film sulfuric acid were determined to be the best alternatives to CAA. The SBAA process was transitioned to full scale demonstration at NADEP North Island and Cherry Point. NAVAIR approved the use of SBAA and Mil-A-8625 process specification was revised to include both alternatives. ($ 0.350 Million)

(U) **Solvent Substitution and Low VOC Cleaners:** Project completed in FY 1997. A no-VOC aircraft exterior cleaner was developed. For corrosion control, Navy aircraft were cleaned using VOCs on a regular cycle, as often as every 14 days if operating at lower altitudes over sea water. The new cleaner will result in elimination of 63 tons/year of VOCs and 6 tons/year of hazardous air pollutants (HAPs). In another significant accomplishment, a heavy duty wheel well degreasing gel that does not contain HAPs and contains less than 10% VOC was developed. Approximately 20 tons of HAPs will be eliminated annually from tri-service aircraft cleaning by using the new gel. MIL-PRF-85570, Type II and Type V have been revised to specify these products and was issued on 11 June 1997. ($ 0.350 Million)

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(U) **Laser Ignition to Replace Lead Containing Igniters for Propulsion:** This continuing project has developed a laser ignition system (LIS) for DoD guns which uses laser light to replace ordnance ignition materials that contain hazardous chemicals. An LIS has the dual advantage of providing significantly increased rates of fire and soldier protection while completely eliminating the lead containing primers and igniter material. The LIS system has been adopted for the Crusader self-propelled 155mm howitzer and has been successfully demonstrated on the Paladin self-propelled howitzers and the Apache 30 mm automatic cannons. It is estimated that $6 million/year in savings will be realized from the use of this system for large and medium caliber ammunition. ($ 0.300 Million)

(U) **Metal Perovskite Catalysts for NOx Reduction:** Project completed in FY 1997. Project provides methods to significantly reduce NOx emissions from military aircraft using metal Perovskite (strontium-lanthanum cobaltate) catalyst. Its feasibility was demonstrated by completing characterization of mid-temperature-range catalyst stability and performance, design and specification of reactor system for high gas flow rate testing of plasma-arc-sprayed catalyst coatings in final phase, and confirming analysis that the catalyst promotes nitrous oxide (NO) reduction in the presence of carbon monoxide. ($ 0.090 Million)

(U) Additional efforts will continue in Cleanup, Compliance, Conservation, and Pollution Prevention. There are 15 other projects in Cleanup ($ 5.863 Million); 13 other projects in Compliance ($ 5.437 Million); 15 other projects in Conservation ($ 5.842 Million); and 23 other projects in Pollution Prevention. ($ 13.783 Million)

(U) **FY1998 Plans:**

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(U) **Next Generation Fire Suppression Technology Program (NGFSTP):** This umbrella project which began in FY 1997 is part of the NGFSTP for the replacement of Halon 1301 in DoD weapon systems. It is divided into the following six fully integrated technical focus areas each with sequential and synergistic research elements (a total of 32 research elements): (1) Risk Assessment and Selection Methodology 2) Fire Suppression Principles 3) Technology Testing Methodologies 4) New Suppression Concepts 5) Emerging Technology Advancement and 6) Suppression Optimization. Research and development activities began in the following sub-thrust areas: Mechanisms of Ultra-High Efficiency Chemical Suppressants, Suppression Dynamics of Fine Droplets and Particles, Stabilization of Flames, Suppression System Effectiveness Screening, and Advanced Propellants/Additive Development for Gas Generators. In FY 1998, model fires for fire suppression research will be developed , and modeling studies will be conducted to develop a better understanding of flame stabilization. Sixteen new projects will be initiated. ($ 3.500 Million)

(U) **Unexploded Ordnance (UXO) Detection:** Continuing umbrella effort to integrate and automate UXO detection, identification, and discrimination sensor technologies to include wide-area, rapid coverage over a variety of terrain of UXO-contaminated areas. Complete design and testing of multisensor data fusion algorithm using existing data. Complete an enhanced prototype multisensor platform data fusion procedure. Refine electromagnetic models for UWB SAR after completion of testing at second test site. The Enhanced Harmonic Radar will conduct image development with third harmonic radar and data fusion with other sensors. Design, build and test third harmonic radar. Demonstrate real-time target processing for multi-sensor MUDDS platform. Demonstrate data fusion and integration. Complete system integration and conduct field demonstration of multi-sensor MUDDS system. Use of MUDSS as compared to manual survey can reduce survey time by a factor of five and reduce costs by 50-70%, a savings of up to $400K per square nautical mile. ($ 2.880 Million)

(U) **Integrated Biotreatment Research Program: From Flask to Field:** Continuing umbrella project to be completed in FY 2000. Project represents a collective research initiative by several key government and academic organizations supporting the development of bioremediation treatment technologies. The research objective is to field several biotreatment processes for remediation of predominant DoD contaminants. Project will evaluate (1) fluidized-bed reactor for explosives (at Volunteer AAP); (2) bioslurry and biocell treatment of explosives-contaminated soils (Yorktown Naval Weapons Station, VA); (3) biocell reactor and cascading bioslurry reactors for PAHs; (4) engineering of electrolytic stimulation of PCE degradation; (6) phytoremediation of explosives, chlorinated solvents and PCBs; (7) aerobic degradation of PCBs with new strains; and (8) engineering of reductive dechlorination of PCBs. ($ 2.600 Million)

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(U) **DoD National Environmental Technology Test Sites Program:** Continuing project facilitates transfer to field use of new, innovative, cost savings cleanup technologies. Four operational test sites plan to host 15-20 field tests and demonstrations of innovative remedial and site characterization technologies. Many demonstrations will be current SERDP projects; several will be from other funded programs, including the Advanced Applied Technology Demonstration Facility and the Environmental Security Technology Certification Program. Will complete installation of an additional high value controlled release cell at Dover AFB. ($ 2.540 Million)

(U) **Aquifer Restoration by Enhanced Source Removal:** Continuing project to demonstrate processes for enhancing removal of light and dense non-aqueous phase liquids (LNAPLs and DNAPLs) in a variety of geologic settings. Extraction of contamination from NAPL source areas is the rate limiting step in pump-and-treat technology which is presently the remediation selection at over 90% of sites. Perform field tests of DNAPL removal strategies in test cells located at Dover AFB. Develop guidelines for applying these strategies to remediate contaminated groundwater, focusing on: (1) enhancing pump-and-treat contaminant removal technologies and (2) producing engineering design guidance documents for application to contaminated groundwater cleanup. The guidance will address the entire remediation effort, including site characterization and support to achieve maximum benefit. ($ 2.180 Million)

(U) **Elimination of Toxic Materials and Solvents from Solid Propellant Components** Continuing project, to eliminate (minimize) the use of lead compounds as a ballistic catalyst in reduced smoke propellants, and eliminate HCl as a combustion product of tactical and strategic booster propellants by using thermoplastic elastomers (TPEs) developed under service and SERDP funding in the Clean Agile Manufacturing Energetics project. Over 50 successful experiments have been conducted to validate the solventless processing system for oxidizers. Scale-up of this process is planned for FY1998. Formulation modification with clean oxidizers for lead elimination and ultrafine aluminum characterization and evaluations to eliminate HCl will continue in FY98. ($ 1.420 Million)

(U) **Whale Monitoring Using Integrated Undersea Surveillance Systems (IUSS):** Continuing project will complete demonstration of a near real-time communication link for data distribution to automate detection and classification processes for marine mammals. Complete at-sea tests to assess the impacts of low-frequency sound sources on mammals and determine long-term monitoring capability. Project results will provide the Navy with first order effects of the impact of Naval operations on marine mammals and the tools and analytical capability to comply with the Marine Mammal Act. ($ 1.265 Million)

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(U) **Compact Shipboard Incinerator:** Project to be completed in FY 1998. Plans include acoustic enhancement of sludge incineration; evaluate and cost/performance benefits of this technology compared to existing technologies; integrate new diagnostics in the actively controlled afterburner; and investigate performance limiting processes in vortex reactor. ($ 1.200 Million)

(U) **Natural Attenuation of Explosive Contaminants:** Continuing project to develop unique microbial monitoring tools and establish geological characteristics needed to determine the rate and extent of natural attenuation. Tasks include: correlate microbial community structure, gene probe data, and microbial lipid analyses with natural attenuation; complete integration of stable isotope monitoring technology into groundwater model for explosives remediation.; develop guidance on natural attenuation assessment including methods for monitoring site-specific rate parameters, site capacity, and mass balance of explosives; and conduct two-day Tri-Service workshop on monitoring tools for natural attenuation of explosives as part of the technology transfer of the project products to DoD users. The long-term benefit of this project is regulatory acceptance of a cost-effective remediation alternative. ($ 1.000 Million)

(U) **Eliminate Heavy Metals from Small Caliber Ammunitions:** Continuing project to eliminate hazardous materials in the bullet core and primer of small caliber ammunition while meeting U.S. and NATO performance requirements. A draft report on environmental safety and health aspects of Tungsten will be completed. Recycle and uptake studies for tungsten as replacement material for lead antimony will continue. Metastable Interstitial Composites primer will be refined and cartridge case sensitivity tests will be performed. Long term storage tests and primer/propellant ignition interface tests will be initiated. ($ 0.900 Million)

(U) **Eliminate VOCs in CARC Paint Formulation, Applications, and Removal:** Continuing project to reduce the VOC content of polyurethane binder based chemical agent resistant coating (CARC) system from 3.5 lb./gal to 1.8 lbs/gal for use on military equipment by all services. Coating properties of pigmented coatings will be validated and formulae for all colors will be optimized. CARC application and stripping studies will be conducted. ($ 0.900 Million)

(U) **Development of Simulators for In-Situ Remediation Evaluation, Design, and Operation:** This FY97 new start project provides computational capabilities for evaluating remedial strategies and developing information for use in risk and tradeoff analyses prior to field implementation of new cleanup technologies. FY 1998 tasks include: modify simulators for surfactant-enhanced bioremediation and bioventing; validate simulators of intrinsic bioremediation (at Wurtsmith AFB), natural attenuation of explosives (at Louisiana AAP) and in-situ chemical treatment of solvents (at Dover AFB); begin Groundwater Modeling System (GMS) implementation of simulator codes. Based on results from several industrial cleanups, an estimated 5% to 15% of cleanups costs can be saved through effective use of subsurface modeling throughout the characterization, assessment, and remedial design/operation phases. ($ 0.850 Million)

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(U) **Lead-Based Paint Hazard Mitigation:** Project to be completed in FY 1998. Field tests and demonstrations of vitrification technologies for immobilizing heavy metals during lead removal activities will be conducted at DoD installations. Other removal technologies including microwave assisted removal of paint from wood, will be further evaluated to minimize worker and public exposure. ($ 0.750 Million)

(U) **Advanced Mass Spectrometer:** Project to be completed in FY 1998. The objectives of the project are to develop and demonstrate an ultra-sensitive mass spectrometer (10^{-9}) detection and measurement of trace gas-phase pollutant gas molecules in the stratosphere, troposphere, and ground level atmosphere. An immediate benefit of the research will be to ensure compliance of jet or rocket engine emissions with mandated standards and to support DoD efforts to reduce pollution from jet and rocket operations. The end product of the research will be a portable, highly sensitive, calibrated and tested instrument with proven performance for determining trace neutral composition in the atmosphere. Product will be suitable for dual use in the environmental monitoring community. ($ 0.600 Million)

(U) **Non-Thermal Plasma (NTP) Technology for Reduction of Atmospheric Emissions:** Continuing project that will develop NTP reactor scaling criteria for NTP technologies and optimization models. Scale-up of NTP reactors will be optimized and a design of a field-pilot NTP reactor unit will be completed. The field-pilot unit will be tested to provide criteria for selecting the most appropriate NTP technology for DoD applications. ($ 0.575 Million)

(U) **Analysis and Assessment of Military and Non-Military Impacts on Biodiversity: A Framework for Environmental Management on DoD Lands Using Mojave Desert As A Regional Case:** Continuing project to provide DoD with the capability to evaluate the impacts of future military operations in the context of regional management of biodiversity in the Western Mojave. Project builds on USMC Camp Pendleton case study and considers the adverse impacts of multiple military installations, not only within their boundaries, but also in the context of the surrounding stakeholders and the cultural and natural resources they manage. Identify military and non-military stressors, determine species-habitat needs, and develop initial assessments of vegetation and terrain. ($ 0.550 Million)

(U) **Trapped Vortex Combuster for Jet Engines:** Continuing project will develop design rules for and demonstrate the feasibility of a trapped vortex combuster for reducing the NOx, VOC, and CO emissions from aircraft, land and marine gas turbine engines by 60%. Project will investigate the pressure dependence of NOx in the trapped vortex combuster at pressure ranging up to 45 ATM. A test matrix will be established so that the NOx dependence on fuel-to-air ratio, inlet air temperature, and inlet air pressure can be determined. ($ 0.500 Million)

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(U) **Development and Demonstration of a Risk Assessment Framework for Natural Resources on Military Training and Testing Lands:** Continuing project to develop a structured, scientifically valid risk assessment framework that can be rapidly and cost-effectively applied to assess risks of single, multiple or cumulative impacts of military training and testing activities on natural resources. Based on the EPA-approved risk assessment paradigm, project will develop specific methodologies for assessing the ecological risks for specific military training and testing activities such as tank maneuvers, smoke releases, or hull tests and their use with existing decision support tools. ($ 0.430 Million)

(U) **Ecological Modeling for Military Land Use Decision Support:** Project to be completed in FY 1998. Project develops analytical and simulation tools to assist military land managers in quantifying runoff, soil erosion, and sediment deposition within watersheds and in predicting their spatial and temporal distribution. It will complete field data collection and model validation, enhance simulation of erosion control practices such as terraces and retention basins, and complete erosion/deposition modeling methodology for impact prediction and land rehabilitation design. ($ 0.400 Million)

(U) **Super Critical Water Oxidation:** Project to be completed in FY 1998. Project involves conducting experiments and theoretical modeling to understand detailed chemical kinetics of supercritical water oxidation (SCWO) processes, an emerging technology for the treatment of aqueous hazardous waste. Focus of the project is to measure the primary oxidation steps that occur in the oxidation of methanol, higher alcohols, methylene chloride, and some simple organic compounds containing nitro groups. A better understanding of the fundamental reaction rates and the kinetic models developed under this project is leading to models for reactor design, predictions of destruction efficiency, and methods for commercial system optimization. Results will feed into improvements and modifications of production prototype equipment and larger scale systems to treat special munitions waste, pyrotechnics, and other military chemicals. ($ 0.300 Million)

(U) Approximately 5 other continuing projects and 4 new start activities are planned in the Cleanup area that directly respond to the highest priority defense environmental mission-relevant requirements include: Novel UXO Sensors, Dense Nonaqueous Phase Liquid (DNAPL) Identification and Remediation, In-Situ Soil/Sludge/Sediment Treatment, and Risk Based Cleanup Assessment Techniques. ($ 9.141 Million)

(U) Approximately 4 other continuing projects and 6 new start activities are planned in the Compliance area that directly respond to the highest priority defense environmental mission-relevant requirements include: Destruction of Energetics, Particulate Emission Characterization, Control/Destruction of Nitrogen Oxide (NOx) Emissions, and Control/Destruction of Volatile Organic Compound (VOC) Emissions, Minimization of Oily and Non-Oily Waste. ($ 6.471 Million)

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(U) Approximately 2 other continuing projects and 6 new start activities are planned in the Conservation area that directly respond to the highest priority defense environmental mission-relevant requirements include: Error and Uncertainty Analysis for Ecological Modeling and Simulation; Assessment and Prediction of Noise Effects on the Environment; Training and Testing Activity Impacts; Mitigation/Rehabilitation of Military Training and Testing Impacts; Landscape Based Change Detection; and Ecosystem Fragmentation. ($ 6.152 Million)

(U) Approximately 9 other continuing projects and 8 new start activities in the Pollution Prevention area are planned that directly respond to the highest priority defense environmental mission-relevant requirements include: Aircraft De-Icing/Anti-Icing, Alternate Materials and Processes for Tactical Vehicle Washing, Non-Toxic Aircraft Sealants, Green Gun Barrels, Composites Repair and Remanufacturing, and Manufacturing/Industrial In-Process Recycle/Recovery. ($ 10.011 Million)

(U) **FY1999 Plans:**

(U) Program transferred to the Army under PE 0603780A as a result of the Defense Reform Initiative. ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	53.475	54.874	57.185	Continuing	Continuing
Appropriated Value	53.475	61.874		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(4.564)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.705)				
c. Other		(0.195)	(57.185)	Continuing	Continuing
Current President's Budget	52.770	57.115	0.000	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** FY1999 funding changes are the result of the Defense Reform Initiative. FY1999 funding was transferred to the Army under PE 0603780A. Changes in FY1997 and FY1998 reflect Congressional undistributed reductions as well as programmatic adjustments.

(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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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3				R-1 ITEM NOMENCLATURE Joint Warfighting PE 0603727D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	8.761	23.700	27.332	30.212	29.949	30.781	Continuing	Continuing
Joint Warfighting/P727	0.000	8.761	23.700	27.332	30.212	29.949	30.781	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) The Chairman of the Joint Staff's *Joint Vision 2010*, the Services' 21st Century visions and the Revolution in Military Affairs (RMA) all stress the critical role technology will play in achieving full spectrum force dominance. New concepts doctrine, organizations, and training enabled by technology, will need to be explored and experimented with to understand the new capabilities needed to achieve the next century's military objectives. This program element provides funding to begin developing, analyzing and experimenting with those concepts. The PE funds two separate but related efforts: a Joint Advanced Warfighting/Revolution in Military Affairs (JAW/RMA) analysis activity and an Joint Warfighting Experimentation program. The JAW/RMA activity will meet the need for analytical support for the development of candidate *Joint Vision 2010* and RMA advanced systems and joint warfighting concepts. This capability, which will include advanced simulation and analysis tools, will provide the catalyst for joint warfighting hypotheses based on revolutionary and evolutionary joint warfighting concepts enabled by advanced technologies, beginning with information superiority. The JAW/RMA effort will combine the capability and talent of the Institute for Defense Analysis, the Joint Warfighting Center, and the Joint Battle Center to achieve these goals. As part of the JAW/RMA activity, funding will be used to create a Federated Joint Battle Laboratory that will provide an advanced distributed simulation and advanced networking capability by linking together the Joint Battle Center with the Service Battle Laboratories. The Federated Joint Battle Laboratory will be a valuable tool for the development and evaluation of advanced joint warfighting concepts.

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(U) The Joint Warfighting Experimentation program funds the field experiments and supporting simulation to evaluate potential systems and concepts and their contribution toward achieving the JV 2010 and RMA objectives. It provides the capability to rapidly incorporate new and emerging systems with advanced concepts, doctrine, organizations, and technology, and experiment with them to prove their value. Initially, this effort will be focused on the development and execution of Information Superiority experiments which will be fundamental to achieving Dominant Maneuver (DM), Precision Engagement (PE), Full Dimensional Protection (FDP) and Focused Logistics (FL). The Advanced Battlespace Information System(ABIS) Task Force produced the most comprehensive assessment, vision and strategy to date for achieving the requisite grid, technologies, and concepts to make JV2010 possible. The 1998 edition of the Joint Warfighting Science and Technology Plan (JWSTP) provided to Congress in compliance with the Fiscal Year 1997 Defense Authorization Act (Section 270) presents the technology investment plan consistent with JV2010 and the ABIS recommendations. The JWSTP defines and maps the requisite technology development and advanced concept technology demonstrations to enable Information Superiority. The effort funded in this program element enables the joint warfighter and evolving Federated Joint Battle Laboratory to work as an integrated team with the objective to experiment with and quantify the impact of information technologies and concepts, along with commercial off the shelf (COTS) and government off the shelf (GOTS) products and to co-evolve organization and doctrine to optimize the Joint and Service Warfighting mission. We will establish and deploy this integrated environment with COTS hardware and existing software (COTS, GOTS, and applications), incurring minimal cost in set-up and operation.

(U) This environment can then be utilized as an Information Technology (IT) Backplane to leverage early prototypes in the context of the existing environment. Advanced concept prototypes will be deployed in this environment. This reduces the risk of new technologies since they can be exercised early, well in advance of development and fielding. The benefits of this program element include: cost-effective exercise by the warfighter/acquisition/technology team of prototypes early in the life cycle; the ability to test interoperability of prototypes with established legacy systems; early insight into the potential for increased joint combat power enabled by advanced information technology and concepts; better information system development and upgrade requirements; and more rapid insertion of information technologies.

(U) The JW is under Budget Activity 3 because this program funds the integration and demonstration of advanced technology for field experimentation into a system of systems and to assess these larger systems. The result is an integration of the demonstrated technological capabilities in addition to the development of 21st Century warfighting concepts for joint forces. This leads to greatly improved understanding of the joint warfighting utility and value assessed in realistic, joint operational context. Whereas the Military Services provide air, land, and naval technological superiority, and ACTDs rapidly prototype and transition technological solutions to specific threat scenarios, this program provides timely resources and flexibility to horizontally integrate across Services and technologies by providing joint warfighting solutions to be evaluated during joint warfighting experiments. The results are quantitative improvements through the co-evolution of technology, organization and doctrine.

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(U) This Program Element is in direct response to the FY 1997 Authorization Act Report 104-267, which calls for "...a process to ensure that the emerging long-term visions of each of the Services will be melded into an affordable, coordinated series of operational concepts that will drive the JWSTP developed in the office of the DDR&E." and FY 1998 Authorization Act Report 105-29 requests a Joint Experimentation Plan to address: "...how the fielding of advanced technologies are being synchronized across the military services" and "...how C4 and ISR capabilities are being integrated jointly to achieve information superiority."

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COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	0.000	8.761	23.700	27.332	30.212	29.949	30.781	Continuing	Continuing
Joint Warfighting/P727	0.000	8.761	23.700	27.332	30.212	29.949	30.781	Continuing	Continuing

(U) **Project Number and Title: JW/P727**

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

(U) **FY1997 Accomplishments:**

(U) Not Applicable (FY1998 start) ($ 0.000 Million)

(U) **FY1998 Plans:**

(U) A joint effort has been established among the OSD, Joint Staff, Joint Battle Center, Joint Warfighting Center, Joint Warfare Analysis Center, Services and Agencies led by the DDR&E, J6 and J7. A detailed roadmap of a series of Information Superiority Experiments (ISXs) is being developed which supports information superiority as well as the four operational capabilities of Dominance Maneuver (DM), Precision Engagement (PE), Focused Logistics (FL), and Full Dimensional Protection (FDP). The roadmap will document the flow of these ISXs so that later experiments build upon previous experiments and their lessons learned. The roadmap presently has 12 ISXs directly supporting FDP, 3 supporting DM, 3 for PE, and 2 for FL. An Information Technology (IT) Backplane compliant with the Joint Technical Architecture, ABIS and the initial joint warfighting operational architecture will be integrated and put in place, thereby providing an environment of existing information technology components into which prototype and other emerging products can be inserted, exercised and evaluated with respect to interoperability and joint warfighting potential. The IT Backplane builds upon JBC's work in standing up the Federated Battle Lab and complements, not duplicates, similar efforts by DISA, ATDnet, and DREN. Joint warfighter and acquisition personnel will experiment with several such prototypes in order to determine improved operational capabilities via field experiments, system integration laboratory, modeling, simulation, visualization, or other techniques. A management and test plan will be initiated for the first Joint Warfighting Experiment (JWE) to be conducted as an embedded experiment in a joint

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training exercise in the year 2000 to determine progress, improve advanced joint warfighting concepts and evolve operational architecture. There will be two Information Grid ISXs conducted and initial models and simulations of the JWE will be planned. ($ 7.261 Million)

(U) The Joint Advanced Warfighting/Revolution in Military Affairs (JAW/RMA) analysis capability will be created with the establishment of an analysis cell at the Institute for Defense Analysis, linked to the Joint Battle Center. In addition, a Senior Advisory Group consisting of senior retired flag officers and civilians will be formed to advise the effort. ($ 1.500 Million)

(U) **FY1999 Plans:**

(U) The IT Backplane will be expanded/improved based upon lessons learned from the FY 98 Information Grid ISXs. Particular attention will be paid to linking the capabilities of several ACTDs including joint logistics, joint planning, rapid battlespace visualization, battlefield awareness data dissemination and STOW. In FY 1999 there will be five ISXs across the Sensor, Engagement and Information Grids. These will involve live as well as simulated activities coordinated by the Joint Staff and utilizing identified emerging ACTD/ATD prototypes as well as COTS. Analysis of the component ISXs will be fed back to the user organizations. Additionally, the plan for the 1st JWE will be completed with coordinated input from Joint Staff and Services. It is imperative that all five ISXs be funded since they feed directly into the large-scale JWE. Preparation and training for the JWE will begin. ($ 19.100 Million)

(U) The IDA/JBC team will begin to identify advanced warfighting concepts and systems and begin to evaluate them through simulation, wargaming and analysis. The team with the advice of the Senior Advisory Group will recommend elements and concepts to be designed into future experiments and exercises. The team will look specifically at the RMA to analyze both the impact of revolutionary technological concepts on both the doctrine and investment strategy. ($ 4.600 Million)

(U) The growth between FY 1998 and 1999 is the result of the increase in the number of ISXs (2 to 5) being run in FY 1999, the increased level of effort in planning for the JWE as well as the fact that, as a new start, there was only six months of effort in FY 1998.

(U) **ACQUISITION STRATEGY:** Not Applicable

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

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	0.000	14.172	22.833	Continuing	Continuing
Appropriated Value		9.172		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.381)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment		(0.030)			
c. Other			0.867	Continuing	Continuing
Current President's Budget	0.000	8.761	23.700	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Funding changes to FY1998 and FY1999 are due to congressional reductions and program budget adjustments

(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 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3				R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	4.500	4.778	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
ADP/P728	4.500	4.778	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) 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. This is a budget level 3 activity.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	4.500	4.778	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
ADP/P728	4.500	4.778	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P728 APD**

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

(U) **FY1997 Accomplishments:**

(U) The FY 1997 program was facilitated by an Interagency Agreement between the Department of Defense and the Maritime Administration, an agency of the US Department of Transportation. Additional agreements were developed between the USTRANSCOM, the Center for the Commercial Deployment of Transportation Technology, and the MARAD to provide for the disbursement and overall execution of the FY 1997 program.

(U) CCDoTT efforts included the continued research and development of advanced technologies supporting DoD Mobility. The focus of these efforts was the continued development of automated measurement capabilities for DoD vehicles and equipment (TrAMS) and the leveraging of high speed sealift and agile port technologies being developed (or considered for development) by commercial entities. FY 1997 work included:

(U) **Advanced Sealift Technologies.** Conducted research, development, testing, evaluation and commercialization of enabling technologies for high speed marine applications. Evaluated commercial ship designs and planned initiatives that can be effectively used for military support or adapted for use by the DoD. Developed configuration designs and/or required design changes to make next-generation lift platforms (surface effect ships, etc.) compatible with DoD Strategic & Tactical requirements and current DoD cargo handling systems. Performed research on high speed sealift propulsion systems, cargo transfer equipment, and other associated systems. Conducted modeling & simulation to assess and recommend sealift designs for systematic integration into the DTS ($ 1.395 Million).

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(U) **Agile Port Technologies.** Conducted research and develop state-of-the-art port systems to decrease port congestion and increase port-mobilization capabilities. Developed, evaluated, and optimized Agile Port concepts and associated Intermodal Transfer (IT) to provide flexibility to DoD mobility, serve both commercial and military needs with efficiency and high throughput, and optimize cargo handling within Agile Port facilities. Capitalized on existing and emerging information technologies to interface Agile Ports with the DTS. Conducted modeling & simulation to perform design analysis supporting the seamless integration of Agile Ports into the DTS ($ 2.705 Million).

(U) **Rapid Deployment Technologies.** Analyzed the feasibility of leveraging advanced commercial Marine-Rail Interfaces in support of DoD intermodal deployments; conducted modeling and simulation to determine the impact of using marine-rail technology in cooperation with Inland Ports; continue the development of the Transportation Automated Measuring Systems (TrAMS) to incorporate advanced Weigh In Motion (WIM) technology; and performed analysis of various advanced technologies to determine their potential benefits on DoD mobility ($ 0.400 Million).

(U) **FY1998 Plans:**

(U) The FY 1998 program will continue research and development of advanced technologies supporting DoD Mobility. The focus of the FY98 effort will be R&D scale demonstrations of technologies for the automated measurement of DoD vehicles and equipment (TrAMS), R&D scale demonstrations of agile port technologies for reducing deployment times and port congestion, and military demonstration exercises using commercial high speed sealift ship technologies being developed by commercial entities. FY 1998 work will include:

(U) **Advanced Sealift Technologies.** Conduct a military Sealift Emergency Deployment Readinesss Exercise (SEDRE) using a commercial high speed sealift vessel to transport troops and materiel from a military deployment port to a selected destination. Perform detailed design, analysis and evaluation of features identified in FY97 as necessary to make commercial vessels compatible with DoD Strategic & Tactical requirements and current DoD cargo handling systems. Focus research and development, testing, evaluation and commercialization on top candidate enabling technologies for high speed marine applications identified in FY97. Evaluate additional commercial ship designs and planned initiatives that can be effectively used for military support or adapted for use by the DoD. Perform more in-depth research on high speed sealift propulsion systems, cargo transfer equipment, and related systems. Increase sophistication of modeling & simulation to assess and recommend sealift designs for systematic integration into the DTS ($ 1.250 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D8Z

(U) **Agile Port Technologies.** Conduct R&D scale demonstrations of selected state-of-the-art cargo handling technologies and port systems to quantitatively assess the improvements in deployment efficiency, reduced times, decrease in port congestion and increase in port-mobilization capabilities. Demonstrate selected terminal management and information technologies to interface Agile Ports with the DTS. Increase sophistication of models & simulations and conduct optimization, design and cost analysis of Agile Ports. Continue to develop, evaluate, and optimize Agile Port concepts and associated Intermodal Transfer (IT) to provide flexibility to DoD mobility while serving both commercial and military needs. ($ 2.250 Million)

(U) **Rapid Deployment Technologies.** Demonstrate R&D scale models of technologies leveraging advanced commercial Marine-Rail Interfaces in support of DoD intermodal deployments. Expand modeling and simulation to include the hinterland region between the seaport and the Inland Port; integrate advanced Weigh In Motion (WIM) technology into an improved TrAMS; and expand analysis and evaluations of advanced technologies offering maximum benefits to DoD mobility. ($ 1.278 Million)

(U) **FY1999 Plans:**

(U) Not Applicable ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Agile Port Demonstration PE 0603728D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	Cost to Complete	Total Cost
Previous President's Budget	0.000	4.897	0.000	5.000	5.000
Appropriated Value	5.000	5.000			
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction	(0.103)	(0.206)		(0.103)	(0.103)
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.397)	(0.016)			
c. Other					
Current President's Budget	4.500	4.778	0.000	4.897	4.897

Change Summary Explanation:

(U) **Funding:** FY 1997/1998 reductions are based on inflation adjustments and other minor below threshold reprogramming.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA 3				R-1 ITEM NOMENCLATURE Cooperative DoD/VA Medical Research Program PE 0603738D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	23.809	14.421	0.000	0.000	0.000	0.000	0.000	0.000	21.334
Coop DoD/VA Medical/P464	23.809	14.421	0.000	0.000	0.000	0.000	0.000	0.000	21.334

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) Funding in this program element has been added by Congress to the Department of Defense (DoD) budget request each year since 1987. Funds support a "core (general research)" program of cooperative medical research funded by DoD and managed by the Department of Veterans Affairs (VA). Core projects address medical research topics potentially of benefit to both Departments, such as emerging infectious diseases, trauma, stress, and exercise physiology. Focus areas are jointly identified by DoD and VA. Projects are selected through a independent peer review process, and are conducted by intramural VA and DoD physicians and scientists. Funds also support Congressionally mandated brain and spinal cord injury research, and studies on Gulf War Illnesses (GWI). GWI research efforts are conducted both intramurally and extramurally; extramural GWI studies typically are managed by the U.S. Army Medical Research and Materiel Command, following proposal selection via independent scientific peer review.

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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)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	23.809	14.421	0.000	0.000	0.000	0.000	0.000	0.000	21.334
Coop DoD/VA Medical/P464	23.809	14.421	0.000	0.000	0.000	0.000	0.000	0.000	21.334

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

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

(U) **FY1997 Accomplishments:**

(U) Initiated intramural, core research efforts concerning combat trauma and wound repair research ($ 2.955 Million).

(U) Initiated intramural, core research efforts on the health effects of combat stress and post-traumatic stress disorder, and GWI-related conditions such fibromyalgia. ($ 5.000 Million).

(U) Continued intramural, epidemiologic studies efforts concerning Gulf War Illnesses. These seven large studies, conducted by the Naval Health Research Center, are comparing symptoms, hospitalizations and reproductive outcomes between Gulf War veterans and non-deployed veterans of the same era. These studies demonstrated that Gulf War veterans who remained on active duty were not at increased postwar risk of unusual hospitalizations or of having children with birth defects. These studies are inter-Agency collaborations among DoD, Centers for Disease Control and Prevention, Environmental Protection Agency, Department of Veterans Affairs, and University of California at San Diego. Studies were endorsed by the Institute of Medicine, presented to the Presidential Advisory Committee for Gulf War Veterans' Illnesses, presented to the GAO, and published in the leading peer-reviewed medical journals. ($ 2.000 Million).

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
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(U) Initiated extramural research efforts concerning Gulf War Illnesses. These studies focus on : historical war syndromes, including factors which produce chronic, non-specific symptoms and physiological outcomes ($4.977 million), and multi-disciplinary studies of neurotoxic Gulf War-related illnesses leading to diagnosis and treatment ($ 3.000 Million) ($ 7.977 Million).

(U) Supported completion of facilitation efforts enabling state-of-the art collaborative brain research ($ 5.877 Million).

[(U) Note: Studies funded through this project complemented FY97 GWI efforts supported through other DoD accounts: $10 million of Operations and Maintenance (O&M) funds supported peer-reviewed, extramural research concerning exposure to chemical warfare agents and other toxins, and possible health effects of combinations of inoculations and investigational new drugs; $3.4 million of O&M funds supported development of an anti-bacterial treatment for GWI-affected veterans; $2 million of O&M funds continued efforts on troop location information, toxicology, mycoplasma, sleep disorders, and clinical data analyses; and $2 million of Army research and development funds continued GWI-related infectious disease efforts (i.e. leishmaniasis). Thus, DoD's total FY97 investment in GWI efforts was greater than $32 million.]

(U) **FY1998 Plans:**

(U) Focus areas for core projects will include exercise physiology and acute brain injury. Research proposals will be solicited from in-house DoD and VA investigators, and projects will be selected for funding based on technical merit and relevance to the solicitation. Technical merit will be determined through peer review by non-DoD, non-VA experts. ($ 10.921 Million)

(U) The Naval Health Research Center will continue epidemiologic studies comparing symptoms, hospitalizations and reproductive outcomes between Gulf War veterans and non-deployed veterans of the same era. Efforts will include a study to determine the feasibility of establishing an active-surveillance birth defects registry for DoD. ($ 3.500 Million).

(U) **FY1999 Plans:**

(U) Not Applicable. ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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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

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	21.334	0.000	0.000	0.000	0.000
Appropriated Value	21.334	15.000			21.500
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.530)			(0.166)
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	2.475	(0.049)			
c. Other					
Current President's Budget	23.809	14.421	0.000	0.000	21.334

Change Summary Explanation:

(U) **Funding:** Funding changes are due to program budget and congressional adjustments. The FY1998 program of $15 Millions was a congressional plus up.

(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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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 3					R-1 ITEM NOMENCLATURE ADVANCED CONCEPT TECHNOLOGY DEMONSTRATIONS PE 0603750D8Z				
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	57.070	77.455	116.330	133.768	122.209	124.182	126.733	Continuing	Continuing
ACTDs/P523	57.070	77.455	116.330	133.768	122.209	124.182	126.733	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) **BRIEF DESCRIPTION OF ELEMENT**: The Department of Defense 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 achieving a "revolution in military affairs" to support the Chairman's *Joint Vision 2010*. Advanced Concept Technology Demonstrations (ACTDs) are low risk vehicles for pursuing that objective. 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 involve a material development organization that develops the technology, and a warfighting organization responsible for assessing 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 capabilities being evaluated. They allow the users an opportunity to assess the military utility of the proposed capability prior to a major acquisition decision. They also provide the Services with a mechanism for compressing acquisition cycle time, thus significantly improving their response to priority operational needs. As such, ACTDs are at the foundation of the DoD acquisition reform process.

(U)) Other sources provide most of the funding for ACTDs. Funding from this program element, typically 10%, is used: 1) to support actual demonstrations and exercises, 2) to provide hardware to demonstrate military utility, and 3) to fund interim capability operations and support for

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two years after the "operational phase" of the ACTD. This two year phase provides the operators with adequate time to continue to address the issues of supportability, maintainability and training identified by the ACTD.

(U) Candidate ACTDs are submitted in January of each year by both the S&T and the warfighter community. The candidates proposed by the S&T community reflect technological opportunities that have been enabled by recently demonstrated technology. The candidates proposed by the warfighter community (Joint Chiefs of Staff (JCS), Unified Commanders in Chief (CINCs), Service 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, and that the capability addresses a priority military need. The maturity of the technology associated with the proposed capability is assessed by the Deputy Under Secretary of Defense for Advanced Technology (DUSD (AT)), with assistance of senior members of the science and technology community. The priority of the military need is determined by the Joint Requirements Oversight Council (JROC). The principal management tool for the ACTD is the ACTD Management Plan. Each approved ACTD will be described in a top-level document that provides details of the demonstration/evaluation, the main objectives, approach, critical events, measures of success, transition options, participants, schedule, and funding.

(U) The typical timeline of two-to-four years for the operational demonstration phase of an ACTD is compressed compared to normal timelines for fielding an operational capability. These shorter schedules are made possible by the fact that the 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 recommend that the capability provided by current technology has sufficient utility to warrant procurement; or, if there are significant shortcomings, either to pursue an advanced technology demonstration to improve performance, or not to 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 used as an interim capability and then move quickly to enter the formal acquisition process and acquire quantities to fully satisfy the need.

(U) The data call for Fiscal Year 1999 candidate ACTDs went out October 1997. Proposals were received from the CINCs, Services, other Department of Defense Agencies, and Industry in January 1998. Candidates are organized into the *Joint Vision 2010* focus areas of Dominant Maneuver, Precision Engagement, Full Dimensional Protection and Focused Logistics Plans are being finalized with the Joint Staff to begin the

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process of identifying and reviewing the candidates for FY 1999 ACTDs in February/March 1998. Funding for FY 1999 ACTDs is approximately $26.3 million.

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

(U) **FY 1997 Accomplishments**: All ACTDs initiated in FY 1995 and 1996 have been reviewed for objectives, content and management. This includes in-depth review by some of the ACTD operational sponsors such as United States Atlantic Command (USACOM). Ten new ACTDs were started in FY 1997: Chemical Add-On to Air Base/Port Biological Detection, Consequence Management, Counter Proliferation II, Extending the Littoral Battlespace, Integrated Collection Management, Information Operations Planning Tool (previously known as Information Warfare Planning Tool), Joint Helicopter Advanced Health & Usage Monitoring System (JAHUMS), Military Operation in Urban Terrain, Rapid Terrain Visualization, and Wide Area Tracking System (WATS). WATS was later canceled as an ACTD due to technical, programmatic and operational issues. Information on each ACTD is available on the Internet at 'www.acq.osd.mil/at'. The selection process for FY 1998 ACTDs began in October 1996. Seventeen final ACTD candidates, of the 80 received from the Unified Commands, the Services, and Defense agencies, were considered. Candidates covered a broad range of technologies and needs, including information warfare, weapons and munitions, logistics, intelligence, reconnaissance, medicine, and information technology. These candidates were evaluated for technical maturity by the Breakfast Club and for operational need and utility by the Joint Staff JWCA process. The JROC then prioritized these seventeen candidates. In order to validate technical maturity, program planning and program management, each final candidate underwent a one-day comprehensive review (termed a 'final scrub') prior to final selection and ACTD start in early FY 1998. FY 1997 funds were transferred to the executing services/agencies in the amount of $57.070M.

(U) FY 1997 accomplishments include:

FY 1995 Starts:

- Advanced Joint Planning (AJP): Software tools to provide the Commander, USACOM with insight into readiness of component forces and to manage Time Phased Force Deployment Data (TPFDD) are used on a daily basis. These tools (Time-Phase Force Deployment Data Editor (TPEdit) and the Joint Readiness Assessment Management System (JRAMS)) were used to support force

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deployment to Joint Endeavor. The tools are in the process of transitioning into the Global Command and Control System (GCCS) common operating environment (COE). JRAMS has been distributed to several CINCs, including USCENTCOM, USEUCOM, and USPACOM. It is completing transition into the GCCS common operating environment. The system underwent final user evaluation in late 1997.

- Joint Countermine: Conducted Demonstration I between August 16 and September 6, 1997 in conjunction with the USACOM-sponsored JTFEX 97-3 at Camp Lejeune and Fort Bragg. Ten naval systems, countermine command control communications, computers, and intelligence (C4I) and countermine simulation were demonstrated. A "quick look" analysis report and operational assessment was prepared and plans are now underway for Demonstration II.
- The Synthetic Theater of War-97 ACTD successfully conducted its first Trans-Atlantic operational demonstration with the United Kingdom over its newly developed secure asynchronous transfer mode (ATM) network. It completed the demonstration phase in November 1997 with very successful participation in the joint and combined Unified Endeavor exercise.
- Predator: On 8 August 1997, The Defense Acquisition Board, chaired by the Acting Under Secretary of Defense (Acquisition and Technology) approved Predator's entry into the production phase of the acquisition process . It designated the program as an Acquisition Category II, and delegated milestone decision authority to the Air Force Acquisition Executive. Predator was the first ACTD to enter the formal acquisition process, with approval of twelve total systems. Interim capability assets from the ACTD and new production systems will be progressively block-upgraded to the required operational configuration.
- High Altitude Endurance Unmanned Aerial Vehicles: Due to the crash of the first DarkStar vehicle on 22 April 1996, that portion of the ACTD experienced delays, as hardware and software engineering changes were made to the system. However, DarkStar electro-optical sensor flight testing was successfully completed (on a surrogate C-130 transport aircraft) in May 1997. DarkStar air vehicle #2 was transported to the NASA Dryden Flight Research Center in October 1997 to begin taxi and flight testing. The Global Hawk air vehicle rollout was accomplished in February 1997. Internal navigation and sensor tests were successfully completed in July and October 1997, respectively. The Global Hawk air vehicle was moved to Edwards Air Force Base, California, in August 1997 to begin taxi testing. The Launch and Recovery Element of the Common Ground Segment (ground system for both air vehicles) was moved to Edwards AFB in September 1997.

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FY 1996 Starts:

- Air Base/Port Biological Detection ACTD: Conducted Aerosol Background Environmental Sampling at U.S. installations in CENTCOM AOR . Held a successful demonstration and evaluation at Dugway Proving Grounds in September 1997, with participation by users that included representatives from Osan and Kunsan Air Bases, Republic of South Korea, the Joint Staff, HQ Pacific Air Force, 7th Air Force, US Pacific Command, US Central Command and US Forces Korea. Conducted "Portal Shield" war game with users that included representatives from Osan and Kunsan Air Bases, the Joint Staff, Pacific Air Force, 7th Air Force, US Pacific Command, US Central Command and US Forces Korea.
- The Battlefield Awareness and Data Dissemination (BADD) ACTD participated successfully in the Army's Task Force XXI Advanced Warfighting Experiment (AWE) at the National Training Center in March 1997. BADD software collected, combined and disseminated, over the Global Broadcast System, simulated and real data from the Joint Surveillance Target Attack Radar System (JSTARS) and unmanned aerial vehicles (UAVs), weather data, terrain and feature data, commander's broadcasts, and annotated white boards. BADD was also used in the July 1997 Joint Warrior Interoperability Demonstration (JWID).
- The Combat Identification ACTD has evaluated 12 separate technologies intended to prevent fratricide and improve situational awareness. Each evaluation included engineering analysis followed by integration in numerous operational exercises, such as NTC 97-06 (TF-XXI AWE), Hunter Warrior, International Demo, JTFEX 97-02, Kernel Blitz, JWID 97, NTC 97-11 and FPE-III (virtual simulation). Six of the evaluated technologies will not be further demonstrated due to the following reasons: two technologies (Laser/Radio Frequency and Mark XII/Global Positioning System (GPS)) have not passed the technical testing phase (performance specifications and/or cost considerations) and have been recommended by the operational user for termination. Another two (Battlefield Combat Identification System (BCIS) Fixed Wing and Enhanced Forward Air Controller (FAC)) have demonstrated little to no military utility and have also been recommended by the operational sponsor, USACOM, for termination. The remaining two (Radar-Coupled Emitter Passive Location and Identification (REPLI) and Situational Awareness Through the Sight (SATTS)) have not reached a sufficient level of technical maturity to be evaluated and/or demonstrated during the ACTD. The remaining six technologies have demonstrated potential military utility and will continue to be evaluated for technical performance and military utility by USACOM.
- Combat Vehicle Survivability ACTD: The hardware contractor has completed design, fabrication and assembly of one modified M1A1 tank. The contractor conducted a successful shakedown evaluation of the vehicle, May 1997. Minor modifications were

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made to the design based on the shakedown evaluation. The hardware contractor has completed fabrication of four sets of equipment for a M1A1 platoon. A technical and operational demonstration occurred 4th quarter FY 1997 - 1st quarter FY 1998. A comprehensive system model and interactive virtual reality simulation was developed. Soldiers from III Corps conducted an interactive simulation June 1997. A draft set of tactics, techniques and procedures was developed and will be finalized after the operational demonstration.

- The Counterproliferation ACTD (Phase I) conducted demonstrations against surrogate chemical production facilities. There included successful demonstrations of the Hard Target Smart Fuze, sensors, targeting and hazard prediction tools in February 1997, with live ordinance dropped from an F-15E and F/A-18. The ACTD participation with targeting tools in several exercises highlighted the need for better capability to conduct counter force missions in the stand-off mode to provide an option to direct attack. Mission planning and assessment tools were evaluated and validated for operational use by the operational user, United States European Command (USEUCOM) which has provided them to NATO.
- The first prototype of the Joint Readiness Extension to the Advanced Joint Planning tool was delivered to USACOM and the Joint Staff in August 1996. Prototypes were delivered to all participants in November 1996 and March 1997. Software is being transitioned through the DARPA/DISA Joint Program Office into the Global Command and Control System (GCCS) common operating environment. Software hardening and testing will enable insertion of planning tools designed to automate preparation of the Joint Staff/Secretary of Defense Joint Monthly Readiness Report into the next version of the Global Command and Control Software scheduled for release in January 1998.
- The ACTD Information Warfare Red Team was initiated to assess the different ACTD vulnerabilities to information warfare and to ensure adequate protective measures are taken. ACTDs being evaluated by the team include Advanced Joint Planning, Joint Countermine, Battlefield Awareness and Data Dissemination, and Rapid Force Projection Initiative. Information Warfare Red Team operations include assessment of ACTD systems and technologies, as well as monitoring ACTD performance in various operations and exercises. This is a continuing effort, with programs selected from each year's new starts.
- Phase I of the Joint Logistics ACTD, designed specifically to support Operation Joint Endeavor, has been successfully completed. A prototype network of "Log Anchor Desks" was deployed at critical nodes in the Continental United States (CONUS) and U.S.

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European Command (USEUCOM) and has been connected to key data bases and equipped with modern planning tools. The system has been transitioned to operations and maintenance status (interim capability) for continued operational use in the Bosnia effort. Phase II of the Joint Logistics ACTD commenced in late FY97. Phase II will migrate more advanced decision support tools into a fielded capability and by linking the logistics network to emerging databases, operations planning systems and advanced communications systems.

- The Miniature Air Launched Decoy (MALD) satisfactorily completed its preliminary and critical design reviews. It is meeting or exceeding it's performance goals, is on schedule, and is under the unit flyaway price goal of $30,000 per decoy (based on a 3,000 units buy in FY 95 dollars). The 30-month ACTD will conduct demonstrations on deceiving enemy air defenses by simulating attacking aircraft, greatly enhancing combat aircraft survivability. The United States and United Kingdom are also finalizing the project arrangement detailing United Kingdom participation in this ACTD.
- Navigation Warfare exercises have begun using Prevention and Protection equipment developed during the Navigation Warfare ACTD. Squad sized exercises have been carried out at White Sands Missile Range, New Mexico, Fallon Naval Air Station, Nevada and Camp Lejeune, North Carolina. Further exercises are planned for larger units and different venues in the Spring, 1998.
- The Semi-Automated Imagery Processing ACTD started demonstrations and engineering evaluation of tools designed to greatly decrease the time needed to exploit imagery beginning with successful participation in Operation Desert Capture in March 1997 and Roving Sands 97 in April 1997. The enhanced system with several new capabilities has been delivered and will be evaluated by the users.
- The Tactical Unmanned Aerial Vehicle ACTD commenced testing to include the Ground Control Equipment and Air Vehicle. Testing is conducted at the contractors test facility in Hondo, TX. Through December 1997, 28 test flights have demonstrated air vehicle handling qualities and performance. The UAV data link system connectivity has been demonstrated to 200 kilometers in helicopter testing. Military utility assessment for joint land force components is scheduled to begin between February and June 1998 and will include the Army and Marine Corps.
- The Theater High Energy Laser ACTD has completed the critical design audit of the system. Fabrication and system integration were initiated . Planning was also initiated for functional testing of the system at the Capistrano Test Site in California . The system will be moved to WSMR in FY98 for full system testing. This is a joint ACTD with Israel.

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FY 1997 Starts

- Chemical Add-On to Air Base/Port Bio Detection ACTD: The sensor hardware was successfully demonstrated and evaluated at Dugway Proving Grounds in September 1997.
- Consequence Management: In December 1997, the Army Technical Escort Unit (TEU) and USMC Chemical Biological Incident Response Force (CBIRF) responded to a simulated domestic terrorist scenario involving release of various biological simulants in a large U.S. city. This was the final and very successful demonstration for this ACTD. TEU and CBIRF were equipped with existing and emerging bio-detection technologies. These technologies were evaluated for their usefulness and ability to be operated by both units. In addition, new concepts of operations developed during the ACTD were evaluated.
- Information Operations Planning Tool ACTD: Completed Phase 1 of the project to baseline user requirements in May 1997. The ACTD is currently in the systems design and development phase scheduled for completion in June 1998. The first prototype of the ACTD was delivered in August 1997 and provides operators with the first generation graphical interfaces and strategy-to-task framework. In concert with the operational users and US Air Force Operational Test Command, the initial measures of effectiveness have been outlined. Air Intelligence Agency/AFIWC has worked with USCENTCOM to set up initial planning for the ACTD demonstration in June, 1998 at INTERNAL LOOK 98. Initial transition discussions for the ACTD were initiated with Air Combat Command (ACC) and Air Force Materiel Command (AFMC). Planning inputs are anticipated in the FY 2000 POM.
- The Integrated Collection Management ACTD was initiated in June 1997. USACOM is the operational sponsor.
- Joint Advanced Health and Usage Monitoring System (JAHUMS). Working in conjunction with the Navy-developed Commercial Off-the-Shelf Savings Initiative (COSSI) for H-53 and H-60 helicopters, the Army and OSD Open System Joint Task Force has developed an open system, technology plan to insert commercial- and military-developed technologies to improve aircraft safety and reduce operations and support costs. A Broad Area Announcement (BAA) soliciting industry inputs was released in August 1997. Draper Labs was selected as the systems integrator. A JAHUMS Industry Information Conference was conducted. Over 21 proposals for 44 technology modules were received in response to the BAA.
- Rapid Terrain Visualization (RTV) ACTD: Established baseline RTV testbed capability at XVIII Airborne Corps and supported 12 major training exercises. Demonstrated capabilities to collect, process, and exploit medium resolution (ten meters) terrain data to

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support Task Force XXI. Initiated engineering design contract to integrate interferometric synthetic aperture radar (IFSAR) high resolution (one meter) terrain data collection capability on United States Air Force (USAF) aircraft.

(U) FY 1998 Plans: Transition those ACTDs that have successfully demonstrated military utility and been determined to warrant acquisition. Continue development and operational demonstration of the remaining FY 95/96/97 ACTDs, and start fourteen new FY 1998 ACTDs in accordance with planned schedules and transition plans. Continue the annual process of developing and structuring new candidate ACTDs to rapidly address user needs and address issues identified in *Joint Vision 2010*. DUSD(AT) is coordinating with the Joint Staff's Joint Warfighting Center to identify candidate ACTDs that could support and help implementation of the Chairman's *Joint Vision 2010*. Funding will continue for all active previous ACTDs, including the fourteen new FY 1998 ACTDs, for a total of $77.455 million.

(U) Other significant plans for FY 1998 are:

FY 1995 Starts

- Joint Countermine ACTD will conduct Demonstration II. The Navy will lead the demonstration which will emphasize surveillance and reconnaissance technologies and seamless transition of countermine operations from the sea to the land. Joint Countermine Operational Simulation (JCOS) will transition to STOW, and the Countermine C4I will begin transition to GCCS.
- Precision SIGINT Targeting System is planning a full scale demonstration in Korea for FY 1998. It will build on the October-November 1996 demonstration. The plan is to have a limited Precision SIGNIT operational capability upon completion of the FY 1998 demonstration.
- Rapid Force Projection Initiative is planning a large scale demonstration in the 4th quarter of FY 1998. All of the hardware components will be delivered to the 101st Air Assault Division in the 2nd quarter of FY 1998. The 101st will use the intervening six months to train for the large scale demonstration.
- The Synthetic Theater of War ACTD will participate in a major operational exercise in support of USACOM and begin the transition of STOW technologies to the Joint Simulation System (JSIMS) and the Services.

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- First flight for both Global Hawk and DarkStar air vehicles is planned for early Winter 1998. Global Hawk successfully completed medium speed taxi tests during the Fall of 1997.

FY 1996 Starts

- The Battlefield Awareness and Data Dissemination (BADD) ACTD will commence a CONUS Pilot Service that provides near-real-time imagery, geographic and video products at transfer rates ranging from hundreds to thousands of times faster than current capability. The ACTD will also demonstrate policy management services (50 or more simultaneous sessions) and battlefield awareness services, integrating at least ten information categories, at Ulchi Focus Lens 98.
- Combat Identification ACTD will conclude in 3rd quarter FY 1998. A final report on all the technologies and their military utility will be generated by USACOM upon conclusion. There will be three exercises in FY 1998: a Combat Identification Exercise (CIDEX) with elements of 4th Infantry Division at FT Hood; a Virtual Integration Experiment (VIE) linking Fort Rucker (aviation), Fort Knox (maneuver) and Armstrong Labs (AF CAS) which will involve virtual (man-in-the-loop) simulations; and a C4I interoperability exercise. Technology integration tests continue for Single-Channel Ground and Airborne Radio System (SINCGARS/SIP(+)). Those technologies that have demonstrated maturity and military utility will remain with their units as interim capability assets, and will be supported for continued operation and to obtain additional user feedback on military utility and maintainability. This commitment to continued operational support provides a mechanism by which critical features for the continued development of Combat Identification technologies are identified.
- Combat Vehicle Survivability ACTD: A logistics and reliability, availability and maintainability evaluation will be conducted 3rd Quarter FY 1998. The program will be transitioned to Program Executive Office (PEO) Ground Combat and Support Systems 4th Quarter FY 1998.
- Counterproliferation ACTD (Phase I) will complete its demonstration using a Tomahawk Land Attack Missile (TLAM-C) against a surrogate soft above-ground chemical production facility. This last demonstration series of the first Counterproliferation ACTD will be conducted against a hardened surrogate chemical production facility. The series of six demonstrations will assess the military utility of the Advanced Unitary Penetrator with the Hard Target Smart Fuze, the Weapon-Borne Sensor, a precision adverse-weather guidance system for gravity bombs, Tactical Unattended Ground Sensors, a battle damage assessment enhancement for the Tactical

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FLIR Pod Modification and target planning and collateral affects prediction tools. Technology evaluation and integration will begin for the Counterproliferation ACTD, Phase II. This ACTD will continue to support exercises and CONOPS development for USEUCOM. New CONOPS development will start for stand-off counter force operations.

- The Information Warfare Red team will continue evaluation of the vulnerability of selected ongoing and new start ACTDs to information warfare attacks.
- Phase II (FY 1998, FY 1999) of the Joint Logistics ACTD will build additional capability into the prototype logistics planning network established in FY1997. The focus is on advanced Joint Logistics decision support tools, connectivity into emerging data bases, operations planning systems and communications networks. These advanced logistics planning capabilities will first be demonstrated in exercises (JWID, UE), then transitioned to the CINCs for true field use.
- The Miniature Air Launched Decoy ACTD will complete tooling development for air vehicle fabrication, assembly, ground integration and testing, and then conduct flight demonstrations where operational users will evaluate military utility in preparation for the user assessment and recommendation.
- Semi-Automated IMINT Processing ACTD integration and field testing will continue to achieve transition system objectives and to support the U-2 Advanced Synthetic Aperture Radar System (ASARS-2), and the ASARS-2 Improvement Program. Military utility assessment by the operational customer, USACOM, will begin.
- Theater High Energy Laser system will undergo functional testing at the Capistrano test site, and will then be transferred to the HELSTAF facility at White Sands Missile Range for full system testing during live single and salvo engagements of Katyusha rockets. At the conclusion of the testing at HELSTAF in late FY98, the THEL system will be shipped to Israel for development of operational concepts, training and deployment along the northern border.

FY 1997 Starts

- Chemical Add-On to the Air Base/Port Biological Detection ACTD: Develop chemical network algorithms and chemical sensor software interfaces.
- Consequence Management: Following the successful Consequence Management (911-Bio) demonstration and assessment in December 1997, the following activities will occur: data reduction and analysis; operational user decisions on technologies to be adapted; and proliferation of lessons learned.

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- Information Operations Planning Tool ACTD will complete Phase 2 and participate in a demonstration at INTERNAL LOOK 98. Plans for transition of the ACTD after the demonstration phase will be finalized. The user evaluation plan and criteria will be completed and used during the exercise demonstration. AIA/AFIWC and USCENTCOM will also continue working for an additional demonstration of the ACTD during the FY 1999 timeframe to further refine operational requirements and to enhance the capability of the tool. CONOPS will be further refined based on user inputs and exercise data.
- Rapid Terrain Visualization: Demonstrate capabilities to collect, process, and exploit medium (ten meters) and high resolution (three meters) terrain data, feature data and imagery to support the Division Advanced Warfighting Experiment (AWE) and XVIII Airborne Corps Warfighting Experiment (WFX). It will also conduct initial technology capabilities demonstration to include data generation, transformation, dissemination, semi-automated feature extraction, mission planning and 3-D terrain visualization capabilities.
- Joint Advanced Helicopter Usage and Monitoring System (JAHUMS): Evaluate select and award contracts for technology modules. Begin procurement of baseline systems under the COSSI program.

FY 1998 Starts

The Under Secretary of Defense for Acquisition and Technology approved fourteen FY 1998 ACTDs, which are summarized below in JROC-prioritized order:

- Joint Biological Remote Early Warning System (JBREWS): Will demonstrate the military utility of a Networked Biological Early Warning System. JBREWS will provide USEUCOM and USCENTCOM an affordable Biological Warfare Sensor Network and support for two years.
- Information Assurance: Automated Intrusion Detection Environment (IA:AIDE): Will provide an initial "Cyber Radar" to detect coordinated information warfare attacks on DoD systems. System will also provide automated detection, correlation, warning and reporting for Integrated Tactical Warning/Attack Assessment (ITW/AA).
- Joint Continuous Strike Environment (JCSE): JCSE will optimize the use of joint and combined weapon suite(s) on emergent targets. It will provide timely prioritized engagement of time critical surface targets, evaluate alternative collaborative engagement approaches, and provide interoperability through DII Common Operating Environment (COE)/Service fire support/targeting systems.

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- Joint Modular Lighterage Systems (JMLS): Provides operational capability to move warfighting materiel from ship to shore in Sea State 3. Current Sea State operations are limited to Sea State 2 conditions. The JMLS system will significantly increase system life and reduce required maintenance. Issued Request for Proposal (RFP) for design of a lightweight, affordable, Sea State 3-capable system. Evaluate and award multiple contracts for most promising designs in March 1998. Develop systems engineering management plan.
- Link 16: Will demonstrate a joint, integrated capability to pass tactical information seamlessly among Link -16 and Variable Message Format-based tactical data link networks, which are currently separated both in message format and physical wavelength. Software will be developed to exchange tactical information between the networks and their physical devices, as well as the specific message sets required for this exchange.
- Precision Targeting Identification (PTI): Demonstrates the potential of Laser Radar (LADAR) and 3rd generation forward-looking infrared (FLIR) technologies to increase search area and obtain low-probability of intercept, precise target location and identification. System will demonstrate capability in the counter-drug mission area aboard a modified U.S. Navy P-3 Orion. Capability is applicable to other platforms and missions requiring precise target identification.
- Unattended Ground Sensors (UGS): Will enable the prosecution of Deep Time Critical Targets through continuous surveillance of critical choke points, and positive target ID to permit retasking/cueing of surveillance and attack assets. Localized weather reporting in denied areas ("Now Weather") will provide improved mission planning and safety for weather sensitive operations (e.g. Special Operation Forces insertion).
- Theater Precision Strike Operations (TPSO): Addresses the Central Intelligence Agency (CIA)/Defense Intelligence Agency (DIA) top priority threat -- North Korea. Will provide the theater commander with a significantly improved, near real-time, synchronized, combined counter fire/precision strike capability.
- Line-of-Sight Anti-Tank System (LOSAT): Will develop the CONOPS and demonstrate military utility applicable to the early entry forces of an anti-armor system which has the following traits: overmatching lethality, greater than tank range capability, countermeasure resilience, rapid multi-target engagement, and an air-dropable/ sling-loadable capability.
- Adaptive Course of Action: Provides real time, end-to-end joint planning by multiple CINCs using software tools for common situational understanding between distributed commands. Crisis action planning is presently conducted in a serial process which

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includes separate situation assessment, course of action, execution planning and execution segments. This ACTD will focus on distributed, coordinated planning with integration into GCCS.

- High Power Microwave: Will demonstrate an operation information warfare attack capability. The system will be packaged for tactical applications.
- Space Based Space Surveillance Operations (SBSSO): Current deep space surveillance is provided by Ground Based Electro-Optical Deep Space Surveillance (GEODSS). SBSSO with Mid-Course Space Experiment (MSX) provides: (1) Full geo-stationary belt coverage with single satellite, (2) location of space objects , (3) detection of new objects, (4) all-weather operation, (5) no foreign base dependencies, and (6) paves the way to future SBSS using Space Based Infrared (SBIR)-Low.
- Migration Defense Intelligence Threat Data System (MDITDS): Provides increased protection of DoD personnel, equipment, and facilities from terrorism, enhanced counter terrorist deterrence, and improved responsiveness to precursor terrorist activities and actual incidents.
- C4I for Coalition Warfare: Will allow US Army command control (C2) systems to inter-operate with, at a minimum, the United Kingdom, France, and Germany. Communication will be at the Corps to Battalion levels and will initially be accomplished with messages, follow-on methods will use data replication. Modular Data Gateway will be built which makes maximum re-use of existing work.

(U) **FY 1999 Plans:** Continue the process of transitioning and initiating ACTDs. Numerous demonstrations will be conducted for those ACTDs initiated in previous years. All FY 1995 ACTD demonstrations should be completed during this period, along with most of the FY 1996 and some FY 1997 ACTDs. Funding will continue for active ACTDs initiated in FY 1995, 1996, 1997 and 1998 ($90.020 million total for all prior year ACTDs) that have not been completed or transitioned to acquisition programs. Funding available for initiating new FY 1999 ACTDs, after subtracting for previous years ACTDs, will be approximately $26.310 million. ($116.330 million).

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(U) Other significant plans for FY 1999 are:

FY 1995 Starts:

- The Advanced Joint Planning ACTD will continue transition of planning tools which have demonstrated utility into the Global Command and Control System.
- The Joint Countermine ACTD will provide follow-on analysis and support for the interim capability equipment.
- The Synthetic Theater of War ACTD will conduct additional mission rehearsal and training exercises in support of USACOM and continue technology transition to Joint Simulation System (JSIMS) and the Services.
- The Global Hawk and DarkStar unmanned air vehicles will commence operational field demonstrations, exercises, and possible contingency deployments, enabling early user involvement to evaluate military utility. A total of four Global Hawks and three DarkStars are planned to take part in the operational demonstrations, along with two complete sets of the associated Common Ground Segment equipment.

FY 1996 Starts

- Air Base/Port Biological Detection will continue evaluations of the military utility of the systems.
- Battlefield Awareness and Data Dissemination will transition to operational use and will continue to be enhanced as high payoff capabilities emerge from the technology base.
- Combat Identification interim capability assets will be supported for a last year of continued operation and to obtain additional user feedback on military utility and maintainability. This commitment to continued operational support provides a mechanism by which critical features for the continued development of Combat Identification technologies are identified.
- Counterproliferation I (CP I) will support interim capability assets for further operational feedback to assist system engineering and integration and production activities. The ACTD will also continue to support exercises and CONOPS development for USEUCOM. New CONOPS development will continue for stand-off counter force operations, and the user will assess the utility of the new dual weapon drop tactic against very hard facilities.
- The Information Warfare Red team will continue evaluation of the vulnerability of selected ongoing and new start ACTDs to information warfare attacks.

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- Information Operations Planning Tool will continue to develop tools and prepare for another operational demonstration. Refinement of the CONOPs based on the field demonstration in FY98 will occur, and an assessment of the INTERNAL LOOK 98 demonstration will be made.
- The Miniature Air Launched Decoy will complete operational demonstration of the decoy with a user assessment of military utility.
- The Theater High Energy Laser will become operational following deployment and testing in Israel.

FY 1997 Starts

- Counterproliferation II: Continue stand-off platform, penetrator and Fuze design and test. Commence UAV integration and planning tools for short standoff weapons. Conduct Demonstration X. Demonstrate a new weapon delivery tactic to achieve penetration into very hard facilities containing NBC materials. This demonstration will employ the F-117 carrying the GBU-27 and Advanced Unitary Penetrator weapons.
- Extending the Littoral Battlespace: Commence Phase I program support, deployment and training.
- Information Operations Planning Tool ACTD user evaluation will continue in part via demonstration during BLUE FLAG 00-1.
- Joint Advanced Health and Usage Monitoring System: Continue Phase II design, fabrication and testing of board-level designs within the JAHUMS open systems framework. Install systems on aircraft and train operational and maintenance crews.
- Military Operations in Urban Terrain: Conduct squad- and platoon-level experiments, integrating experiments at the company level.
- Rapid Terrain Visualization: Conduct initial prototype data collection of IFSAR high resolution (one meter) terrain data on USAF aircraft. Upgrade the baseline RTV testbed capability at XVIII Airborne Corps. Conduct baseline technology capabilities demonstrations to include: terrain data generation, rapid imagery collection, data transformation, data dissemination.

FY 1998 Starts

- Adaptive Course of Action (ACOA): Continue CINC-level software integration. Conduct a multi-CINC user demonstration.
- C4I for Coalition Warfare: Conduct a field trial, in the context of a coalition exercise, of the integrated message gateway.
- Information Assurance: Automated Intrusion Detection Environment (IA:AIDE): Continue Sensor Bridge development, adding 15 sensors and nine sights. Implement data base and design changes covering new sensors additions. Conduct training at the added nine sights and an end-of-year operational demonstration.

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- Joint Biological Remote Early Warning System (JBREWS): Conduct a demonstration and military utility assessment of integrated master and satellite units to provide remote detection and warning of biological agents for an assembly area.
- Joint Continuous Strike Environment (JCSE): Conduct in-theater demonstration exercise and continue concept of operations refinement.
- Joint Modular Lighterage System (JMLS): Conduct system critical design review and begin hardware fabrication. Conduct unit-level demonstrations in the Norfolk/Virginia beach area. Conduct a joint exercise demonstration.
- Line-of-Site Anti-Tank (LOSAT): Develop constructive and virtual simulations. Conduct final design review and a preliminary user evaluation.
- Link-16: Conduct system tests at the Joint Battle Center. Conduct a demonstration test and a warfighter assessment/operational demonstration. Begin interim capability.
- Migration Defense Intelligence Threat Data System (MDITDS): Integrate warning, collection interface, force protection tool kit and debriefer's aids modules.
- Precision Targeting Identification (PTI): Conduct crew training and user utility operations.
- Space Based Space Surveillance Operations (SBSSO): Conduct annual user demonstration.
- Theater Precision Strike Operations (TPSO): Commence three-year series of annual user demonstrations. Conduct CONUS/OCONUS baseline demonstration.
- Unattended Ground Sensor (UGS): Develop hand- and air-deployed sensors. Develop planning and data analysis tools. Conduct a major test and user demonstration.

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(U) **A: Acquisition strategy**: Not Applicable

(U) B. Program Change Summary	FY 1997	FY 1998	FY 1999	To Complete	Total Cost
Previous President's Budget	56.972	121.076	139.458	Continuing	Continuing
Appropriated Value	56.972	81.076			
Adjustments					
a. Congressional Reductions		(3.360)			
b. Recessions/Reprogramming					
c. Other	.098	(.261)	(23.128)		
Current Budget Submit/President's Budget	57.070	77.455	116.330	Continuing	Continuing

Change Summary Explanation: (total Program Element or Project, as applicable).
FY 1997: Changes were based on program budget adjustments as well as Congressionally directed undistributed reductions.
Schedule: (total Program Element or Project, as applicable) Not Applicable
Technical: (total Program Element or Project, as applicable) Not Applicable

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

(U) **D. Schedule Profile**: Not Applicable

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(U) **E. PE Funding for FY 1995 ACTDs:**

ACTD	FY 1997	FY 1998	FY 1999
Advanced Joint Planning**	0	1.480	1.550
Cruise Missile Defense Phase I*	0	0	0
Joint Countermine	1.024	6.950	1.430
High Altitude Endurance Unmanned Aerial Vehicle	0	0	0
Kinetic Energy Boost Phase Intercept*	0	0	0
Medium Altitude Endurance Unmanned Aerial Vehicle*	0	0	0
Precision SIGINT Targeting System	0	1.0300	0
Rapid/Counter Multiple Launcher*	0	0	0
Rapid Force Projection Initiative	0	0	0
Synthetic Theater of War**	4.000	2.280	2.380

*Completed

** Completed the demonstration phase of the ACTD

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(U) E. PE Funding for FY 1996 ACTDs

ACTD	FY 1997	FY 1998	FY 1999
Airbase/Port Biological Detection	2.793	1.140	2.380
Battlefield Awareness and Data Dissemination	3.744	4.560	2.380
Combat Identification	13.168	4.560	4.760
Combat Vehicle Survivability	2.374	1.290	0
Counterproliferation I	1.536	1.170	5.240
Counter Sniper*	0	0	0
Information Warfare Red Team	1.695	0	0
Joint Logistics	.050	0	0
Joint Readiness Extension to Advanced Joint Planning	3.351	0.340	0
Low Life Cycle Cost, Medium Lift Helicopter*	0	0	0
Miniature Air Launched Decoy	5.524	0.800	0
Navigation Warfare	4.190	4.450	.360
Operational Planning and Military Utility Assessment	2.136	0	0
Semi-Automated IMINT Processing	3.724	2.280	2.380
Tactical UAV	0	0	0
Theater High Energy Laser	3.520	0	0

*Completed

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(U) **E. PE Funding for FY 1997 ACTDs**

ACTD	FY 1997	FY 1998	FY 1999
Chemical Add-On to Biological Detection	.500	1.140	.600
Consequence Management**	0	0	0
Counterproliferation II	0	0	5.950
Extending the Littoral Battlespace	0	2.280	5.950
Information Operations Planning Tool	2.141	2.280	1.780
Integrated Collection Management	.200	1.140	1.190
Joint Advanced Health and Usage Monitoring System	0	4.560	5.950
Military Operations in Urban Terrain	1.200	5.760	0
Rapid Terrain Visualization	0	1.710	2.380
Wide Area Tracking System (canceled late FY97)	.200	0	0

**Completed the demonstration phase of the ACTD

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(U) E. PE Funding for FY 1998 ACTDs

ACTD	FY 1997	FY 1998	FY 1999
Adaptive Course of Action	0	3.080	4.930
C4I for Coalition Warfare	0	.455	1.070
High Powered Microwave	0	.630	0
Information Assurance: AIDE	0	3.420	3.570
Joint Bio Remote Early Warning System	0	0	0
Joint Continuous Strike Environment	0	1.030	1.550
Joint Modular Lighterage System	0	4.050	4.230
Line-of-Sight Anti-Tank	0	5.700	17.850
Link 16	0	1.310	0
Migration Defense Intelligence Threat Data System	0	.450	0.950
Precision Targeting Identification	0	2.160	2.080
Space Based Space Surveillance Operations	0	.800	.830
Theater Precision Strike Operations	0	1.140	4.760
Unattended Ground Sensors	0	2.030	1.540

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E , Defense Wide /BA 3				R-1 ITEM NOMENCLATURE Commercial Technology Insertion Program PE 0603752D8Z*					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9.500	19.105	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Commercial Technology Insertion for First Use Military Applications/P795	9.500	8.905	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Open Systems Demonstrations to Expand Commercial Insertion Opportunities/P796	0.000	10.200	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

*Funding for the Commercial Technology Insertion Program to be shown in PE 604805D beginning in FY 1999

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) The purpose of the Commercial Technology Insertion Program (CTIP) is to reduce risks and increase opportunities for the insertion of commercial technologies into defense systems. By supporting the required nonrecurring engineering, test and qualification, CTIP enables commercial components to be used confidently in weapon system applications. By demonstrating open system architectures that take advantage of the latest commercial technologies, CTIP increases the ability of defense systems to avoid parts obsolescence and keep pace with commercial technology advancement. Commercial technologies selected for insertion through this Program apply to more than one weapon system and will reduce life cycle costs and improve performance, reliability and maintainability. This Program implements the Department's strategy for using more commercial technologies in military equipment.

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(U) The Program is managed by the Office of the Secretary of Defense and executed by Service program offices. Proposed projects for the insertion of commercial technologies and demonstration of open architectures in defense systems are selected by the Services and approved for funding by the OSD. The systems selected as initial applications are planned/ongoing development and modification programs. CTIP has defined two major thrust areas for the FY 97-99 program: P*795 - Commercial Technology Insertion for First Use Military Applications and P*796 - Open Systems Demonstrations to Expand Commercial Insertion Opportunities.

(U) P*795. The first thrust eliminates barriers to the insertion of a commercial components in a military system. DoD program managers are often reluctant to take the risk of using parts whose characteristics in a military operating environment have not been tested and validated. The business case often does not exist for a single program to make the required investment in adapting and testing commercial items. As a result, military unique items continue to be selected by designers of defense systems, leading to higher costs, lower reliability, increased parts obsolescence, and often lower performance than commercial alternatives. CTIP addresses this problem by providing the engineering and qualification testing needed for the "first user" program, thereby reducing the risk and expense to an acceptable level for follow-on programs. CTIP also provides information to users on test and operational experience with commercial parts in military applications. Two projects were initiated in the first year of the program: (1) commercial microelectromechanical sensors for fuze, safe, and arm devices, with initial applications for undersea weaponry and missiles, and (2) commercial analog to digital signal processing architecture for the F-15 radar.

(U) P*796. The second thrust focuses on the system engineering of open system architectures (OSA). OSA are based on commercial market developments and standards. This thrust demonstrates the effectiveness and suitability of these open architectures for use in weapon systems. The purpose is to increase the opportunity for insertion of commercial subsystems and components from sources other than the original equipment manufacturer, and to facilitate upgrades over the life cycle to keep pace with commercial technology advancement. Defense system architectures are often proprietary system solutions that make parts substitution and future upgrades difficult. By contrast, the best practice in the commercial sector is to rely on open system standard interfaces that make upgrading faster, easier and less expensive. Commercial interfaces apply to computer hardware and software and to other electronic, electrical and mechanical attributes.

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APPROPRIATION/BUDGET ACTIVITY RDT&E , Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Commercial Technology Insertion Program PE 0603752D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9.500	19.105	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Commercial Technology Insertion for First Use Military Applications/ P795	9.500	8.905	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P795 Commercial Technology Insertion for First Use Military Applications**

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

(U) **FY1997 Accomplishments:**

(U) Tested, evaluated, and qualified commercial micro-electromechanical systems (MEMS) sensors for miniaturized fuze, safe and arm devices in Submarine Torpedo Defense, Multiple Launch Rocket System, submunitions and the MPIM/SRAW missile guidance system. ($ 4.400 Million)

(U) Initiated system engineering to replace six circuit cards in the F-15 radar with two circuit cards employing commercial analog to digital technology. ($ 4.056 Million)

(U) Modified commercial simulation technology and qualified it for the Weapon System Engagement Trainer. ($ 1.044 Million)

(U) **FY1998 Plans:**

(U) Expand testing and qualification of commercial MEMS sensors for application to Extended Range Guided Munition (ERGM) and Low Cost Competent Munitions. ($ 4.000 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E , Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Commercial Technology Insertion Program PE 0603752D8Z

(U) Complete system engineering to integrate a commercially based analog to digitial signal processing architecture into the F15 radar. Design, prototype, and test the video processor board, integrate it with the digital signal processor board, and conduct bench testing to verify performance. ($ 4.905 Million)

(U) **FY1999 Plans:**

(U) Beginning with FY 1999, CTIP funding will transfer to PE 604805D. ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E , Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Commercial Technology Insertion Program PE 0603752D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	9.500	19.105	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Open Systems Demonstrations to Expand Commercial Insertion Opportunities/P796	0.000	10.200	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

(U) **Project Number and Title: P796 Open Systems Demonstration to Expand Commercial Insertion Opportunities**

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

(U) **FY1997 Accomplishments:**

(U) Not applicable. Open Systems Architecture projects begin in FY 1998. ($ 0.000 Million)

(U) **FY1998 Plans:**

(U) Demonstrate the feasibility of using commercial software and standard commercial interfaces in the avionics suite, mission computer, and warfare management computer of the AV-8B. ($ 10.200 Million)

(U) **FY1999 Plans:**

(U) Beginning with FY 1999, CTIP funding will transfer to PE 604805D. ($ 0.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E , Defense Wide /BA 3	R-1 ITEM NOMENCLATURE Commercial Technology Insertion Program PE 0603752D8Z

(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	9.744	47.889	47.457	Continuing	Continuing
Appropriated Value	9.744	20.000			
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(0.895)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(0.244)				
c. Other			(47.457)		
Current President's Budget	9.500	19.105	0.000	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Reductions are due to Congressional adjustments as well as programmatic changes. The President's Budget submit for FY 1999 transfers part of the funding to PE 064805D and the balance to the Services.

(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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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide / BA 3				R-1 ITEM NOMENCLATURE HIGH PERFORMANCE COMPUTING MODERNIZATION PE 0603755D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	119.092	143.176	140.927	139.548	146.206	139.482	144.110	Continuing	Continuing
HPCM/P476	119.092	143.176	140.927	139.548	146.206	139.482	144.110	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) directly supports the needs of the warfighter for technological superiority and military dominance on the battlefield by providing the highest computational power available 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 quicker and with more precision than any potential adversary threatening national security. The results of these efforts feed directly into the acquisition process by increasing our fundamental understanding of the battlefield environment as well as improving upon weapon system design, development, test, evaluation, deployment, operations and sustainment. 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 Developmental Test and Evaluation (DT&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 DT&E laboratories and centers and are accessible to local and remote scientists and engineers via high-speed network access. Providing for the adaptation of broadbased, widely-used applications and algorithms to address S&T and DT&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 academe, industry, and other government agencies to facilitate the sharing of knowledge, tools, and expertise.

(U) The HPCMP user base includes approximately 3,000 computational scientists and engineers and approximately 50 DoD laboratories and over 1,200 computational scientists, engineers, and analysts at approximately 20 developmental test and evaluation facilities. The integrated HPCM program consists of a set of four large Major Shared Resources Centers (MSRCs) that 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, programming environments, and training. 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 expertise located at the remote sites. The MSRCs and DCs are currently interconnected with all S&T and DT&E user sites via the Interim Defense Research and Engineering Network (IDREN) and soon will be interconnected under the DREN Intersite Services Contract (DISC). Additionally the Common HPC Software Support Initiative (CHSSI) develops a set of critical common DoD applications programs that run efficiently on advanced HPC systems at the MSRCs and Distributed Centers.

(U) True modernization of DoD's HPC capability and fulfillment of the program's vision and goals requires a 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 and technology development for superior weapons, warfighting and related support systems. The goals of the HPCMP are to:

- Provide the best of commercially available, state-of-the-art HPC capacity and capability to enable weapons development and more capable warfighting systems,
- Ensure development of software tools, supportive programming environments, and applications to exploit the capabilities of HPC,
- Expand and train the DoD HPC user base to more effectively use HPC,
- Provide classified and unclassified access through robust high speed networking, and
- Engage, leverage, contribute to, and be a major participant in the National HPC Infrastructure and exploit benefits for Defense R&D.

(U) Four major contracts to support each of the MSRCs were competitively awarded during FY 1996. These contracts provide equipment for up to five years and comprehensive support services for the next five to eight years. The four MSRCs and their location are:

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- Aeronautical Systems Center (ASC), Wright-Patterson Air Force Base, OH
- Army Corps of Engineers Waterways Experiment Station (CEWES), Vicksburg, MS
- Army Research Laboratory (ARL), Aberdeen Proving Ground, MD
- Naval Oceanographic Office (NAVO), Stennis Space Center, MS

(U) Nichols Research Corporation of Huntsville, AL was awarded contracts to support both the ASC and CEWES MSRCs. Grumman Data Systems 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. Each of the MSRC contracts contains provisions, i.e. established contract options, to allow significant expansion of high performance computing systems and related support systems over the first five years of the contract. These contract options ensure that MSRC system expansions can take place in a timely fashion during each fiscal year.

(U) There are currently 13 distributed centers. In FY 1997 five existing centers were upgraded and one new center, Redstone Technical Test Center, was created. In FY 1998, another five existing centers will be upgraded. The distributed centers and their locations are listed below:

- Arnold Engineering Development Center (AEDC), Arnold AFB, TN
- Air Force Development Test Center (AFDTC), Eglin AFB, FL
- Army High Performance Computing Research Center (AHPCRC), Minneapolis, MN
- Maui High Performance Computing Center (MHPCC), Maui, HI
- Naval Air Warfare Center (NAWC), Patuxent River NAS, MD
- Space and Naval Warfare Systems Center (SSCSD), San Diego, CA
- Naval Research Laboratory (NRL), Washington, DC
- Naval Undersea Warfare Center (NUWC), Newport, RI
- Air Force Research Laboratory (Rome) (RL), Rome, NY
- Space and Missile Defense Command (SMDC), Huntsville, AL
- Tank-Automotive Research, Development and Engineering Center (TARDEC), Warren, MI
- White Sands Missile Range (WSMR), NM
- Redstone Technical Test Center (RTTC), Huntsville, AL

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(U) In addition to the distributed centers listed above, the Arctic Region Supercomputer Center (ARSC) has been funded by Congress in FY 1996, FY 1997, and FY 1998 and is providing computational resources to the HPCMP user community.

(U) Networking: 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 HPCMP will transition from an Interim DREN implemented through an in-house developed Internet Protocol (IP) based network of individual leased communications circuits to the DREN implemented through an asynchronous transfer mode (ATM) based network services contract with American Telephone and Telegraph (AT&T) in FY 1998.

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COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	119.092	143.176	140.927	139.548	146.206	139.482	144.110	Continuing	Continuing
HPCM/P476	119.092	143.176	140.927	139.548	146.206	139.482	144.110	Continuing	Continuing

(U) **Project Number and Title: P476 HPCM**

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

(U) **FY1997 Accomplishments:**

(U) **Shared Resource Centers:** The program continued the modernization and sustainment of the Shared Resource Centers. Additional HPC systems, storage, and scientific visualization capabilities were acquired to populate and upgrade the established MSRCs to fulfill the projected HPC requirements of the laboratories and R&D centers. Contract options were executed to upgrade performance at four MSRCs, minimally tripling their computing capability over the two year period (FY 1997 and FY 1998). The program assessed and prioritized HPC requirements for DCs and deployed new systems at five existing DCs and established one new DC to accomplish S&T and DT&E mission needs which cannot be met effectively or efficiently at the MSRCs.

(U) **Networking:** After award of the DREN Intersite Services Contract in July 1996, efforts initially focused on the development of site installation and test procedures and processes. Ten sites were selected for an operational demonstration. The operational demonstration was successfully completed in June 1997. The DREN started operation with 10 service delivery points on 1 July 1997. By the end of FY 1997, a total of 60 service delivery points will have been ordered with deliveries expected throughout FY 1998. As expected, nearly all network traffic was accommodated over IDREN in 1997. To resolve extreme congestion on the IDREN backbone two T-3 leased circuits (45 Mbps) and three T-1 leased circuits (1.5 Mbps) were added to partially address the growing HPC user bandwidth requirements. In addition, IDREN service was extended to both the Arctic Region Supercomputing Center (ARSC) in Alaska and the Maui High Performance Computing Center in Hawaii. ($ 16.022 Million)

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(U) **Software Applications Support:** The initial set of software applications development efforts (approximately fifty core projects across ten computational technology areas) under the Common High Performance Computing Software Support Initiative (CHSSI) was approved in FY 1996 and began full development in FY 1997. Their goals are to exploit the latest advances in HPC technology and capabilities by producing scaleable, reusable, robust software code to support several critical, high priority, cross-Service military applications. ($ 21.026 Million)

(U) **MSRC and Distributed Center Sustainment:** The program sustained and supported the integration, operation, and use of existing HPC resources at the four MSRCs. The program funded maintenance expenses for the HPC systems at the DCs. The program funded sustainment and operations at the MHPCC and the ARSC in accordance with FY 1997 Congressional language. Although not formally a HPCMP DC because it lacks a DoD sponsor, ARSC funding is included in the DC totals. ($ 82.044 Million total = MSRCs $ 52.872 million + DCs $ 29.172 million)

(U) **FY1998 Plans:**

(U) **Shared Resource Centers:** The program will sustain the existing capability and continue the modernization process by acquiring additional HPC systems, storage, and scientific visualization capabilities to populate and upgrade the established MSRCs to fulfill the projected HPC requirements of the laboratories and R&D centers. Contract options will continue to be executed to upgrade performance at four MSRCs, minimally tripling their computing capability over the two year period (FY 1997 and FY 1998). The program will continue assessing and prioritizing HPC requirements for DCs and will acquire and deploy new systems or upgrades to existing systems as needed to accomplish RDT&E mission needs.

(U) **Networking:** The networking focus in FY 1998 will be to transition HPC sites from the IDREN to the DREN. DREN connections will be installed at a rate of approximately 5 per month until all sites have been installed. As the DREN services become operational at each site and the site is able to transition traffic to DREN, the individual communication circuits that make up IDREN will be discontinued. By the end of FY 1998, the transition to DREN will be complete. The typical user site will be connected to the DREN at bandwidths of 10 to 45 Mbps. High usage sites, such as the MSRCs, will be connected at 622 Mbps by the end of the fiscal year. Collaborative work will begin with the Federal networking community to assure DREN remains compatible with future technology changes. ($ 23.718 Million)

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(U) **Software Applications Support:** Development efforts across the ten computational technology areas of CHSSI will continue with an emphasis and assessment on the use of sound software engineering practices and principles to aid in code development, alpha and beta testing, validation, verification, release and reusability across HPC platforms and down to the desktop workstation and field system levels. ($ 21.201 Million)

(U) **MSRC Sustainment:** The program will sustain and support the operation and use of DoD HPC resources at the four Major Shared Resource Centers. The majority of initial equipment and related contractor support was implemented at the MSRCs during FY 1997. Full twelve month annualized sustainment costs for this initial Performance Level 1 capability is included in the FY 1998 total. ($ 73.506 Million)

(U) **Distributed Center Sustainment:** Prior to FY 1998, the HPCMP funded investment and related equipment maintenance at the DCs. At selected centers, the HPCMP also provided partial funding of sustainment costs. Beginning in FY 1998, the HPCMP will no longer fund sustainment or operations of the DCs. Due to program funding limitations recognized in 1996, a decision was made to 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. The program will fund operations, sustainment and upgrades at the Maui High Performance Computing Center and the Arctic Region Supercomputing Center in accordance with FY 1998 congressional language. Only a nominal amount of funding is allocated for other DC program management. ($ 24.751 Million)

(U) **FY1999 Plans:**

(U) **Shared Resource Centers:** The program will sustain the existing capability and continue the modernization process by acquiring additional HPC systems, storage, and scientific visualization capabilities to populate and upgrade the established MSRCs to fulfill the projected HPC requirements of the laboratories and R&D centers. Contract options will continue to be executed to meet the required performance levels at the four MSRCs, minimally tripling their computing capabilities from the previous performance levels over the two year period (FY 1999 and FY 2000). The program will continue to identify evaluate and prioritize HPC requirements for DCs and will acquire and deploy new systems or upgrades to existing systems as needed to accomplish RDT&E mission needs.

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(U) **Networking:** As researchers take greater advantage of their connectivity to high performance computing systems and other researchers, the bandwidth demands on DREN will continue to grow. As local infrastructures expand, more user sites will be able to take full advantage of the DREN ATM fabric. Thus the majority of the effort in FY 1999 will be to upgrade services to all sites to full ATM compatibility and increase bandwidth. Low end users will be connected at 45 Mbps, mid range users will be connected at 155 Mbps and high range users will be connected at 622 Mbps. Collaborative work will continue with the Federal networking community and standards associations to assure DREN remains compatible with future technology changes. ($ 28.691 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 to their fullest. ($ 22.846 Million)

(U) **MSRC Sustainment:** The program will sustain and support the operation and use of expanding HPC resources at the four Major Shared Resource Centers. The additional funds requested will provide for a full year of sustainment and operations for those systems purchased and deployed in FY 1998. Also partial year sustainment and operations for systems purchased and deployed in FY 1999 is included in the total FY 1999 funding requested. ($ 88.544 Million)

(U) **Distributed Center Sustainment:** Due to program funding limitations recognized in 1996, a decision was made to 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. Only a nominal amount of funding is allocated for DC program management. ($ 0.846 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	122.900	126.211	148.852	Continuing	Continuing
Appropriated Value	122.900	149.880		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(6.216)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(3.808)	(0.488)			
c. Other			(7.925)	Continuing	Continuing
Current President's Budget	119.092	143.176	140.927	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** The funding adjustment in FY 1998 is based on congressional adjustments in the Defense Appropriations Act and inflation adjustments. The funding changes, in FY 1997 and FY 1999, are due to both program budget reductions as well as congressionally directed reductions.

(U) **Schedule:** Not Applicable

(U) **Technical:** In accordance with FY 1998 congressional language, the High Performance Computing Modernization Program will use additional FY 1998 RDT&E funding for operations, sustainment and upgrades at the Maui High Performance Computing Center and the Arctic Region Supercomputing Center.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide / BA 3	R-1 ITEM NOMENCLATURE HIGH PERFORMANCE COMPUTING MODERNIZATION PE 0603755D8Z

(U) C. Other Program Funding Summary Cost

Procurement Line P-1 Line, PROCUREMENT, DEFENSE-WIDE (OSD High Performance Computing - Major Equipment)

($ in Millions)

FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	To Complete	Total Cost
122.682	89.668	82.455	64.997	42.117	52.889	51.866	Continuing	Continuing

MILESTONE SCHEDULE:	**Fiscal Years**
Milestone II Decision Review	1Q 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
FY 1997 HPC Modernization Plan Updated	3Q 1997
MSRC Performance Level 2 Capability Installed	2Q 1997- 3Q 1998
DREN Initial Performance Capability	3Q 1997
FY 1998 HPC Modernization Plan Updated	2Q 1998
IDREN to DREN Transition Complete	4Q 1998
MSRC Performance Level 3 Capability Installed	2Q 1999- 3Q 2000
MSRC Follow-on Contract(s) (Recompete)	2H 2001
DREN Follow-on Contract (Recompete)	3Q 2001

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide / BA 3	R-1 ITEM NOMENCLATURE HIGH PERFORMANCE COMPUTING MODERNIZATION PE 0603755D8Z

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

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3					R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office PE 0603832D8Z				
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	56.945	61.460	70.696	71.136	70.984	72.147	73.657	Continuing	Continuing
JSM/P476	56.945	61.460	70.696	71.136	70.984	72.147	73.657	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT:**

(U) This program element was established in response to congressional guidance to coordinate simulation policy, to establish interoperability standards and protocols, to promote simulation within the military departments, and to establish guidelines and objectives for coordination of simulation, war-gaming, and training. As a consequence, modeling and simulation (M&S) can substantially improve capabilities and decision making in each of the four pillars of military capability: (1) readiness; (2) modernization ; (3) force structure; and (4) sustainability. In order to promote effective and efficient use of M&S within the Department of Defense (DoD), this program element has facilitated significant advances in M&S in four areas: architectures, standards, and protocols; representation of the environment, systems, and human behavior; fielding of M&S and associated infrastructure; and outreach activities. As a result, there is better sharing of information, capabilities, and resources within and among key DoD (M&S) communities.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office PE 0603832D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	56.945	61.460	70.696	71.136	70.984	72.147	73.657	Continuing	Continuing
JSM/P476	56.945	61.460	70.696	71.136	70.984	72.147	73.657	Continuing	Continuing

(U) **Project Number and Title: P476 Cost JSM**

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

(U) **FY1997 Accomplishments:**

(U) Assessed DoD simulation programs for High Level Architecture (HLA) compliance; identified modification to legacy system to interoperate through HLA; identified requirement for industry standardization of HLA components; developed reference implementation of Runtime Infrastructure software; continued development of support software, including testing and Federation Object Model (FOM) development tools; identified security architecture for HLA. ($ 22.628 Million)

(U) Completed development of Modular Reconfigurable C4I (MRCI) prototype, an HLA-based C4I system interface; applied MRCI prototype software in Synthetic Theater of War (STOW) Advanced Concept Technology Demonstration (ACTD) tests and HLA/C2 experiments; conducted technical assessment of the prototype to focus future activities. ($ 1.580 Million)

(U) Common Operational Modeling, Planning and Simulation Strategy (COMPASS) services integrated within the Defense Information Infrastructure (DII) Common Operating Environment (COE) version 3.0 level 8 compliant; completed integration with 19 C4I and M&S systems; conducted operational assessment of COMPASS at the Joint Battle Center and Warfighter familiarization at 12 sites and coordinated the assessment and fielding plan with the Joint Staff. ($ 1.430 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
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(U) Generated version 0.3 of the Conceptual Models of the Mission Spaces (CMMS) Technical Framework for simulation implementation-independent functional descriptions of mission space processes, entities, and environments; completed the CMMS prototype, conducted user evaluations of the CMMS Technical Framework using prototype CMMS capabilities, and began development of operational CMMS; compiled and deployed a Noun/Entity database (8742 entries), a Task Performer/Noun Dictionary (2700 entries), a comprehensive Task I/O database (7000 data elements), a Military Mission Tasks list (1424 entries), and a Verb Dictionary (1300 entries), and CSS CMMS Ontological Tool on the World Wide Web (WWW); developed and deployed a comprehensive Unified Modeling Language usage guide for the JSIMS CMMS Integrated Product Team (JCMMS IPT). ($ 2.560 Million)

(U) Completed the preliminary design and initial population of a Tools Catalog for the Atmosphere and Space environmental domain; completed the evaluation of a high resolution terrain database for dismounted operations in urban terrain; completed initial evaluation of the requirements for an integrated surf zone representation model with initial input of algorithms and data into the Synthetic Theater of War (STOW) and JOCKS programs; expanded availability of resources through the Master Environmental Library including access to non-DoD repositories; demonstrated the interchange of synthetic environment databases through use of a common data model and application program interfaces. ($ 12.646 Million)

(U) Developed an HLA Object Model Data Dictionary System (OMDDS) and Object Model Data Dictionary DIF (OMDD DIF) for the interchange of OMDD information among HLA components; identified, designated, and made 500 Authoritative Data Sources (ADS) available to support M&S; developed a prototype Order of Battle Interchange Format (OB-DIF) and scenario generation tool for implementation on the Classified M&S Resource Repository (CMSRR); conducted a demonstration of the Data Engineering Process by the Services and Joint Staff; completed the initial development of the Data Verification Interactive Editor/data quality tool; prototyped IDEFObject for complex data representations; generated version 0.2.0 of the Data Engineering Technical Framework (DE-TF); reverse engineered existing resource repositories and developed activity, work flow, and information models in support of a Cataloging and Registration Specification (CARS) for the M&S Resource Repository (MSRR); began integrating end-user data verification, validation, and certification (VV&C) guidelines into the model verification, validation, and accreditation (VV&A) recommended practices guide; prototyped a complex data solution for selected M&S applications; analyzed tools to support complex data implementations; developed the prototype and distributed a set of M&S 3D visual models; expanded DIF's to include key data areas supporting M&S federation development; expanded the Data Quality Engineering (DQE) tool to comply with open database connectivity (ODBC) standards; initiated and completed Validation, Verification and Certification (VV&C) studies. ($ 5.970 Million)

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(U) Continued study of state-of-the-art/state-of-practice for human behavior representation; established requirements and priorities of human behavior representation; established initial human behavior representation conceptual framework; initiated study of character development in entertainment industry. ($ 1.002 Million)

(U) Prototyped the process/methodologies defined in the VV&A Recommended Practices Guide (RPG); collected lessons learned from the prototype effort and other applications of the methodologies defined in the RPG; used lessons learned to develop a phased approach to RPG enhancement and evolution; initiated development of capstone VV&A information formats for the MSRR. ($ 0.381 Million)

(U) Developed and prototyped configuration control procedures and tools to access, modify, and update the resources in the MSRR; completed MSRR prototyping. ($ 3.248 Million)

(U) Expanded prototype Modeling and Simulation Operational Support Activity (MSOSA) operations capability to serve DoD acquisition and analysis of Modeling and Simulation domain, as well as continued support to the training domain; assessed expanded prototype MSOSA's performance and adjust structure and procedures accordingly. ($ 2.150 Million)

(U) Refined the analytical framework for M&S impact assessment; published training and analysis impact assessment. ($ 0.710 Million)

(U) Developed DoD-wide M&S staff officer education and training plan; conducted technical seminars, workshops and symposia on M&S; initiated transition of executive level course to the WWW; identified critical needs/shortfalls M&S technologies required to support the DoD acquisition process; inserted M&S technology in major joint warfighter exercises; implemented integrated training and education program for HLA. ($ 2.640 Million)

(U) **FY1998 Plans:**

(U) Continue development of support software for testing and FOM development; incorporate modification to legacy systems to interoperate through HLA; competitive procurement process for Runtime Infrastructure software to be completed; continue development, integration, test and standardization. ($ 20.766 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Joint Wargaming Simulation Management Office PE 0603832D8Z

(U) Continue experimental development of simulation interface to C4I systems to refine requirements and develop functional specifications for simulation, data exchange, data interchange formats and C4I systems; collaborate effort with Defense Information Systems Agency (DISA) and Defense Advanced Research Projects Agency (DARPA) to integrate simulation services in DII COE Ver. 3.2 and support integration of non-DII COE C4I systems with HLA-compliant simulation federations. ($ 2.000 Million)

(U) Integrate operational CMMS into M&S Resource Repository (MSRR); continue to integrate Component knowledge acquisition projects into CMMS; conduct research and integrate new technology into CMMS. ($ 2.505 Million)

(U) Continue development of HLA related data standards and associated OMDDS and OMDD DIF; complete the identification and designation of approximately an additional 1000 ADS and initiate formal life-cycle maintenance. Develop a Cataloging and Registration Specification (M&S CARS) as a standard for the M&S Resource Repositories (MSRR) implementation; demonstrate distributed data quality guidelines, tools, and utilities; coordinate and promulgate the Data Engineering Technical Framework (DE-TF) as a DoD Instruction; establish Common Semantics and Syntax (CSS) and associated Data Interchange Formats (DIF's) for HLA, CMMS, Order of Battle (OB), targets\facilities, and Synthetic Environments Data Representations Interchange Specification (SEDRIS) as DoD data standards; complete the integration of end-user data VV&C guidelines into the model VV&A recommended practices guide; begin development of producer Data Quality Assurance guidelines; complete the development of the Data Quality Tool and distribute/install at DoD locations; develop data standards for the authoritative representation of the natural environment, units and systems with a focus on SEDRIS for the natural environment and on AIAA standards for aviation related representations; develop standards and procedures for employing IDEFObject, UML, and STEP to specify complex data; demonstrate distributed data security policies and procedures; provide Functional Data Administration for M&S in accordance with DoDD 8320.1; develop tools to perform complex data work; enhance Data Interchange Formats (DIFs) to cover specific areas of data; prototype the means to allow automated data retrieval for classified and unclassified data. ($ 6.070 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) Develop and deliver the first operational build of the CMMS common repository to support integration and exchange of campaign-level analysis and training related knowledge acquisition products, especially in JWARS and JSIMS; extend the CMMS Technical Framework to include hardware/software implementation-independent functional specifications for synthetic representations of the natural environment, units and systems; develop and establish the Common Semantics and Syntax (CSS) and associated Data Interchange Formats (DIF's) for CMMS subject matter descriptions; develop and demonstrate knowledge acquisition tools and utilities to support CMMS activities; conduct CMMS evaluation experiment to establish scope, priority, and compatibility of acquisition and operational test and evaluation related CMMS requirements with products developed to support campaign-level analysis and training related activities; continue to develop security policies for the Modeling and Simulation Resource Repository as the application of M&S is enhanced and expanded; continue investigation of technology required for federating simulations. ($ 2.205 Million)

(U) Demonstrate the capability to produce standard terrain data to meet M&S functional area requirements contained within a nominal 2500 Km^2 area (with three-dimensional terrain, including three-dimensional man-made features, reasonably attributed), within 72 hours; demonstrate the initial capability to generate and /or receive and apply data updates to standard synthetic environment databases from multiple sources and document the configuration control process; expand the content of the Tools Catalog to all environmental domains; define reference processes to ensure consistency and correlation in natural and man-made perturbations on ocean, atmosphere, and space representations; complete development of an interchange specification for environmental data and integrated databases. ($ 12.442 Million)

(U) Initiate development of prototypes that address critical DoD Acquisition Reform requirements for the implementation of life-cycle based simulation technology; assess state-of-the-art M&S technology for insertion into on-going major defense acquisition program developments. ($ 3.900 Million)

(U) Test and refine proposed conceptual framework through selected individual Human Behavior Representation efforts; implement prototype efforts of various categories and human behavior variables; establish initial human behavior representation conceptual framework for organizational units; complete study of character development in entertainment industry. ($ 1.180 Million)

(U) Initiate Phase I of RPG modifications, focus will be placed on document consistency and integration of VV&A concepts with other key DMSO initiatives such as the CMMS, end-user data VV&C, HLA, MSRR, and MSEAs; initiate study efforts to identify and define: risk assessment methodologies, the underlying decision-making framework, return on investment (ROI) associated with defined VV&A techniques, and the derivation of VV&A cost metrics; identify VV&A tool set deficiencies and develop tool specifications. ($ 1.600 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) Provide limited operational capability for configuration control procedures and tools to access, modify, and update the resources (e.g., process models, data models, directories, data, algorithms, models and simulations, authoritative data sources) in the MSRR; populate MSRR and develop transition requirements; modify software based on user requirements; establish full time information domain coordinators; continue documentation of MSRR. ($ 3.208 Million)

(U) Develop and expand capabilities to include increased interoperability to real world C2 systems, planning tools, and other modeling and simulation assets; assess MSOSA performance and adjust structure and procedures to meet evolving user needs; develop full scale MSOSA Operational Support Activity; upgrade MSOSA operational support system to incorporate current developments in electronic information research and network technologies. ($ 3.218 Million)

(U) Initiate the Impact Assessment of M&S in support of acquisition programs; revise analytical framework to incorporate the impact of inserting M&S tools into the acquisition process; develop capstone document to address overall impact of M&S.
($ 0.944 Million)

(U) Finalize DoD-wide M&S education and training plan; expand M&S executive level course to incorporate acquisition process; Conduct technical seminars, workshops and symposia on M&S; insert M&S technology into major joint warfighter exercises. ($ 1.422 Million)

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(U) **FY1999 Plans:**

(U) Continue development of HLA technology, prototypes of enhanced capabilities and applications of advanced technology; expand support, including high performance infrastructure for users of modeling and simulation, to enable them to exploit fully the increased capabilities that will be fielded under the HLA initiative, to include JSIMS and JWARS; design, develop and prototype the M&S technologies required to implement technology needed to federate simulations operating at different levels of security to support simulations in applications for training, analysis and acquisition. ($ 19.766 Million)

(U) Develop and deliver the second operational build of the CMMS common repository to support integration and exchange of campaign-level analysis and training related knowledge acquisition products, especially in JWARS and JSIMS; begin development and delivery of the first operational build of the CMMS common repository to support engineering and engagement level of detail in acquisition and operational test and evaluation related simulations; extend the CMMS Technical Framework to include hardware/software implementation-independent functional specifications for military operations and human behavior; continue the development of the Common Semantics and Syntax (CSS) and associated Data Interchange Formats (DIF's) for CMMS subject matter descriptions; develop and demonstrate knowledge acquisition tools and utilities to support CMMS activities; develop and promulgate the campaign-level analysis and training related standards in the CMMS Technical Framework as a DoD Instruction. ($ 6.000 Million)

(U) Continue development of HLA related data standards and associated OMDDS and OMDD DIF; update maintain required M&S ADS data; extend CARS to support additional repository requirements, security and release policies and procedures; promulgate producer Data Quality Assurance guidelines as a DoD Instruction; integrate Data Quality tool with data retrieval process to allow automated data quality/accuracy checking; distribute/install Data Quality tool at additional DoD locations; review and update DE-TF to ensure appropriateness; maintain DIF's for HLA, CMMS, OB, targets\facilities, and SEDRIS; establish CSS and associated DIF's for additional environmental representations and for units and systems; continue develop data standards for the authoritative representation of the natural environment, unit and systems with a focus on complex data; begin data standards development for the authoritative representation of military operations and human behavior; continue to nominate and obtain final standards approval for other M&S data elements and 3D visual models for inclusion in the DoD Data Dictionary System (DDDS); assess Data Security requirements for on-going M&S efforts, including CARS and MSRR; provide Functional Data Administration for M&S in accordance with DoDD 8320.1. ($ 7.070 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) Incorporate known fixes for the simulation interfaces to C4I systems; refine requirements and further develop functional specifications for simulation, data exchange, data interchange formats and C4I systems; continue collaborate effort with Defense Information Systems Agency (DISA) and Defense Advanced Research Projects Agency (DARPA) to integrate simulation services in DII COE Ver. 3.2 and support integration of non-DII COE C4I systems with HLA-compliant simulation federations. ($ 3.150 Million)

(U) Demonstrate the initial capability to produce integrated terrain, ocean and atmosphere data to meet M&S functional area requirements contained within a nominal 2500 Km^2 area (with three-dimensional terrain, including three-dimensional man-made features, reasonably attributed), within 72 hours; develop a standard methodology for interconnecting simulations using environmental models of differing resolution; demonstrate the capability to generate and receive data updates from multiple sources, and apply them to databases supporting engineering-grade synthetic environments (including full documentation of all appropriate configuration control and certification processes); transition the interchange specification for environmental databases to a designated office of primary responsibility for configuration management and user support. ($20.860 Million)

(U) Standardize conceptual framework for individual human behavior representation; test and refine proposed conceptual framework through selected organizational unit Human Behavior Representation efforts; implement prototype efforts of various categories and human behavior variables; establish initial human behavior representation conceptual framework for opposing forces. ($ 2.452 Million)

(U) Initiate Phase 2 of RPG modifications, focus will be placed on the capture of information from the FY98 studies incorporating the concepts of risk assessment, decision making, ROI, and cost metrics; develop and incorporate descriptive test cases; analyze service requirements for common DoD VV&A technical guidance; prototype defined tool concepts. ($ 3.650 Million)

(U) Modify and enhance MSRR common, physical and software infrastructure based on network and database state-of-art and user requirements; continue documentation of MSRR; finalize population of a distributed MSRR system providing: (a) directories /catalogs; (b) data standardization resources (e.g., process and data models, data dictionary); (c) reusable data, algorithms, models and simulations; and (d) tools for browsing and accessing, linking across resources, configuration management etc.; initiate transition to appropriate agency; modify software based on user requirements. ($ 3.205 Million)

(U) Initiate the development of tools and automated methods to perform cost and benefit impact assessment as new simulations for training, analysis, and acquisition emerge. ($ 1.543 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) Institute development of fully interactive user, staff officer, manager and executive level courses that address training, acquisition and analysis domains; conduct technical seminars, workshops and symposia; insert M&S technology into major joint warfighter exercises; refine and enhance the capability of the models and simulations developed to support DoD's acquisition process. ($ 3.000 Million)

(U) **ACQUISITION STRATEGY:** Not Applicable

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(U) B. Program Change Summary	FY1997	FY1998	FY1999	To Complete	Total Cost
Previous President's Budget	59.331	71.338	74.614	Continuing	Continuing
Appropriated Value	59.331	64.338		Continuing	Continuing
Adjustments to Appropriated Value					
a. Congressionally Directed undistributed reduction		(2.668)			
b. Rescission/Below-threshold Reprogramming, Inflation Adjustment	(2.386)				
c. Other		(0.210)	(3.918)	Continuing	Continuing
Current President's Budget	56.945	61.460	70.696	Continuing	Continuing

Change Summary Explanation:

(U) **Funding:** Funding changes are the result of Congressionally undistributed reductions as well as program budget adjustments.

(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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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	19.096	23.095	17.939	31.792	32.252	31.324	31.598	31.999	Continuing	Continuing
PHYSICAL SECURITY EQUIPMENT PSE P228D8Z	19.096	23.095	17.939	31.792	32.252	31.324	31.598	31.999	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 4 based on the demonstration/ validation activities ongoing within the program. The purpose of this program is to develop physical security equipment (PSE) systems and to safeguard DoD acquisition information for all DoD components, to include Force Protection. This program supports the protection of Nuclear Weapons, tactical and nuclear weapons systems, DoD personnel and DoD weapon systems. Funding for critical RDT&E security improvements within service channels has fluctuated widely over the years and prompted the consolidation of the Services and Defense Special Weapons Agency (DSWA) PSE RDT&E funds into this single OSD controlled program element.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS: This program was originally formed by the Congressional consolidation of the three Services and the DSWA RDT&E PSE budget submissions for FY 1989. 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 Special Weapons Agency (DSWA) representatives monitor, direct, and prioritize potential and existing PSE programs. With few exceptions, each Service sponsors RDT&E efforts for technologies and programs which have multi-service applications. In several cases, applications are unique to only one service. The funds are also employed to evaluate exploratory development of Physical Security Equipment. This program element supports the Army's advanced and engineering development of Interior Detection, 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 area of Exterior Surveillance, Entry Control and Airborne Intrusion. Finally, the program supports Navy RDT&E efforts

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in the areas of Shipboard Security, Waterside Security, Explosive Detection, Locks and anti-compromise/emergency destruction of classified material equipment. Recent concerns regarding the protection of DoD weapon systems acquisition information at DoD RDT&E facilities has led to an expanded role for this Program Element since FY 1995. Beginning with FY 97, this PE includes funding for Force Protection Commercial-Off-The-Shelf (FP COTS) evaluation and testing, which has received focus since the 1996 Khobar Towers bombing incident. This FP COTS testing applies to all available technologies which are considered for effective DoD use.

(U) FY 1997 Accomplishments:

FORCE PROTECTION COMMERCIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (4.397 million)

- Developed a FP COTS testing methodology.
- Began review of User Force Protection requirements.
- Prepared a market survey, to develop, and produce a listing of Commercially available Non Developmental Items for Force Protection uses.
- Performed crosswalk of requirements and available technologies.
- Developed a database to meet test support resource requirements.
- Identified and prioritized technologies for FP COTS testing and evaluations in both FY 1997 and 1998.
- Performed test and evaluations of selected COTS equipment/systems.
- Published a FY 1997 FP COTS test and evaluation guide.
- Hosted a Force Protection Equipment Demonstration at Quantico, VA to demonstrate Commercial-Off-the Shelf Force Protection capabilities to government users.

TACTICAL AUTOMATED SECURITY SYSTEM (TASS) (1.035 million)

- Completed Full production RFP documentation.

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- Production RFP released June 1997.
- Initiated source selection.
- Developed RF datalink and portable monitor upgrade.
- Initiated IFF concept investigation.

ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.250 million)
- Completed Technical Order Verification.
- Initiated installation of equipment supporting QOT&E.
- Conducted system functional tests to confirm system performance and correction of deficiency corrections.

ADVANCED EXTERIOR SENSOR (AES) (0.300 million)
- Accomplished program transition from DSWA to Air Force.
- Identified risk reduction activities.
- Prepared system functional description.
- Initiated acquisition strategy development.

DELAY/DENIAL--SABER 203 (2.540 million)
- Continued Engineering and Manufacturing Development phase of program.
- Completed Contractor Test and Evaluation for the Saber 203 system.
- Initiated contracting action for development of an Eye Safe at the Aperture (ESATA) product improvement project.
- Built equipment sets for Operational Test and Evaluation.
- Initiated Hinder Adversaries with less than Lethal Technology (HALT) (ESATA) ED contract.

WEAPON STORAGE AREA UPGRADE AND FLIGHTLINE SECURITY ENHANCEMENT (0.375 million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
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- Transitioned exterior Video Motion Detection (VMD) project from TASS.
- Developed VMD product functional description for integration with CCTV or thermal cameras.
- Characterized operational requirements for the USAFE Flight Line Security Enhancement Program (FSEP).
- Developed system architecture for FSEP.

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.615 million)

- Completed design prototyping of platform computer, IDS and navigation enhancements.
- Conducted Category II and III console (MRHA) development and testing.
- Developed draft specification and draft RFP components for EMD/Production contract.
- Anniston Army Depot selected as early user appraisal (EUA) site.
- Completed RF tag market study and two new technology updates.
- Successfully completed technical feasibility test II.
- Completed preparatory phase of MDARS-I EUA.
- Completed MDARS-I platform development and prototyping.
- Completed installation phases of MDARS-I EUA.
- Prepared IPR and RFP packages.

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (3.611 million)

- Completed initial design of MDARS-E vehicle, and prototyped one unit for development of payload subsystems.
- Completed final design iteration of MDARS-E vehicle.
- Successfully completed informal vehicle test Aberdeen Test Center Robotics Test Course.
- Completed and prototyped first design iteration of internal locking device (ILD).
- Identified interest and initially coordinated MDARS-vehicle use and evaluation by UGV/S JPO, TARDEC, USAF and ARL.

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

- Completed initial design and integration of vehicle mission payloads and subsystems.
- Conducted design review and demonstration of integrated vehicle with subsystems.
- Integrated SARNOFF VFE-100 collision avoidance and IDS subsystem into vehicle.

HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.381 million)
- Completed initial staffing of operational requirement document (ORD).
- Completed trade-off analysis (approved July 1997).
- Initiated miniaturized radio frequency identification (RFID) tagging and tracking.
- Completed Milestone I requirement.
- Transitioned to acquisition phase I.

PLATOON EARLY WARNING DEVICE II (PEWD-II) (0.391 million)
- US Army Infantry Center designated the combat developer.
- ORD approved by TRADOC.
- Initiated market investigation to identify NDI/COTS systems candidates.
- Conducted initial technical testing on four potential candidate NDI/COTS systems.
- Completed market investigation of NDI/COTS equipment.
- Developed program management plan.
- Developed acquisition strategy and plan.
- Evaluated candidate NDI/COTS systems including USAF TASS to determine requirements shortfalls.

WATERSIDE SECURITY SYSTEM (WSS) (1.955 million)
- Completed Phase I & II of a WSS ATD at Submarine Base Kings Bay, GA; trained 54 USN personnel.
- Interoperability issues of WSS /Intrusion Detection Distributed Array (IDDA) resolved.
- Completed planning for WSS technology insertion at New London.
- Tested uncooled TI sensor technology.

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- Provided swimmer detection sonar for naval ships a Mina Salman Pier in Bahrain.
- Completed all sonar integration efforts at SUBASE Bangor.
- Conducted ATD at SUBASE Kings Bay (included sonar technology).
- Conducted transportable WSS demonstration in San Diego.

SHIPBOARD PHYSICAL SECURITY (SPS) (0.645 million)
- "Smart Ship" installation drawings completed.
- "Smart Ship" equipment tested and modified for shipboard installation.
- "Smart Ship" digital CCTV integration completed.
- Examined and continue to examine PSE requirements for the "Arsenal Ship".
- Evaluated COTS technologies for SPS applications.
- Completed "smart ship" installation effort and prepared ILS documentation.

DoD LOCK PROGRAM (1.465 million)
- Executed Security Technology Project.
- Completed ILD production drawings.
- Established and chaired security seals core user group.
- Conducted COTS evaluation of access control systems.
- Completed security seal guidance manual.

PORTABLE EXPLOSIVES DETECTION (0.050 million)
- Continued market survey of COTS vendors.
- Continued assessment of current technologies.
- Completed COEA Report.
- Determined that no commercial product(s) can meet the Operational Requirement.

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- Re-evaluated and expanded the scope of effort.
- Prepared Management Plan for expanded program.
- Began review of wide range of COTS.

ANTICOMPROMISE EMERGENCY DESTRUCT (ACED) (0.160 million)
- Completed design of encryption system.
- Completed design of control software.
- Initiated procurement of circuit boards.
- Prepared Management Plan for expanded program.
- Began review of wide range of COTS.

ELECTRONIC SECURITY SYSTEM (ESS) (0.425 million)
- Completed all support efforts to the Pentagon ISIS effort.
- Completed all support of the MARC effort.
- Continued to provide direct technical contractor support.

TECHNOLOGY BASE (2.500 million) Completed and demonstrated prototype hardware for the self-powering wireless sensor, the passive millimeter wave sensor for exterior applications, the advanced exterior sensor system (AES), the millimeter wave data link. In addition, initiated new service sponsored projects for an improved laser diode, miniaturized radio frequency tags, underwater security vehicle with acoustic guidance, sonic denial systems, and an acoustic detection and classification sensor for use on a mobile platform. Initiated the development of a passive optical motion sensor, tactical security sensor integration and advance interfaces, and improved anti-tailgate detection.

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

(U) FY 1998 Plans:

FORCE PROTECTION COMMERICIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (2.539 million)
- Publish User's Guide of Commercially available Non Developmental Items for Force Protection uses.
- Update methodology and publish evaluation and test schedule for FY 1999.

TACTICAL AUTOMATED SECURITY SYSTEM (TASS) (1.194 million)
- Design a secure radio frequency (RF) network for TASS.
- Design and implement an RF Video Link for Thermal Imagers.
- Investigate new COTS security sensors.
- Initiate passive millimeter wave sensor development project.

ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.175 million)
- Investigate interface requirements for, and potential use of, state of the art COTS security system components and sensors as part of the AECS product baseline.
- Incorporate Video Storage System (VSS).

ADVANCED EXTERIOR SENSOR (AES) (0.455 million)
- Release RFP and award contract for prototype system demonstration.

DELAY/DENIAL--SABER 203 (1.592 million)
- Complete Saber 203 OT&E.
- Finalize Saber 203 system production baseline.
- Initiate Hinder Adversaries with less than Lethal Technology (HALT) "Proof of Concept" demonstration.

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- Prepare for DSWA transition of Laser Countermeasures project.
- Transition Laser Diode improvement program from DSWA to USAF.

WEAPON STORAGE AREA UPGRADE AND FLIGHTLINE SECURITY ENHANCEMENT (0.584 million)

- Test, evaluate & qualify VMD products for integration in existing surveillance camera systems and generate procurement specifications.
- Investigate the utility of an AES based VMD application.
- Complete investigation of Video Storage System (VSS) to improve capability of existing alarm annunciation systems.
- Investigate PRLS for IDS applications.

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.448 million)

- Conduct system functional review (SFR).
- Complete final development of MDARS-I command and control capabilities of the MDARS console (MRHA).
- Conduct In-Process Review (IPR).
- Release EMD RFP and conduct EMD source selection.
- Award EMD contract (CPFF).

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (2.205 million)

- Complete initial development of command and control capabilities for MDARS-E vehicle into the MDARS console (MRHA).
- Complete second design iteration and prototype the ILD.
- Install ILD at initial operational evaluation site.

HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.174 million)

- Finalize ORD.
- Obtain HQDA validation of ORD.

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- Prepare RFID BAA.
- Award RFID contract.
- Continue miniaturization RF tagging/tracking effort.

PLATOON EARLY WARNING DEVICE II (PEWD-II) (0.109 million)
- Conduct trade-off analysis and trade-off determination.
- Develop technical development plan.
- Develop logistics concept.

INTEGRATED COMMERCIAL INTRUSION DETECTION DEVICE (ICIDS) (.164 million)
- Conduct market surveillance supporting technology insertion.

WATERSIDE SECURITY SYSTEM (WSS) (1.549 million)
- Conduct sonar testing at SUBASE Kings Bay.
- Test and evaluate COTS WSS related technologies.
- Transition Intrusion Detection Distributed Array (IDDA) and integrate into the WSS.

SHIPBOARD PHYSICAL SECURITY (SPS) (1.054 million)
- Test and integrate into SPS emerging technologies (miniature cameras, RF personnel tracking system, CCTV with built-in motion detection, Adaptive Sensitivity Technology, digital video recorder technology, facial recognition and other biometric technologies).
- Evaluate COTS lighting systems for SPS.
- "Smart Ship" after action report and lessons learned.
- Develop Baseline Security System configuration for CVN-76 (Ronald Reagan class).

DoD LOCK PROGRAM (1.247 million)

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- Complete ILD design package.
- Field Hotline Database.
- Distribute NSI destruction guidance CD-ROM.

PORTABLE EXPLOSIVE DETECTION (PED) (0.300 million)
- Provide product recommendations to users.
- Review current ORD for ED.
- Submit draft ORD for ED to JRWG.

ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.150 million)
- Provide final design to user community.

TECHNOLOGY BASE (2.000 million) Complete and demonstrate prototype hardware for the improved laser diode, miniaturized radio frequency tags, the underwater security vehicle with acoustics guidance, and the acoustic detection and classification sensor systems. In addition, initiate projects to identify improved tactical sensors, thermal camouflage techniques, millimeter wave imaging to detect threats at distance of ten meters, a long range intruder equipment detection sensor, and smart shipping and storage container. If funds are adequate, initiate additional projects as identified by the Services.

(U) FY 1999 Plans:

FORCE PROTECTION COMMERCIAL-OFF-THE-SHELF ASSESSMENTS (FP COTS) (11.956 million)
- Perform scheduled FY 1999 test and evaluations of selected COTS equipment/systems.
- Publish appropriate reports.
- Update a User's Guide of Commercially available Non Developmental Items for Force Protection uses.
- Update methodology and publish test and evaluation schedule for FY 2000.

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

TACTICAL AUTOMATED SECURITY SYSTEM TASS (0.700 million)
- Continue to investigate new COTS and developed security sensors.
- Integrate Automatic Alarm Assessment into TASS Annunciator to provide immediate visual assessment of alarms.

ADVANCED ENTRY CONTROL SYSTEM (AECS) (0.100 million)
- Investigate interface requirements for, and potential uses of, state of the art COTS security system components and sensors as part of the AECS baseline.

ADVANCED EXTERIOR SENSOR (AES) (2.800 million)
- Initiate design, fabrication and Contractor Test and Evaluation of prototype system.

DELAY/DENIAL--SABER 203 (1.800 million)
- Complete QT&E and IOT&E on HALT (ESATA) system.
- Initiate Saber 203 system laser diode product improvement acquisition contract.

WEAPON STORAGE AREA UPGRADE AND FLIGHTLINE SECURITY ENHANCEMENT (0.300 million)
- Continue Advanced Systems Concepts project.
- Integrate VMD products with annunciator and perimeter sensors to improve operator awareness.
- Award EMD contract.

MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - INTERIOR (MDARS-I) (2.961 million)
- Initiate and complete pre-planned product improvements (P3I) to develop capabilities which will satisfy the final phase requirements of the ORD.
- Conduct TT/OT.

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MOBILE DETECTION ASSESSMENT RESPONSE SYSTEM - EXTERIOR (MDARS-E) (2.724 million)
- Deliver one system to Aberdeen Test Center (ATC) to begin technical testing and training.
- Conduct a multi-unit early user appraisal at an operational site.
- Conduct Milestone I/II In Process Review (IPR).

HIGH VALUE ITEM SECURITY SYSTEM (HVISS) (0.176 million)
- Complete EMD requirements.
- Demonstrate system.

PLATOON EARLY WARNING DEVICE (PEWD II) (0.110 million)
- Perform system modifications according to Force XXI approved P3I.
- Conduct TT/OT on Enhanced PEWD II system.

INTEGRATED COMMERCIAL INTRUSION DETECTION DEVICE (ICIDS) (0.165 million)
- Conduct market surveillance supporting technology insertions.

WATERSIDE SECURITY SYSTEM (WSS) (1.800 million)
- WSS Installation of NAVSTA Mayport.
- As a result of US/Israel and US/Korean Senior National Representative meeting(s) work with Israel and Korea to provide assistance with a harbor Defense System for those countries.

SHIPBOARD PHYSICAL SECURITY (SPS) (1.185 million)
- Work closely with Military Sealift Command (MSC) to upgrade security systems onboard MSC pre-positioned vessels.
- Develop baseline configurations for integrated security systems for all classes of Navy ships.

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DoD LOCK PROGRAM (1.365 million)

- Continue development, design, procurement support for locks, safes, vaults, seals and containers in support of overall DoD assets protection requirements.
- Products include reports on materials studies, attack tools, electronic media protection systems, internal locking device designs for special assets.
- Continue user support through DoD Lock Program hotline.

PORTABLE EXPLOSIVE DETECTION (PED) (0.400 million)

- Expand to include all operational requirements for explosive detection.
- Interoperability specification will be written to ensure compatibility of different operating systems.
- Commercial Item Descriptions will be written to support procurement of explosive detection equipment for small, medium and large quantities at portals of various configurations.

ANTICOMPROMISE EMERGENCY DESTRUCT (AECD) (0.250 million)

- Complete work on encryption devices to protect data in high threat operational environment.
- Will transition to include both routine and emergency destruction of information stored on media other than paper in high threat operational environments.

TECHNOLOGY BASE (3.000 million) Complete and demonstrate prototype hardware for the improved tactical sensors, thermal camouflage techniques, millimeter wave imaging device, long range intruder detection sensor, and a smart shipping and storage container. In addition, initiate additional projects as identified by the Services.

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B. Program Change Summary ($ million)

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	22.107	31.553	32.536	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Appropriation Reduction		(12.877)		
b. Congressionally Directed Undistributed Reduction		(0.737)	(0.744)	
Current Budget Submit/President's Budget	22.107	17.939	31.792	Continuing

Change Summary Explanation:

Funding: Funding changes are due to undistributed congressional reductions and inflation adjustments.

Schedule: N/A

Technical: N/A

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE PHYSICAL SECURITY EQUIPMENT PE 0603228D8Z

C. Other Program Funding Summary

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Compl	Cost
Procurement Line P-1 No(s)	- N/A								
Milcon Project No(s)	- N/A								
Related RDT&E:	- N/A								

D. Schedule Profile

Fiscal Year actual and planned events by quarter:

	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
MDARS-I						ΔMSI/II						
MDARS-E											ΔMSI/II	
TASS		ΔMSIII										
SABER 203							ΔMSIII					
AES			ΔMSI									
WSS			ΔMSIII									
Engineering Milestones												
N/A												
T&E Milestones												
MDARS-I	TFT			EUA								

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MDARS-E

DT&E

HVISS EUA DTII

DT&E OT&E

SABER 203

Contract Milestones

N/A

Other Program Events

FY2000	- MDARS-I - MSIII
	- AES - MS II
	- DT&E/OT&E
FY2001	- MDARS-E - MSIII
FY2003	- AES - MS III

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE
	February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics 0603708D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete
P708 Integrated Diagnostics Demonstration	9.255	6.257	3.436	2.891	2.941	3.071	3.226	Continuing

(U) A. Mission Description and Budget Item Justification

The program element provides funding for large scale, high leverage demonstrations of the integrated application of existing commercial and DoD technologies, practices, standards and products for order of magnitude weapon system affordability and support improvements. Demonstrations are selected to 1) measure the risks and show the feasibility of payoff from selected technology applications and 2) show novel or unorthodox alternatives to conventional weapon system acquisition and support. Demonstrations underway show technology applications which provide a highly integrated and automated set of weapon system support capabilities (built in test, factory, depot, and test equipment, technical information, etc.). The demonstrations are intended to lead to reduced maintenance man-hours, "per weapon system" deployment tails, and weapon system acquisition and ownership costs. New demonstrations examine leveraging industry manufacturing processes and integrated acquisition processes/technology approaches to address systemic weapon system production and support affordability drivers. Demonstrations examine implementation risks and cross-phase impacts of alternative approaches to mitigate DoD imposed production and support business inefficiencies.

As preconditions to initiating a demonstration, Service managers commit to provide the R&D or procurement investment to transition the products to the selected demonstration field weapon system fleet and to incorporate products and concepts into new weapon systems designs for long-term payoffs. Generic products are migrated for DoD-wide use.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE: Integrated Diagnostics 0603708D8Z

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

Descriptions of the FY1997-FY1999 demonstrations:

The **Joint Factory-to-Field Test Integration Demonstration** will establish definitions of key elements and interfaces in automatic test systems (ATS) to establish a generic ATS open-systems architecture. The architecture will support joint-Service test equipment interoperability and rehostability of test software, instrument interchangeability and scalability on a variety of defense and commercial testers. Anticipated benefits include the ability to reapply factory test systems for field maintenance testing; improved interoperability among test systems; increased use of commercial products; and continued support of legacy test systems in new test environments.

The **Trident Launcher Integrated Diagnostics Demonstration** will show the feasibility of using a real-time, shipboard monitoring and diagnostics system for the launcher subsystem. On-board monitoring will provide greater visibility of launch system readiness and reduce maintenance requirements. The demonstration system will outfit the launcher subsystem with new diagnostic sensors and processors linked together in an integrated network for real-time and off-board analysis substantially improving weapon system assureity, supporting failure "prediction" to reduce the potential for catastrophic failures, and reducing removals of still-good assets.

The **Diagnostics for Acquisition Demonstration** will show the feasibility of using DoD test systems to ensure purchases and repair returns of Commercial-Off-The-Shelf (COTS) products are compatible with the existing test infrastructure. The demonstration will examine the use of test hardware and software to validate component reprocurements using performance specifications. Demonstrations include a series of in-use trials and off-weapon system diagnostics tests of modules from a COTS aircraft flight control computer.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE Integrated Diagnostics 0603708D8Z

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

The **Open Architecture Demonstration** will show the feasibility of establishing a common open-systems architecture for Integrated Diagnostics approach. Definitions of key interfaces will be established to facilitate multi-Service logistical support interoperability and support multi-user applications such as industry/DoD and acquisition/field users. The demonstration will support the Department's Open Systems Joint Task Force initiatives.

The **Field Diagnostics Demonstration** will show the feasibility of using diagnostic modeling and functional performance testing for fault detection and isolation of electronic systems. The demonstration will use communication and bus structures to perform additional on-board diagnostic and prognostic tests before removing and replacing the component. The demonstration will develop decision support system for real-time communication and automated sorting and logging of diagnostic maintenance information. Candidate support systems are the Navy's automated maintenance environment, the Air Force's integrated maintenance data system, and the Army's integrated diagnostic support system.

The **Characterization of Commercial Semiconductor Sources Demonstration** will show the feasibility of using integrated circuit (IC) test and diagnostic capabilities to enable the use of parts from a wide variety of manufacturing sources. The demonstration will focus on how to obtain integrated circuits that meet critical military environments from COTS design and fabrication sources. The demonstration will validate the application of diagnostic and simulation techniques (e.g. IC CAD simulation tools) which will assure that products meet defense critical performance needs and that they can fabricate those products with "as is" commercial manufacturing sources. The demonstration will develop an implementation plan for a sustaining this mechanism through a joint partnership of the design and procurement industries with commercial IC manufacturers.

Program Accomplishments and Plans:

FY1997 Accomplishments: Automatic test system (ATS) instrument interfaces were identified and specifications and rules for critical hardware and software elements and interfaces were developed for the Factory-to-field Test Integration Demonstration. Candidate system hardware and software areas were identified and the system specifications were established, the

program plan was developed, and the cost evaluation method established for the Trident Launcher Demonstration. Candidate COTS components from the vehicle management system were identified for the Diagnostics for Acquisition Demonstration. Existing system architectures were documented, and case studies were prioritized and begun for the Open Architecture Demonstration.

FY1998 Plans: The use of open architecture interface standards will be demonstrated on a variety of DoD test systems for the Factory-to-field Test Integration Demonstration. Prototype hardware and software will be demonstrated for the Trident Launcher Demonstration. Test hardware and software modifications will be completed for the Diagnostics for Acquisition Demonstration. Candidate architectures and interface standards will be developed for the Open Architecture Demonstration. Test strategies will be developed for the Field Diagnostics Demonstration. Test and diagnostics capabilities will be identified, example products for two or more manufacturers will be characterized, and military performance for products from different manufacturers will be predicted for the Characterization of Commercial Semiconductor Sources Demonstration.

FY1999 Plans: System architecture and interface specifications will be formalized for the Factory-to-Field Test System Demonstration. At-sea demonstration of the Trident Launcher Diagnostic system will be completed. In-field demonstration of the COTS components functional performance test program diagnostics will be completed for the Diagnostics for Acquisition Demonstration. Cross-platform system support demonstrations will be completed for the Open Architecture Demonstration. Test program demonstration will be completed for the Field Diagnostics Demonstration. Implementation plan will be developed for the Characterization of Commercial Semiconductor Sources Demonstration.

(U) B. Program Change Summary	FY1997	FY1998	FY1999	Cost
Previous President's Budget	9.313	6.514	3.518	Cont.
Appropriated Value				
Adjustments to budget year since 1997 President's budget	(0.058)	(0.257)	(0.082)	
Current Budget Submit/President's Budget	9.255	6.257	3.436	Cont.

Change Summary Explanation: Funding changes are due to budget review decisions.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE: Integrated Diagnostics 0603708D8Z

(U) C. Other Program Funding Summary

This Program funds Service managed demonstrations of technologies in the field environment to assess operational benefits. The Service managers are responsible for budgeting for any engineering and manufacturing development, Procurement, and MILCON necessary to transition the technologies to field use.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense-wide / BA-4	R-1 ITEM NOMENCLATURE: Integrated Diagnostics 0603708D8Z

(U) D. Schedule Profile

Fiscal Year events by quarter:	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Joint Factory-to-Field Demonstration												
Identify instrument interfaces			x									
Modify test hardware/software					x							
Complete instrument interface demonstration						x						
Complete test program interface demonstration								x				
Coordinate architecture standards									x			
Trident Launcher Demonstration												
Establish system specifications			x									
Conduct land-based integration tests						x						
Conduct in-field tests											x	
Complete tests and final report												x
Diagnostics for Acquisition Demonstration												
Identify and procure COTS components				x								
Modify test hardware/software							x					
Translate test strategy and rehost on legacy ATS										x		
Complete field demonstration												x
Open Architecture Demonstration												
Document existing system architectures				x								
Develop critical interface definitions							x					
Software modifications complete									x			
Complete cross-platform support demonstrations												x
Field Diagnostics Demonstration												
Document existing false failure indications						x						
Develop in-place F^3I test strategy								x				
Modify diagnostic system hardware/software										x		
Complete demonstration												x

Characterization of Commercial Semiconductor Sources Demonstration				
Identify test and diagnostics capabilities	x			
Characterize example products for two or more manufacturers		x		
Predict military performance for products from different manufacturers			x	
Develop implementation plan				x

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APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z

COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	21.038	27.972	27.085	16.217	13.374	10.858	11.883	9.451	Continuing	Continuing
JRP-P7098Z	21.038	27.972	27.085	16.217	13.374	10.858	11.883	9.451	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 4 based on the demonstration/validation activities ongoing within the program. This PE was established in response to Congressional guidance to consolidate DoD robotics programs on unmanned ground systems and related robotics technologies in order to increase focus of the Services' robotics 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 robotics 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 Engineering and Manufacturing Development (EMD) acquisition projects and (2) enhancement and exploitation of critical robotics technologies for today's and future UGV acquisition requirements. UGV projects under this PE are: (1) the Vehicle Teleoperation (VT) - a generic, modular set of kits that can be used to retrofit several different types of currently fielded Engineer vehicles to allow remote teleoperation capabilities, like obstacle breaching operations (minefields, earthworks, bunkers, etc,), that have supported Operations Joint Endeavor and Joint Guard in Bosnia; (2) the Tactical Unmanned Vehicle (TUV) - a joint Army/USMC effort to develop a telerobotic UGV for the Reconnaissance, Surveillance and Target Acquisition (RSTA) mission, scheduled to go into EMD in 1999; (3) the Robotics Ordnance Clearance System (ROCS) - a USAF effort to develop a robotics/autonomous vehicle capability for area clearance, including active range clearance (ARC). Platforms include the following: All-purpose Robotics Transport System (ARTS), Subsurface Ordnance Characterization System (SOCS), Automated Ordnance Excavator (AOE), and Joint Amphibious Mine Countermine (JAMC). This technology can also be applied to formerly used defense sites for cleanup/disposal; (4) the Remote Ordnance Neutralization System (RONS) - a Navy effort to develop an ordnance neutralization system that performs Explosive Ordnance Disposal (EOD) tasks robotically

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and by teleoperation in chemical, radiation and explosive environments; and a (5) Basic Unexploded Ordnance [UXO] Gathering System (BUGS) - a Joint Service EOD effort to develop a system that will safely clear unexploded improved conventional munitions (ICM) from the surface of large areas. BUGS consists of an autonomous or semiautonomous sensor platform to localize the ICMs and several small expendable autonomous vehicles that use the location data to proceed to the area and perform the required mission. The enhancement and exploitation of critical robotics technologies for today's and future UGV acquisition requirements is centered in the DEMO III program. DEMO III, in part a follow-on to the very successful DEMO II program, is a four year effort to further advance semi-autonomous technologies.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1997 Accomplishments:
General Officer Steering Committee reviewed program status and provided guidance that included establishing, by services, procurement funding, and a Joint Robotics Program Working Group that would be an action officer group tasked with following the developments of robotics in support of unmanned ground vehicles/systems.

VEHICLE TELEOPERATION CAPABILITY (VT) (4.200 million)

- Conducted support and maintenance training in Bosnia in support of Operation Joint Guard through April 1997.
- Provided support for four VT equipped M-60 Panthers in support of countermine operations for Operation Joint Guard.
- Provided support for three Mini Flails in support of Operation Joint Guard.
- The VT ORD was approved by MG Gill, Commandant, United States Army Engineer Center (USAEC), on 18 April 1997, and approved by TRADOC in Aug 8, 1997.
- USAF and USMC have expressed joint interest in the VT ORD.
- Prototype full-width mine rollers were developed for the M-1 tank at MICOM RDEC, and successfully demonstrated at Enforce 1997 (U.S. Army Engineer Center).
- Successfully demonstrated semi-autonomous capability for M-1 tank at Enforce 1997.

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- Developed, built, and successfully demonstrated Standardized Teleoperation Systems (STS) kits for the M-1 tank and D7G bulldozers.
- Designed and installed STS on the Interim Vehicle Mine Mounted Detector (IVMMD) for PM-MCD.
- Delivered three STS HMMWV kits in support of the Night Vision Laboratory's Vehicle Mine Mounted Detector (VMMD).
- Completed COEA

TACTICAL UNMANNED VEHICLE (TUV) (13.117 million)

- User Appraisals training.
  - JANUS simulation training at Ft. Benning, GA in October 1996.
  - Scout platoon leadership training at Redstone Arsenal, AL in November 1996.
  - Scout platoon training at Ft. Benning, GA in January 1997.
  - Scout platoon and lane training at Ft. Benning, GA in March 1997.
  - TUV desert training at Marine Corps Air-Ground Combat Center 29 Palms, CA in April 1997.
- Four SARGE systems, including the Remotely Controlled Multi-Mission Platform (RCMMP), the SARGE Transport HMMWV (STH), an Operator Control Unit (OCU), and a Mission Planner, were handed off to 2-69 Armor Bn, 3d BDE, 3d ID in January 1996 for User Appraisals.
- User Appraisals Phase I was completed 12 April 1997.
- The Draft Performance Specification for TUV was released to industry for comment on 17 April 1997 during an Industry Support Group briefing at Redstone Arsenal, AL.

UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.200 million)

- Completed the domain model for the Joint Architecture for Unmanned Ground Systems (JAUGS)
- Began combining JAUGS with the National Institute of Standards and Technology 4-D/RCS architecture for use in Demo III.

REMOTE ORDNANCE NEUTRALIZATION SYSTEM (RONS) (0.400 million)

- Integrated RONS automated functions into the RECORM system and conducted a demonstration.

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ROBOTIC ORDNANCE CLEARANCE SYSTEM (ROCS) (3.600 million)

- Completed proof-of-concept and live ordnance testing at Tyndall using BLU97 combined effect munitions (CEM).
- User, Air Combat Command/Nellis AFB Range/Explosive Ordnance Disposal (EOD) Detachment, accepted concept and requested operational testing on active bombing range.
- Range testing successfully completed at Nellis AFB ranges, December 96. ARTS/ARC met all user requirements for performance and survivability. The ARTS/ARC withstood six detonations.
- Nellis AFB funded 2 ARTS/ARC's for full-time surface munitions clearance use on active ranges.
- Delivered first ARTS/ARC with integrated global positioning system (GPS) and mapping capability for night operations.
- Began adaptation/development of anti-terrorism tools to ARTS platform in response to "URGENT & COMPELLING" needs statement from 4404th WG Provisional, Prince Sultan AFB, Saudi Arabia.
- Integrated controller area network (CAN) based control system from other JRP programs onto the ARTS platform. This allowed fielding of the force protection (FP) system within 30 days of receipt of message.
- ARTS/FP shipped to Southwest Asia (SWA) for in-theater operational testing June 97.
- Test Support Working Group (TSWG) committed to funding six additional systems for theater insertion in FY98.
- HQ/ACC POM'd three platforms for FY98 and 19 more through FY00.
- Developed and integrated obstacle avoidance subsystem and EM61 inductance coil.
- Successfully tested and demonstrated the system at Eglin AFB.
- Refined the processing algorithms and the characterization of both magnetometer and ground penetrating sensors.
- Developed neural network processing technique to apply toward data analysis of ground penetrating radar information.
- Developed a multiple line laser scanner as a short range collision system.
- Developed reduced weight ground penetrating radar.

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- Implemented standard tele-operation, controller area network (CAN) bus control scheme suing radio frequency (RF) line to operational control unit (OCU).
- Conducted operational field testing at Charleston Naval Shipyard and O'Hare International Airport involving the recovery of live buried unexploded ordnance (UXO).
- Memorandum of Understanding (MOU) established with 96th CEG/CED Explosive Ordnance Disposal (EOD) Detachment, Eglin AFB, FL., permitting real-world user evaluation of the AOE system.
- Developed rudimentary in-bucket sensor capable of detecting any significant metallic mass within the bucket envelope.
- Completed development effort for Phase II of JAMC System.
- Integrated and tested two complete JAMC Systems containing:
  - D7G tractor with armor protection.
  - Vehicle Control System (VCS).
  - Chain array.
  - Explosive Deployment System (EDS).
  - Pathfinder marking system.
  - Magnetic Countermine System (MACS).
- Integrated and tested 3rd "stripped-down" JAMC System.
- Conducted demonstration and briefing of JAMC System at Tyndall AFB, FL, April 97.
- Delivered JAMC Systems to the 2nd Marine Division, Camp Lejeune, NC.
- Trained Marines to operate complete JAMC System.
- Operated JAMC System as integral part of USMC TCAT military exercise, July 97.
- JAMC System implemented as key element of OSD sponsored Advanced Concepts Technology Demonstration, September 97.

TECHNOLOGY BASE (6.455 million)

- Transitioned DEMO II technology and components to Project Manager, Unmanned Ground Vehicles.
- Initiated new platform evaluations through simulations and testing.
- Pursued further improvements in obstacle detection to include countering holes and wire.

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- Made improvements to mission planner/man-machine interface.
- Conducted evaluations of sensors for limited night operations and RSTA.
- Conducted mobility evaluations of smaller, 2000 lb. class platform.

(U) FY 1998 Plans:

VEHICLE TELEOPERATION (VT) (11.500 million)

- Obtain favorable MS I/II for entry into combined PDRR/EMD phase.
- Award Small Business Innovative Research (SBIR) Phase III contract to enter combined PDRR/EMD phase in support of VT acquisition program.
- Develop final Performance Specification for MK4 (EMD) VT kits, and bring under configuration control.
- Develop, build, and demonstrate STS kits for M9 ACE, D5, and T3 bulldozers.
- Complete initial development testing for the STS.
- Complete Limited User Testing for STS on the M-1 tank, and the D7G, D5, T3, and M9 ACE bulldozers.
- Increase involvement with USMC and USAF.
- Start design/development of Robotic Combat Support System (RCSS) for USAES.
- Define VTC requirements for the USAF, USMC, and USN.

TACTICAL UNMANNED VEHICLE (TUV) (4.885 million)

- Finalize System Specification for TUV and release a Draft RFP for EMD in February to March 1998.
- Continue long-term User Appraisals in support of Evolutionary Acquisition Strategy.
- Improve reliability performance in SARGE prototype for participation in MOUT ACTD.
- Train USMC Chemical, Biological Incident Response Force (CBIRF) and integrate robotics into contingency exercise training.

UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.200 million)

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- Continue to update the JAUGS based on technology improvements, Joint Technical Architecture standards established by DoD, and mission requirements.
- Coordinate JAUGS activities closely with 4D/RCS development efforts.
- Validate the JAUGS.
- Incorporate JAUGS as a requirement in the TUV EMD RFP.

BASIC UNEXPLODED ORDNANCE [UXO] GATHERING SYSTEM (BUGS) (0.500 million)

- Initiate sensor platform/basic UXO gatherer (BUG) integration.

ROBOTIC ORDNANCE CLEARANCE SYSTEM (ROCS) (3.000 million)

- Build and field 2nd ARTS/ARC for delivery December 97.
- Develop and integrate surface ordnance removal system.
- Design, develop and prototype scrap removal system to remove surface debris and process for disposal.
- Integrate brush-cutting attachment for rapid vegetation removal in hazardous areas.
- Build and field six platforms for the Southwest Asia Area of Responsibility (SWA-AOR).
- Integrate UGV/S JPO fiber optic control capability into the ARTS control system for both RF and fiber optic control.
- Start development of a remote tool carousel utilizing several standard EOD tools - Joint project with Naval Explosive Ordnance Disposal Technology Division, IndianHead, MD.
- Modularize subsystem components and transfer autonomous capabilities onto a modified ARTS platform for rough terrain surveys.
- Implement WL/FIVC generic controller area network control system into autonomous system.
- Demonstrate multi-sensor platform (magnetometers, ground penetrating radar and EM-61).
- Develop 3-D path-planning algorithms for rough terrain.
- Develop advanced algorithms for data analysis and data fusion.
- Develop controller area network interface for autonomous control modules.

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- Integrate and demonstrate low-cost navigation system using multiple navigation sensors and Kalman filter technology.
- Improve in-bucket sensor system into a usable, survivable mechanism for field demonstrations.
- Demonstrate autonomous functions at the Jefferson Proving Ground demonstration in the Fall 98.
- Support follow-on demonstrations for Advanced Concepts Technology Demonstration (ACTD).

- Continue development of selected JAMC subsystems technologies:
  - Vehicle Control System.
  - Chain Array.
  - Folding Mine Rake.
  - Marking System.
  - Remote 2-D8N bulldozers for mine countermeasures use.

TECHNOLOGY BASE (7.000 million)

- Pursue limited night operations for mobility and RSTA.
- Achieve RSTA functions at tactically realistic ranges.
- Initiate integration of advanced technologies onto smaller, 2000 lb. class demonstration platform.
- Fully integrate Laser Radar (LADAR) with dual focal length stereo for high tempo day/night operations.
- Pursue auto-navigation model based vision for improved on-off road robustness.
- Conduct Critical Design Review of demonstration platforms.
- Conduct Virtual Battle Lab Warfighting Experiment (BLWE) to provide initial operational evaluation of smaller advanced unmanned ground vehicles.

(U) FY 1999 Plans:

TACTICAL UNMANNED VEHICLE (TUV) (4.117 million)

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- Complete User Appraisal assessment and analyses
- Assess Release MS II RFP
- Prepare for MS II EMD decision.

UNMANNED GROUND VEHICLE ARCHITECTURAL DEVELOPMENT (0.400 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.

BASIC UNEXPLODED ORDNANCE [UXO] GATHERING SYSTEM (BUGS) (.700 million)

- Initiate sensor platform/BUG testing.
- Initiate BUGS analysis of alternatives and obtain Milestone 0.

ROBOTIC ORDNANCE CLEARANCE SYSTEM (ROCS) (4.000 million)

- Integrate autonomous control functions for a fully autonomous surface range clearance system including:
  - Submunition neutralization and removal.
  - Scrap and debris removal.
  - Field dressing (filling craters).
  - Painting grid lines.
- Improve long range vehicle control.
- Complete development of the tool carousel.
- Integrate explosive detection systems.
- Integrate advanced render safe procedures.
- Expand autonomous vehicle navigation modules integrating obstacle avoidance for real-time control.
- Continue development for a low-cost navigation solution.

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- Continuously evaluate new subsurface sensors to establish operating parameters and merits.
- Develop discrimination technology using computer vision and laser scanners.
- Couple information flow from detection system for autonomous area clearance operations.
- Develop companion vehicle to assist with range clearance operations.
- Continue support for additional demonstrations with Phase II JAMC System.
- Implement POM funding to field prototypes of selected JAMC subsystem technologies.

TECHNOLOGY BASE (7.000 million)

- Complete integration of advanced technologies onto demonstration platforms; deliver two prototypes.
- Initiate development of Second Generation User Appraisal Vehicle.
- Conduct live Battle Lab Warfighting Experiment (BLWE) with troops to provide operational evaluation of smaller advanced unmanned ground vehicles.
- Pursue UGV Control Station which is compatible with the new Force XXI architecture.
- Achieve advanced mobility enhancements for new platform.
- Initiate a pre-Advanced Concepts Technology Development (ACTD) Second Generation User Appraisal Vehicle for MOUT, Scouts, and other missions.

B. Program Change Summary ($ million)

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	23.744	23.196	24.694	Cont.
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction	(0.772)	(1.111)		
b. Congressionally Directed Addition	05.000	5.000		

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 4	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0603709D8Z

c. OSD PBD 202			(7.693)	
Current Budget Submit/President's Budget	27.972	27.085	16.217	Cont.

Change Summary Explanation:
Funding: Funding changes are due to adjustments during the POM development process.
Schedule: N/A
Technical: N/A

C. Other Program Funding Summary

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Compl	Cost
Procurement Line P-1 No(s)	- N/A								
Milcon Project No(s)	- N/A								
Related RDT&E:	- N/A								

D. Schedule Profile

Fiscal Year actual and planned events by quarter:

	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
VTC				ΔMSI/II								ΔMSIII
RONS								ΔMSIII				
BUGS									ΔMS0			
ROCS/SOCV												ΔMSII
Engineering Milestones						Design ΔReview		Virtual ΔBLWE				Live BLWE Δ2 Vehicles
UGV TECH							DEMO III					
T&E												

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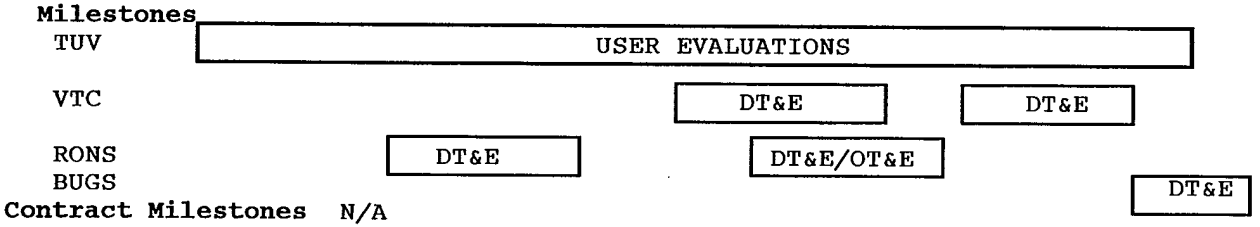

Contract Milestones N/A

Other Program Events FY2000 - TUV MS II

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **ADVANCED SENSOR APPLICATIONS PROGRAM** **PE 0603714D8Z**

COST *(In Millions)*		FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		24.683	17.655	15.147	15.602	15.928	16.118	16.471	Continuing	Continuing
Project Name/No. and Subtotal Cost ASAP/P714		24.683	17.655	15.147	15.602	15.928	16.118	16.471	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: This program focuses on continued development of domestic and foreign nonacoustic technology that has demonstrated potential for improvements in U.S. capabilities. Through joint international programs, unique and innovative approaches to expanding the performance of existing systems are examined for potential enhancements to US abilities to detect, locate and target potential threats to National Security.

Program Accomplishments and Plans:

FY 1997 Accomplishments:

- Completed two US/UK data collections(6.3 Million)
- Completed final report for US/German data analysis project (3.1 Million)
- Completed Russian data collection and continued analysis of hydro-dynamics theory-US/Russian undersea experiments (5.0 Million)
- Continued modeling and theoretical analysis-reports submitted (10.3 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z

FY 1998 Plans:

- Continue Russian activities - complete initial sensor evaluation (4.8 Million)
- Continue joint US/UK sensor activity (5.8 Million)
- Complete and test LIDAR system for testing (2.3 Million)
- Complete Infrared (IR) program - submit final reports (1.9 Million)
- Explore applications of High Frequency Active Auroral Research Program (HAARP) (2.9 Million)

FY 1999 Plans:

- Continue Russian activities - complete initial model validations (5.0 Million)
- Continue joint US/UK sensor activity (7.8 Million)
- Complete final testing on LIDAR System (2.4 Million)

The ASAP program is in Budget Activity 4, Demonstration and Validation. The program will continue in the dem/val phase of development through FY 1999.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z

B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	24.937	15,379	15.744	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressional add		3.000		
b. Congressionally directed		(.724)		
undistributed reductions				
c. OSD/QDR Reductions	(0.254)		(0.597)	
President's Budget	24.683	17.655	15.147	Continuing

Change Summary Explanation:
Funding: Not Applicable
Schedule: Not Applicable
Technical: Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z

C. **Other Program Funding Summary Cost**

	FY1995	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost
Procurement Line P-1 No(s), Name(s)			Not Applicable								
Milcon Project No(s), Name(s)			Not Applicable								
Related RDT&E:			Not Applicable								

D. **Schedule Profile**

Joint US/Russian undersea experiments	1QFY97
Joint US/UK at-sea IR data collection	4QFY97
Joint US/UK at-sea data collection	3QFY98
Establish Dod critical applications for HAARP	3QFY98
Identify system requirements for critical enhancements or additional capabilities for HAARP applications	4QFY98
Russian sensor evaluation	4QFY98
Russian Model Validations	4QFY98
At-sea LIDAR system evaluations	3QFY99
Joint US/UK sensor data collection	3QFY99
Concept feasibility demonstrations for HAARP	3QFY99
Russian airborne sensor data collections	4QFY99

Fiscal Year actual and planned events by quarter. Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 4	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. ADVANCED SENSOR APPLICATIONS PROGRAM PE 0603714D8Z

	FY1994				FY1996				FY1997						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones	Not Applicable															
Engineering Milestones	Not Applicable															
T&E Milestones	Not Applicable															
Contract Milestones	Not Applicable															
Other Program Events	Not Applicable															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE January 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 4					R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		Cost to Complete	Total Cost
Total Program Element (PE) Cost	15.105	5.525	1.863	1.708	1.679	1.709	1.747		Continuing	Continuing
Specific Emitter Identification /P457	15.105	5.525	1.863	1.708	1.679	1.709	1.747		Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENT**: 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 logistic 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 (SIF) of the standards, protocols, procedures, and network management conventions required to achieve compatible implementation of the IDE throughout the international defense enterprise.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE August 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D8Z

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1997 Accomplishments:

- Develop CALS Thrust Teams' initiatives for Business Process Improvements (BPI) using CALS technology. Areas of focus will be on identifying and implementing BPI concepts to establish the Integrated Data Environment ($.900 Million).
- Support a Weapon System Program's development of an IDE ($.400 Million).
- Continue to develop analysis tools and methods to support the IDE implementations ($.305 Million)
- Continue to develop and deploy RAMP and IWSDB technolgy ($13.5 Million).

(U) Documentation includes: Analyses of technologies for representing products during the design and acquisition phases which can be translated into the support phase of the weapon system life cycle; investigation of techniques for capturing design knowledge-base used for development of software; identification and analysis of technologies and capabilities which provide structure and guidance for identifying knowledge-base and meta-knowledge update needs; enhancing simulation and modeling techniques for identifying linkages and dependencies among devices, and the interplay between hardware and software.

(U) FY 1998 Plans:

- Continue supporting Joint Service initiatives for Business Process Improvements (BPI) using CALS technology. Areas of focus will be on identifying opportunities for and implementing BPI concepts to establish the Integrated Data Environment. ($1.000 Million)
- Support a Weapon System Program's development of an IDE ($.500 Million)
- Continue development and update of analytic tools and methods to support the IDE implementations ($.025 Million)
- Continue to develop and deploy IWSDB technolgy ($4.000 Million).

(U) FY 1999 Plans:

- Continue implementing necessary changes to establish the Integrated Data Environment. ($1.000 Million)
- Support a Weapon System Program's development of an IDE ($.500 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE August 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 0603736D8Z

- Continue development and update of analytic tools and methods to support IDE implementations ($.363 Million)

(U) B. **Program Change Summary**	FY1997	FY1998	FY1999	TotalCost
Previous President's Budget	15.527	1.916	1.899	Continuing
Appropriated Value		9.916		
Adjustments to Appropriated Value				
a. Congressionally-directed undistributed reduction	(.388)	(.391)		
b. Other (DoD Program Changes)	(.034)	(4.000)	(.036)	
Current Budget Submit /President's Budget	15.105	5.525	1.863	Continuing

(U) Change Summary Explanation:

(U) Funding: The changes in FYs 1997 and 1998 are due to Congressional undistributed reductions, program budget adjustments, and amended fiscal guidance.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-3 Exhibit)	DATE February 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 4	R-1 ITEM NOMENCLATURE CALS, The Strategy - PE 063736D

(U) A. **Project Cost Breakdown** ***(in Millions)***

	FY 1997	FY 1998	FY 1999	FY 2000
Systems Engineering	7.005	4.725	1.063	.908
Training Development	0.250	.300	.300	.300
Integrated Logistics Support	0.250	.250	.250	.250
Configuration Management	0.250	.250	.250	.250
Technical Data				
Contractor Engineering Support				
Research Personnel				
Miscellaneous (less than 15% of total)				
Business Process Improvements	7.350			
TOTAL	15.105	5.525	1.863	1.708

(U) B. **Budget Acquisition History and Planning Information**

Not Applicable

(U) C. **Funding Profile**

Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date: (MONTH/YEAR) February 1998
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 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE 0603851D Cost	21.021	14.566	17.051	16.925	16.337	16.529	16.789	Continuing	Continuing
ESTCP/P514 Cost	21.021	14.566	17.051	16.925	16.337	16.529	16.789	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, (3) Executive Order 12856 which requires Federal agencies to 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 respond to Environmental Security objectives, 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date: (MONTH/YEAR) February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/ Budget Activity 4**	R-1 ITEM NOMENCLATURE **Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z**

FY 1997 Accomplishments:

- Reviewed and selected technologies for demonstration.
- Reviewed and selected sites for demonstration of remediation technologies.
- Prepared site-specific implementation plans ($0.628 million).
- Prepared sites and secure regulatory permitting ($3.142 million).
- Demonstration and evaluation of selected technologies ($17.251 million).

FY 1998 Plans:

- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans ($0.529 million).
- Prepare sites and secure regulatory permitting ($2.719 million).
- Award demonstration testing and evaluation for selected technologies ($11.318 million).

The FY98 funds are invested in projects which address priority DoD environmental requirements. The funds are programmed in the areas of:

- Cleanup: To demonstrate and validate innovative technologies to restore DoD facilities contaminated with toxic, explosive, or hazardous waste. ($6.806 Million)
- Compliance: To demonstrate and validate innovative technologies to ensure DoD complies with our federal, state, and local environmental laws. ($2.969 Million)
- Pollution Prevention: To 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. ($4.791 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date: (MONTH/YEAR) February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/ Budget Activity 4**	R-1 ITEM NOMENCLATURE **Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z**

FY 1999 Plans:

- Review and select technologies for demonstration.
- Review and select sites for demonstration of technologies.
- Prepare site-specific implementation plans ($0.538 million).
- Prepare sites and secure regulatory permitting ($2.523 million).
- Award demonstration testing and evaluation for selected technologies ($13.990 million).

FY 2000-03 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.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date: (MONTH/YEAR) February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/ Budget Activity 4**	R-1 ITEM NOMENCLATURE **Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z**

Justification for Budget Activity Assignment: To conform to the defined DoD acquisition milestones sequence, this program element is categorized under Budget Activity 4, Demonstration and Validation (Dem/Val).

Acquisition Strategy: When demonstration and validation of a particular technology is completed, and if the technology is found to be effective and affordable by users, regulators and other stakeholders, a user data package will be developed and distributed, e.g., specification, procurement package, etc., providing details to users on the technologies validated cost and performance and on how to acquire and implement the technology. When this step is completed, the demonstration will be considered successful.

B. Program Change Summary

	FY 1997	FY 1998	FY1999	Total Cost
Previous President's Budget	14.155	15.164	17.385	Continuing
Appropriated Value	22.155	15.164		
Adjustments to Appropriated Value				
a. Undistributed reduction	(.595)	(235)		
b. SBIR	(.539)	(363)		
Current Budget Submit/ President's Budget	21.021	14.566	17.051	Continuing

Change Summary Explanation: FY 1998 changes are due to congressional undistributed reductions. FY 1999 changes are due to DoD budget adjustments.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	Date: (MONTH/YEAR) February 1998
APPROPRIATION/BUDGET ACTIVITY **RDT&E, Defense-wide/ Budget Activity 4**	R-1 ITEM NOMENCLATURE **Environmental Security Technology Certification Program (ESTCP) PE 0603851D8Z**

C. Other Program Funding Summary Not applicable.

D. Schedule Profile (Fiscal Year actual and planned events by quarter)

	FY 1998				FY 1999				FY 2000				FY 2000			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones																
- Select technology				X												
- Select site					X											
Engineering Milestones																
- Complete site prep and regulatory permitting							X									
T&E Milestones																
- Complete T&E											X					
Contract Milestones																
Other Program Events																
- Obtain user, regulator and other stakeholder approvals													X			
- Develop and distribute user data packages														X		

This program continues from FY 1998 through FY 2003. The above milestones reflect the average life cycle of a typical, successful remediation demonstration utilizing FY 1997 funding. A similar pattern is expected for FY 1999 and outyear funding

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE : (MONTH/YEAR) February 1998
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 1997	FY 1998	FY 1999	FY 2000	FY 2001
Cost Categories:					
a. Demonstration & Validation	19,970	13,757	16,101	16,025	15,462
b. Program Management Support	1,051	809	950	900	875
TOTAL	21,021	14,566	17,051	16,925	16,337

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE : (MONTH/YEAR) February 1998
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 1997	Budget FY 1997	Budget FY 1998	Budget FY 1999	Budget FY2000	Budget to Complete	Total Program
DoD	C	-	-	-	68.368	21.021	14.566	17.051	16.925	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 FY1997	Budget 1997	Budget 1998	Budget 1999	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									

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RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense Wide / BA 4	R-1 ITEM NOMENCLATURE: Humanitarian Demining PE 0603920D

COST (In Millions $)	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element Cost	0	0	0	17.234	16.113	15.086	15.125	15.224	Continuing	Continuing

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

(U) **BRIEF DESCRIPTION OF ELEMENTS:**

(U) This program element demonstrates, evaluates, and validates equipment for humanitarian demining. The program is focused on reducing the time and cost associated with demining while improving operational safety. The systems developed under this program are intended to meet the following technical objectives: locate minefields (or confirm their absence); detect individual mines; clear and destroy large numbers of mines rapidly and safely; enhance the safety of deminers; and provide tools to facilitate mine awareness and deminer training. The program applies current technology and systems developed from multiple sources including PE 0603120D and commercial efforts to rapidly develop and field demining equipment. The program seeks opportunities to leverage past and current R&D project activity in related areas, including tactical countermine and unexploded ordnance clearance. If significant improvements to equipment applicable to one technical objective are not likely to be achieved in the short term, the development effort is shifted to a more promising area.

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

(U) **FY 1997 Plans:**

(U) Not Applicable

(U) **FY 1998 Plans:**

(U) Not Applicable

RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense Wide / BA 4	R-1 ITEM NOMENCLATURE: Humanitarian Demining PE 0603920D

(U) **FY 1999 Plans:**

(U) Complete development and demonstrations of enhanced mechanical large area clearance equipment specialized for demining agricultural areas. Continue development and demonstration of new alternatives for in-situ mine neutralization that are simple, affordable, and expendable. Conclude development and demonstration of multi-lingual, multi-media mine awareness training system for host nation deminers. Continue to pursue simple, affordable, safe, and robust technologies for locating, discriminating, and identifying landmines. Continue operational filed testing of equipment items as deemed appropriate. ($17.234 million)

(U) **ACQUISITION STRATEGY:** Not Applicable

(U) B. Program Change Summary	FY 1997	FY 1998	FY 1999	FY 2000	To Complete	Total Cost
FY-1998/99 President's Budget:	0	10.000	0	0	Continuing	Continuing
Appropriated Value:	0	0				
Adjustments to Appropriated Value:						
a. Congressionally-directed undistributed reduction:						
b. Rescission/Below-threshold reprogramming:						
c. Other:			17.234	16.113	Continuing	Continuing
FY-1999 President's Budget:	0	0	17.234	16.113	Continuing	Continuing

Change Summary Explanation:

Funding: No funds were appropriated for this line in FY 1998. FY 1999 through FY 2003 program reflects a realignment of funding from PE 0603120D.
Schedule: (total PE or Project, as applicable) Not Applicable
Technical: (total PE or Project, as applicable) Not Applicable

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

None

RDT&E BUDGET JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: RDT&E, Defense Wide / BA 4	R-1 ITEM NOMENCLATURE: Humanitarian Demining PE 0603920D

(U) **D. Schedule Profile:** Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY ENGINEERING, MANUFACTURING AND DEVELOPMENT, DEFENSE-WIDE, BUDGET ACTIVITY 5	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM EMD PE 0604709D8Z

COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost	-	-	-	11.307	12.392	12.152	13.838	14.375	Continuing	Continuing
JRP-P7098Z	-	-	-	11.307	12.392	12.152	13.838	14.375	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: This program is a budget activity level 5 based on the successful transition of robotic technologies from demonstration/validation activities to Engineering, Manufacturing and Development. This PE was established by PBD 202, in response to OSD and Service agreement at the April 1997 Joint Robotics Program General Officer Steering Committee (GOSC) to have OSD retain consolidation of DoD robotics programs on unmanned ground systems through EMD. Individual Services are responsible for procurement. The JRP demonstration/validation efforts have demonstrated maturity of robotics technologies for their application to the formal acquisition process of land systems and subsystems. Emphasis is on the development of robotics 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. Success has been achieved in two programs to justify EMD at this time. This PE establishes the consolidated DoD robotics program for unmanned ground vehicles (UGV) which advances the UGV concepts into Engineering and Manufacturing Development (EMD) acquisition projects for (1) the Vehicle Teleoperation (VT) - a generic, modular set of kits that can be used to retrofit several different types of currently fielded Engineer vehicles to allow remote teleoperation capabilities, like obstacle breaching operations (minefields, earthworks, bunkers, etc,), that have supported Operations Joint Endeavor and Joint Guard in Bosnia; and (2) the Tactical Unmanned Vehicle (TUV) - a joint Army/USMC effort to develop a telerobotic UGV for the Reconnaissance, Surveillance and Target Acquisition (RSTA) mission, scheduled to go into EMD in 2000.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH,DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 5	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0604709D8Z

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1999 Plans:

VEHICLE TELEOPERATION (VT) (11.307 million)

- Develop, build and demonstrate STS kits for the DEUCE bulldozer.
- Conduct DT&E II.
- Begin IOT&E 4th Quarter.

B. Program Change Summary ($ million)

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	0.000	0.000	0.000	Cont.
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally Directed Undistributed Reduction				
b. Congressionally Directed Addition				
c. OSD PBD 202			(11.307)	
Current Budget Submit/President's Budget	0.000	0.000	11.307	Cont.

Change Summary Explanation:
Funding: Funding changes are due to OSD PBD action.
Schedule: N/A
Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH,DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 5	R-1 ITEM NOMENCLATURE JOINT ROBOTICS PROGRAM PE 0604709D8Z

C. Other Program Funding Summary

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Compl	Cost
Procurement Line P-1 No(s)	- N/A								
Milcon Project No(s)	- N/A								
Related RDT&E: 603709D8Z	17.317	12.000	4.521						

D. Schedule Profile

Fiscal Year actual and planned events by quarter:

	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
VT					ΔMSI/II							
T&E												
VT										ΔDT&E		ΔIOT&E

Contract Milestones N/A
Other Program Events **FY 2000 TUV - MS II**

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE .February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771/P773

COST *(In Millions)*		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		42.238	53.266	30.512	16.641	16.674	16.975	17.346	Cont.	Cont.
Joint Tactical Information Distribution System (JTIDS) - P771		5.301	3.066	2.793	4.327	4.153	4.244	4.336	Cont.	Cont.
Multifunctional Information Distribution System-Low Volume Terminal (MIDS-LVT) - P773		36.937	50.200	27.719	12.314	12.521	12.731	13.010	Cont.	Cont.

A. Mission Description and Budget Item Justification

JTIDS is a joint program to acquire a highly jam-resistant, secure, high capacity, digital voice and data distribution system to enable integrated communications, navigation, and identification in a joint tactical combat environment. The program element funds ongoing system level engineering of the existing JTIDS system and the development of the next generation LINK 16 system, the Multifunctional Information Distribution System (MIDS) which is a joint and international cooperative program involving (U.S., France, Italy, Germany, and Spain). The MIDS-LVT will make LINK 16 affordable for a much 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.

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.

B. Program Change Summary - See individual project R-2 pages

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771

COST *(In Millions)*		FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	Cost to Complete	Total Cost
JTIDS - P771		5.301	3.066	2.793	4.327	4.153	4.244	4.336	Cont.	Cont.

A. Mission Description and Budget Item Justification

JTIDS is a joint U.S. program to acquire a highly jam-resistant, secure, high capacity, digital voice and data distribution system providing integrated communications, navigation, and identification for use in a tactical combat environment. This program element funds completion of JTIDS and transition into production and support for joint service applications. This element also supports the expanded application of LINK 16 to U.S. forces, including LINK 16 systems level engineering, spectrum certification, investigation of operational enhancements, and support of joint LINK 16 demonstrations and exercises.

PROGRAM ACCOMPLISHMENTS AND PLANS

1. FY 1997 ACCOMPLISHMENTS:

- Continued JTIDS ($5.301 Million)
  -
  - Provided Class 2M Milestone III Full Rate Production Approval Support
  - Provided technical support and Link-16 support for International users
  - Concluded sustainment engineering support for JTIDS Class 2/2H/2M
  - Provided efforts, including testing, associated with receiving and maintaining frequency certification
  - Developed/analyzed increased operational requirements

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771

2. FY 1998 PLANS:

- Continue JTIDS ($3.066 Million)
  -
  - Provide technical support and Link-16 support for International users
  - Provide field support for demos and exercises and contingencies
  - Continue efforts, including testing, associated with receiving and maintaining frequency Certification
  - Continue development/analysis for increased operational requirements

3. FY 1999 PLANS:

- Continue JTIDS ($2.793 Million)
  -
  - Provide technical support and Link-16 support for International users
  - Provide field support for demos and exercises and contingencies
  - Continue efforts, including testing, associated with receiving and maintaining frequency certification
  - Continue development/analysis for increased operational requirements

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771

B. Program Change Summary

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget (FY 1998)	5.442	3.191	2.896	Cont.
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction	(.141)	(.125)	(.103)	
Current Budget Submit/FY 1999 President's Budget	5.301	3.066	2.793	Cont.

Change Summary Explanation:

Funding: N/A
Schedule: N/A
Technical: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771

C. Other Program Funding Summary

	FY1997 & PRIOR	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost
PE 27130F	91.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	91.7
PE 27417F	45.9	3.4	0.3	0.0	0.0	0.0	0.0	0.0	49.6
PE 27419F	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7
PE 27581F	15.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.8
PE 27412F	106.8	22.1	15.0	0.0	0.0	0.0	0.0	0.0	143.9
PE 35154F	12.8	4.8	4.9	0.0	0.0	0.0	0.0	0.0	22.5
Multi (BMDO)	46.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.6
PE 28014A	12.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.9
PE 42310M	10.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.9
204152N	144.4	4.3	0.0	0.0	0.0	0.0	0.0	0.0	148.7
204112N	63.8	4.6	0.0	0.0	0.0	0.0	0.0	0.0	68.4
204660N	159.0	8.4	3.7	1.9	0.0	0.0	0.0	0.0	173.0
TOTAL	717.3	47.6	23.9	1.9	0.0	0.0	0.0	0.0	790.7

Related RDT&E: 64754F, 25604N; 64702A; 63216C; 63861C; 64779F; 64770F; 27417F; 27419F; 27412F; 35154F; & 64719M

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P771

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones		DAB III(2M)										
Engineering Milestones												
T&E Milestones		Complete										
Contract Milestones		MS OT III				FRP(2M)						

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P773

COST *(In Millions)*		FY1997	FY1998	FY1999	FY2000	FY2001	FY 2002	FY 2003	Cost to Complete	Total Cost
MIDS - P773		36.937	50.200	27.719	12.314	12.521	12.731	13.010	Cont.	Cont.

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 1997 ACCOMPLISHMENTS:

- Continued MIDS EMD ($36.937 Million)
  - Continued Supplement 3 (International production phase agreement) negotiations
  - Conducted Critical Design Review (CDR) of MIDS variant for Army
  - Conducted Design Reviews for Incremental Deliveries of MIDS Operational Software
  - Contracted for additional elements of pre-operational support

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FY 1997 ACCOMPLISHMENTS (continued):

- Initiated In-Process Reviews of EMD Technical Data Package (TDP)
- Initiated delivery of MIDS Interface Simulators (MIS) Version 1
- Initiated MIDS-LVT CDT&E testing
- Initiated corrective action for problems discovered in contractor testing
- Conducted studies of MIDS configurations for additional U.S. platforms
- Awarded Production Readiness Other Transaction Agreements (OTA's)

2. FY 1998 PLANS:

- Continue MIDS EMD ($50.200 Million)

  - Conclude Supplement 3 negotiations
  - Initiated delivery of MIDS terminals
  - Continue delivery of MIDS Interface Simulators (MIS) Version 1
  - Initiate delivery of MIDS Interface Simulators (MIS) Version 2
  - Continue MIDS-LVT CDT&E testing (including Army Variant)
  - Continue studies related to proliferation of MIDS in U.S. platforms
  - Initiate government laboratory testing
  - Initiate pre-operational support of MIDS On Ship, F/A-18, and Army integration and testing
  - Initiate government developmental testing/operational testing of various MIDS platforms
  - Continue corrective action for problems discovered in testing (contractor and government)
  - Continue Production Readiness Other Transaction Agreements (OTA's) efforts
  - Initiate production decision process

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3. FY 1999 PLANS:

- Continue MIDS EMD ($27.719 Million)
  - Continue delivery of MIDS terminals
  - Continue corrective action for problems discovered in government and contractor testing
  - Complete delivery of MIDS Interface Simulators (MIS) Version 2
  - Deliver MIDS Interface Simulator (MIS) Version 3
  - Continue government developmental testing/operational testing of various MIDS platforms
  - Continue pre-operational support of MIDS On Ship, F/A-18, and Army integration and testing
  - Complete Production Readiness Other Transaction Agreements (OTA's)
  - Award initial production contracts
  - MS-III

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B. Program Change Summary

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget (FY 1998)	37.035	52.238	28.192	Cont.
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction	(.098)	(2.038)	(.473)	Cont.
Current Budget Submit/OSD Budget	36.937	50.200	27.719	Cont.

Change Summary Explanation:

Funding: Funding adjustments during budget review/execution.
Schedule: N/A
Technical: N/A

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APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-Wide/BA-5	R-1 ITEM NOMENCLATURE Joint Tactical Information Distribution System (JTIDS)/0604771D8Z/P773

C. Other Program Funding Summary

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost
Procurement:									
APN									
PE0205604N	.000	.000	34.393	57.919	52.670	36.879	39.209		
OPN									
P-1#21614000									
P-1#313000	.000	.000	2.895	4.644	3.376	3.766	3.300		
OPA									
PE027134F/PE027130F	.450	30.500	38.400	38.500	9.600	.000	.000		
PE0207133F	.000	.000	.000	.000	45.500	71.300	35.900		
OPDW	.000	.000	23.555	.000	.000	.000	.000		
PE0205604C									
Related RDT&E									
PE0603713A	.479	2.595	6.362	.000	.000	.000	.000		
PE0205604N	28.784	38.779	40.907	27.748	16.341	16.692	17.076		
PE0604503N	.000	1.399	2.882	1.423	.000	.000	.000		
PE064574F	3.976	.000	.000	.000	.000	.000	.000		
PE027134F	.000	7.600	.000	.000	.000	.000	.000		
PE0207133F	.000	.000	2.000	.960	.000	.000	.960		

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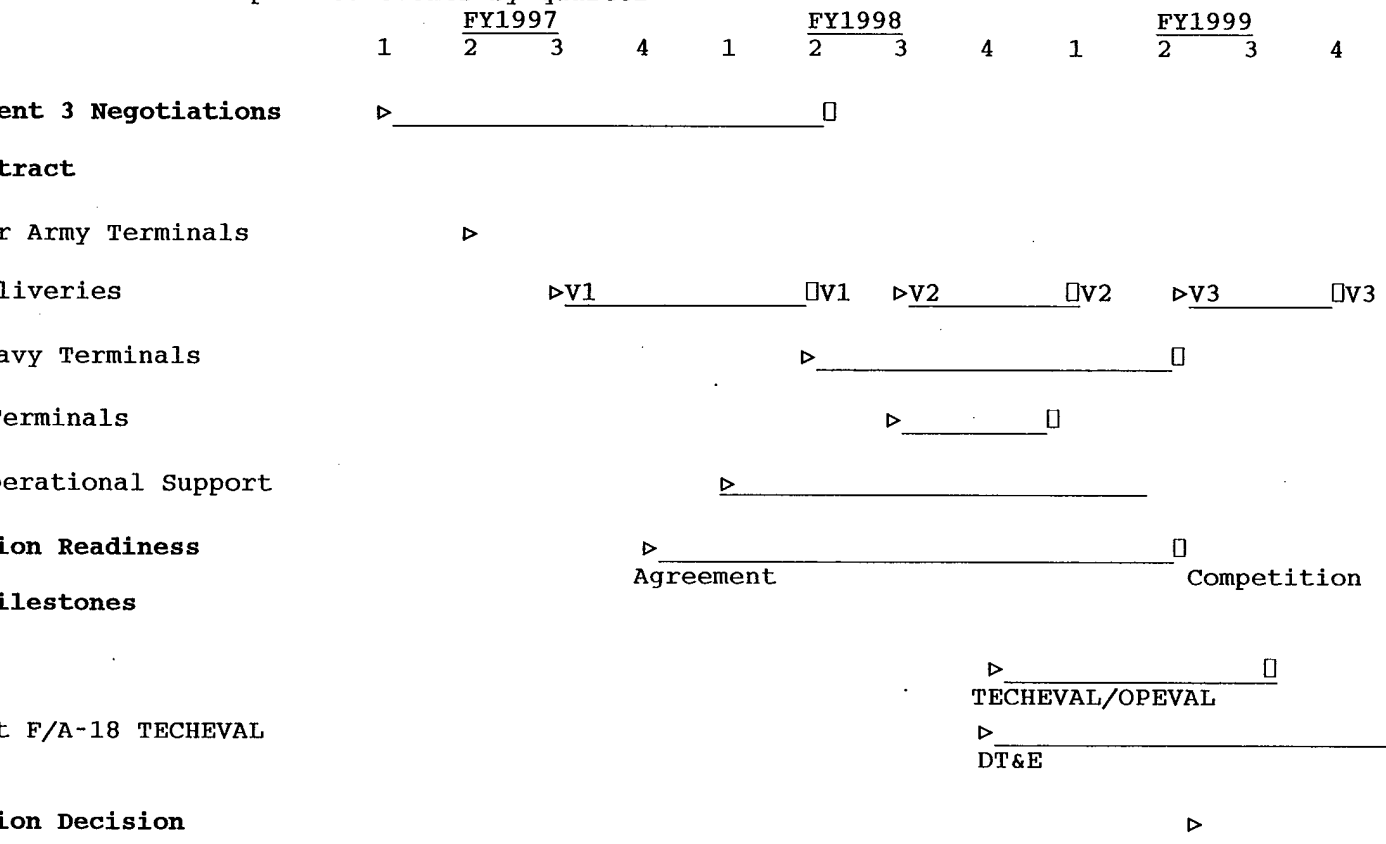
D. Schedule Profile

Fiscal Year actual and planned events by quarter



RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE September 1997	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 5						R-1 ITEM NOMENCLATURE COMMERCIAL O & S SAVINGS INITIATIVE PE 0604805D8Z				
COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Commercial O&S Savings Initiative	0	9.744*	20.0*	13.410	17.528	15.639	16.684	17.135	84.0	110.14

* Formerly PE 0603752D

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

(U) **BRIEF DESCRIPTION OF ELEMENT**: The purpose of the Commercial Operations and Support Savings Initiative (COSSI) is to reduce weapon system life cycle costs, especially operating and support (O&S) costs, by inserting commercial products and processes into military systems. COSSI had previously been a component of the Dual Use Applications Program (PE 0603805E). Additionally, this PE incorporates the closely related goals and mission previously covered by the Commercial Technology Insertion Program (CTIP) (PE 0603752D). The combined program inserts existing commercial technology into defense systems already fielded or in development. The nature of this development work is more appropriate for research category 6.4 than the previous 6.3 program element. COSSI projects are cost shared between the government and industry and involve the nonrecurring engineering and testing needed to deliver and demonstrate prototype retrofits to military systems. If the testing is successful and the cost savings validated, the Services are expected to purchase the retrofits using normal procurement procedures. OSD funding incentivizes the Services to structure joint projects with pervasive impact across weapon systems, and to institutionalize a streamlined acquisition process. The acquisition process uses cost shared COSSI development agreements coupled with follow-on fixed price commercial item procurements. COSSI prototypes an approach the Services and industry can adopt to routinely insert commercial products and processes into existing systems. This Program is essential for the implementation of the Department's Dual Use Technology Strategy which places more reliance on the commercial sector for technologies applicable to national defense.

(U) A Dual Use Steering Group consisting of the Under Secretary of Defense (Acquisition and Technology), the DUSD (I&CP), the Director for Defense Research and Engineering, and the Service Acquisition Executives, will continue to have general oversight responsibility for COSSI. Under the combined COSSI and CTIP, the Services will select proposals best meeting established criteria for cost savings, military customer commitment, quality of the cost share, and technical/management approach. OSD will provide funds for projects having the greatest cross-Service/System applications and cost savings potential.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE September 1997
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/BA 5	R-1 ITEM NOMENCLATURE COMMERCIAL O & S SAVINGS INITIATIVE PE 0604805D8Z

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

COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Commercial O&S Savings Initiative	0	9.744*	20.0*	13.410	17.528	15.639	16.684	17.135	80.396	110.140

* Formerly PE 0603752D

(U) **FY 1997 Accomplishments:**

(U) Three projects were started under the Commercial Technology Insertion Program (PE 0603752D):

(U) Commercial micro-electromechancial systems (MEMS) sensors were tested, evaluated, and qualified for miniaturized fuze, safe and arm devices in Submarine Torpedo Defense, Multiple Launch Rocket System, submunitions, and the MPIM/SRAW missile guidance system ($4.4 million)

(U) System engineering was initiated to replace six circuit cards in the F-15 radar with two circuit cards employing commercial analog to digital technology ($4.3 million)

(U) Commercial simulation technology was modified and qualified for the Weapon System Engagement Trainer. ($1.0 million)

(U) **FY 1998 Plans:**

(U) Perform expanded testing and qualification of commercial MEMS sensors for application to Extended Range Guided Munition (ERGM) and Low Cost Competent Munitions ($4.8 million)

(U) Complete system engineering and design, prototype, and test components for the F15 radar ($5.0 million)

(U) Demonstrate standard commercial interfaces in the avionics suite, mission computer, and warfare management computer of the AV-8B ($10.2 million)

(U) **FY 1999 Plans:**

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE September 1997
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(U) Beginning in FY 1999, the CTIP and COSSI programs will be combined. OSD will maintain a funding line to encourage projects with joint Service and cross-platform applications. Funds will be used to complete the F15 radar and AV8B open system avionics project and to support joint projects having the potential for significant O&S savings. Funds provided by OSD will be matched by the Services. Additionally, each Service will have Program Elements established to conduct Service unique COSSI projects. Funds that had been programmed for CTIP and DUAP (PE 06030805E) will be used by the Services to initiate the COSSI program.

(U) B. Program Change Summary	FY1997	FY1998	FY1999	FY2000	To Complete	Total Cost
Previous President's Budget	48.411	46.048	47.457	47.033	Continuing	Continuing
Appropriated Value	10.000	20.000				
Adjustments to Appropriated Value	0					
a.Congressionally-directed undistributed reduction	(.256)					
b. Below threshold reprogramming						
c. Other		(.159)	(1.318)	(2.569)		
Current Budget Submit/President's Budget	9.744	19.841	46.139	44.464	Continuing	Continuing

Change Summary Explanation:

Funding: Reductions due to Congressional adjustments for first year.
Schedule: Not Applicable
Technical: Not Applicable

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

(U) D. Schedule Profile: Not Applicable

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 6					R-1 ITEM NOMENCLATURE Unexploded Ordnance Detection and Clearance - PE 0603858D8Z					
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	0	1.273	1.268	1.264	1.258	0		Continuing	Continuing

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT:

This program element funds the Joint Unexploded Ordnance Coordinating 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 the evaluation of UXO detection and clearance technology; and to establish, gather, and maintain a database of 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 UXO clearance mission areas (active range clearance, demining, countermine, explosive ordnance disposal, and environmental remediation). 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 UXOCOE to implement this plan, and in October 1997, the Department established the operational arm of the UXOCOE, the JUXOCO, which is collocated with the Night Vision Electronic Sensors Directorate at Ft. Belvoir, Va.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE Unexploded Ordnance Detection and Clearance - PE 0603858D8Z

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1997 Accomplishments:
Not Applicable.

(U) FY 1998 Plans:
Not Applicable. Funded under the Army.

(U) FY 1999 Plans:
- Preparation of updated report for submission to Congress ($ 0.200 Million
- Continue as the focal point for UXO detection and clearance expertise ($ 0.100 Million)
- Promote international cooperation and coordinate research efforts in promising technologies ($ 0.100 Million)
- Continue development of standards, test sites, test targets and test protocols. Select and establish common test sites, data formats, and metrics. ($ 0.800 Million).
- Evaluate and capitalize on emerging, new sensor technologies and processing techniques ($.100 Million).

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE Unexploded Ordnance Detection and Clearance - PE 0603858D8Z

(U) B. **Program Change Summary**	FY1997	FY1998	FY1999	TotalCost
Previous President's Budget	0	0	1.273	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally-directed undistributed reduction				
b. Other (DoD Program Changes)				
Current Budget Submit /President's Budget			1.273	Continuing

(U) Change Summary Explanation:

(U) Funding: Not Applicable

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

(U) C. **Other Program Funding Summary**	FY1997	FY1998	FY1999	TotalCost
PE 0602712A	0	1.5000	0.500	Continuing

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

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 6	R-1 ITEM NOMENCLATURE – Number: 99 Assessments and Evaluations - PE: 604942D8Z

COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		Cost to Complete	Total Cost
Total Program Element (PE) Cost	0	* 4.655	3.916	0	0	0	0		Continuing	Continuing
National Assessment Group Project Code: 842	0	* 4.655	3.916	0	0	0	0		Continuing	Continuing

*FY 1998 funding will be executed in Program Element 0605804D8Z.

(U) A. Mission Description and Budget Item Justification

(U) BRIEF DESCRIPTION OF ELEMENT: The National Assessment Group (NAG) charter mandates the new organization to continue providing low cost, responsive, secured evaluations of National Level programs belonging to Department of Defense. The NAG shall continue to encompass the provisions for comprehensive evaluations support, instrumentation, open sources integrated research and analyses, technical engineering, operations security, risk management, logistics support, rapid assessments, and integration of technology prototypes, and their applications for DoD programs, projects and operations.

PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1997 Accomplishments: N/A

(U) FY 1998 Plans:

- The National Assessment Group will continue its efforts in becoming fully operational and autonomous.
- Continue an emphasis on quick reaction to current warfighter requirements.
- Provide infrastructure support.
- Purchase of equipment for client support.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide/Budget Activity 6	R-1 ITEM NOMENCLATURE – Number 99 Assessments and Evaluations – PE: 0604942D8Z

PROGRAM ACCOMPLISHMENTS AND PLANS: (Continued)

(U) FY 1999 Plans:

- Begin recapitalization effort.
- Facility upgrades to support security requirements.
- Purchase hardware and software upgrades to support client assessment requirements.

(U) B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	0	0	0	
Appropriated Value	0	0	0	
Congressional Directed Transfer (From DT&E 0450; PE65804D	0	4.655	4.000	Continuing
Adjustments to Appropriated Value/Transferred Amount				
a. Congressionally-directed undistributed reduction	0	0	0	
b. Other (DoD Program Changes)	0	0	(.084)	
Current Budget Submit/President's Budget	0	4.655	3.916	Continuing

(U) Change Summary Explanation:

(U) Funding: The change in FY 1999 is due to DoD undistributed changes.

(U) Schedule: Not Applicable

(U) Technical: Not Applicable

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

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide**					R-1 ITEM NOMENCLATURE **Technical Studies, Support & Analysis PE 0605104D**				
COST (In Millions)	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		
Total Program Element (PE) Cost	29.583	29.178	30.021	30.519	31.058	31.559	32.019		
P421 Tech Studies, Support & Analysis	29.583	29.178	30.021	30.519	31.058	31.559	32.019		

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: This program element is classified in Budget Activity 6 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 and Technology [USD(A&T)], 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 the defense budget declining and 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 immediate through the long-range becomes greater.

PROGRAM ACCOMPLISHMENTS AND PLANS:

General Support for USD(A&T):

FY 1997 Accomplishments:

- Assessment of deep attack weapons capabilities, both fielded and under development by all Services, to determine the appropriate combination and quantities of weapons for maximum effectiveness—led to revisions in weapons procurement plans to achieve higher combat effectiveness
- Continued development and enhancement of the electronic deskbook reference for all DoD acquisition managers
- Quantification of relative performance levels (including resource allocation, design, production, supplier integration, and overhead categories, in terms of cost, cycle times, and quality) to compare world class European/Asian shipbuilders with major US Navy shipbuilders--Shipbuilding Industrial Base Study.
- Analyses of space systems architectures and integration
- Analysis of modernization approaches and outcomes (QDR)
- Review of the adequacy of non-major procurement funding during the FYDP and DPP periods.
- Analyses of the extent to which programmed acquisition funds have been shifted to O&M accounts during the formulation and execution of the Defense budget, resulting in acquisition program instabilities.
- Support for DoD's review of the causes of illnesses experienced by Gulf War veterans
- Pilot study to determine ways to monitor and assess the consequences of vertical integration of defense industries.
- Analyses of technical issues affecting the relative performance of ballistic and cruise missile defense systems.
- Validation of new commercial technology for comparative risk reduction prioritization of DoD's annual $5 billion environmental investments

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APPROPRIATION/BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide**	R-1 ITEM NOMENCLATURE **Technical Studies, Support & Analysis PE0605104D**

- Development of a prototype methodology for validating education standards by job clusters, representing the first-ever application of the Uniform Guidelines for Employee Selection to aggregations of jobs.
- Support for the Congressionally-mandated Quadrennial Defense Review.
- Independent assessment of the Navy's Surface Ship Torpedo Defense program at the request of Congress.
- Development and publication of *Defense Acquisition Handbook* documenting good risk management procedures, and identifying relationships between product quality and risk reduction practices in industry and government.
- Analyses of environmental security strategies involving NATO Partnership-for-Peace nations.
- Examination of the pros and cons of applying commercial acquisition practices in the procurement of military turbine engines.
- Support for identification and implementation of international cooperative opportunities for armaments development.
- Formulation of methodology for examining Integrated Product and Process Development (IPPD) case studies to improve understanding of IPPD concepts.
- Assessment of problems and issues related to DoD's long-term access to low volume, affordable microelectronics devices.
- Examination of approaches for applying commercial microelectronics technologies to defense systems.
- Improved the DoD process for developing, maintaining, and using specifications and standards
- Analyses in support of International Arms Control
- Documented and distributed the DoD Science and Technology program strategy and planning, significant because this effort brought together the user and the developers in the earlier planning stages, and has resulted in a unified position, approach, and support.
- Continued development of integrated strategy to produce affordable weapons systems applying new manufacturing and business process
- Metrics and benchmarking for acquisition reform initiatives.
- Ready access to private industry networks to assess the manufacturing feasibility of emerging technology.
- Developed concepts to integrate commercial technology into military systems

FY 1998 Plans:

- Spin-off research required after the cost and operational effectiveness assessments of deep attack weapons mix
- Analysis and planning for clearance of anti-personnel land mines and unexploded ordnance
- Analyses of Theater and National Missile Defense requirements
- Implement QDR findings on program stability: develop program baselines and procedures for implementation
- Determine the environmental costs associated with weapon system design, engineering, manufacturing, development, operation, and support
- Prioritize and focus DoD technology investments on high potential environmental technologies that target high risk or high cost environmental problems
- Refine initial Shipbuilder comparative metric assessments, and develop strategic investment road map to improve performance levels of the domestic industry supporting Navy programs up to world class standards.
- Conduct follow-on assessments in areas identified during the Quadrennial Defense Review as needing additional analytic work.
- Identify organizational and procedural lessons learned from the Quadrennial Defense Review in order to improve the next QDR.
- Address issues affecting the relative performance of deep attack systems, including the modeling of system survivability at low altitudes.
- Assess schedule and technical risks associated with tactical aircraft and missile programs in preparation for acquisition milestone meetings.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 1998**
APPROPRIATION/BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide**	R-1 ITEM NOMENCLATURE **Technical Studies, Support & Analysis PE0605104D**

- Analyze the cost and schedule impacts of applying stealth technology to tactical aircraft and other systems.
- Continue implementation, tracking, and metrics of acquisition reform initiatives--specifications and standards reform, streamlining, workforce incentives
- Develop methods for improving the quality and timeliness of major defense acquisition program reporting procedures and systems.
- Support the implementation strategy for improving the insertion of commercial technologies into defense systems.
- Develop and evaluate strategies to reduce total ownership costs associated with the operating/sustainment phase of system life cycles.
- Examine technology and system performance issues related to the development and use of laser systems for missile defense.
- Standardize and rationalize facility classifications across all Services and Agencies
- Analyze/compare how the Services allocate costs in their operations and maintenance accounts for the military family housing appropriation.
- Analyze the Department's base closure and realignment costs and savings resulting from four previous rounds of BRAC and the current/projected installation capacity (per Senate Defense Authorization Act language requiring DoD to complete such a report before considering future BRAC rounds.)
- Apply prototype methodology for validating job clusters to two new career fields: the Contracting career field, and Systems Planning, Research, Development and Engineering (SPRDE) career field.

FY 1999 Plans: This program is the primary funding source for acquiring high quality, objective studies, analyses, and policy research supporting senior DoD management and decision makers in the Office of the Secretary of Defense. It produces the analytical bases for mission area rethinking, policy analysis and modeling, policy development, and program management across all functional areas of the OUSD (Acquisition & Technology) -- Space Policy, Environmental Security, Industrial Base Analysis, Acquisition Reform, Logistics, Research & Engineering, International Cooperation, Commercial Technology Insertion, Installations, Base Closure and Transitions, PPBS Improvements, and Nuclear / Chemical / Biological issues. We will continue to support the QDR and NPR goals and recommendations related to acquisition. Other research areas will: analyze/compare DoD/private sector family housing construction and operating costs; expand the use of modern modeling and simulation tools and techniques applied to DoD environmental problems; implement Dual-use policy.

General Support for Director, (PA&E):

FY 1997 Accomplishments:

Part I. Current Agenda Issues:

Readiness and Quality of Life Monitoring

- Developed tools to relate resources to readiness, as well as analyses of the most cost-effective ways to meet our objectives for readiness and quality of life.
- Examined technical and performance issues related to various ballistic missile defense systems.
- Assessed methods used by the Services to establish munitions inventory objectives, including expenditures in peacetime and war.
- Reviewed host nation support (HNS) in the Gulf War, and assessment of potential for increased reliance on HNS in selected contingencies.
- Assessed technological issues related to the Improved Cargo Helicopter program
- Improved the FYDP data system to better understand the relationships.

Infrastructure Downsizing

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE **February 1998**
APPROPRIATION/BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide**	R-1 ITEM NOMENCLATURE **Technical Studies, Support & Analysis PE0605104D**

- Developed tools/analytical frameworks addressing the need to downsize DoD's infrastructure
- Conducted analyses of the drivers of infrastructure costs.
- Followed-up on The Commission on Roles and Missions (CORM) emphasis on this theme, especially privatization and outsourcing initiatives.
- FYDP improvement project -- directly related to our ability to improve our analytical capabilities in the infrastructure area.
- Performed analyses to extend our understanding of the economies of DoD's infrastructure.

Long-Term Modernization

- Analyzed long-term investment needs and equipment aging trends.
- Developed metrics to assess our needs in this area, as well as studies of specific investment areas and systems.
- Assessed DoD's post- 2000 resource needs to maintain the Bottom-Up Review force structure and modernize key investment areas.
- PA&E and A&T have jointly sponsored the Defense Program Projection (DPP) project to address modernization issues.

Support to the Acquisition Process

- Continued analytical support for the defense acquisition process, including both the Defense Acquisition Board reviews and the MAISRC process, incorporating acquisition reform efforts.
    - Independent cost estimates prepared by the CAIG and the Cost and Operational Effectiveness Analyses overseen and reviewed by PA&E's program analysts. (Better cost and effectiveness tools, discussed below in Part II, also provide important support to the acquisition process.)
    - Development of improved methodologies to support our analysts.
- Examined potential cost savings from defense contractor mergers.
- Developed a taxonomy of cost reduction initiatives and suggested guidelines for evaluating them.
- Assessed ways to re-engineer the Contractor Cost Data Reporting system to improve its usefulness to DoD.

Congressional Mandates -- A number of reports are mandated each year by the Congress, for which PA&E has responsibility for preparation, including the annual responsibility sharing report.

Part II. Development of Analytic Tools.

- Provided critical research support for both DoD's Cost Analysis Improvement Group (CAIG) activities in support of the Defense Acquisition Board and other cost analysis activities supporting the Secretary and Deputy Secretary, including the program review process and other special studies and reviews.
    - Through the CAIG, PA&E has a statutory responsibility to ensure that DoD develops realistic cost estimates of major weapon systems.
    - This legislation requires that the CAIG prepare independent cost estimates for these systems at prescribed milestones in the acquisition process.
- Developed quantitative theory of interactions among skill, technology, and complexity in major combat operations.
- Developed analytic model to simulate naval battle group air defense, including cooperative engagement and other new technologies.
- Updated model for assessing average age of over 700 weapons systems and equipment for use in QDR.
- Strengthened DoD's independent cost estimating capability.
    - CAIG uses parametric and other cost estimating the likely development, production, and O&S costs of major weapons systems.
    - These models use methodologies that are highly dependent on sound historical data and statistical methods.
    - Includes a strong research effort in the cost analysis area, with particular emphasis on the following current issues: diminished industrial base,

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software intensive functionality, low observable technology, the rapidly changing microelectronics environment, cost impacts of acquisition streamlining initiatives, and operating and support cost estimating.

Part III. General Support for PPBS Activities:

- Alternative planning scenario analyses

FY 1998 Plans (PA&E):

Part I. Current Agenda Issues:

Infrastructure Downsizing

- Develop tools/analytical frameworks addressing the need to downsize DoD's infrastructure as directly related to the Quadrennial Defense Review (QDR), including such issues as outsourcing, lean logistics, and maintaining forces.
- Analyses of the drivers of infrastructure costs.
- Assess the impact of planned replacement, restoration, closure, and privatization actions on the age distribution of DoD facilities.
- Follow-up on emphasis on this theme, especially privatization and outsourcing initiatives.
- FYDP improvement project -- directly related to our ability to improve our analytical capabilities in the infrastructure area.
- Analyses to extend our understanding of the economics of DoD's infrastructure.

Readiness and Quality of Life Monitoring

- Develop tools to relate resources to readiness, as well as analyses of the most cost-effective ways to meet our objectives for readiness and quality of life.
- Comprehensive review of the compensation system, including medical benefits, pay and retirement annuities.
- Develop data and methods for improving DoD's understanding of the costs of NATO expansion.
- Assess skill-technology-complexity interactions to improve understanding of modeling force-on-force combat, regional balance assessments, and readiness versus modernization tradeoffs.
- Extend assessment of host nation support options to other potential contingencies.
- Continue analyses of the performance of planned ballistic missile defense systems.

Long-Term Modernization

- Analytical efforts of long-term investment needs and equipment aging trends, and the revolution in military affairs (also QDR related).
- Develop metrics to assess our needs in this area, as well as studies of specific investment areas and systems.
- Assess DoD's post- 2000 resource needs to maintain the QDR force structure and modernize key investment areas.
- PA&E and A&T have jointly sponsored the Defense Program Projection (DPP) project to address modernization issues.

Support to the Acquisition Process

- Identify and quantify the economic and regulatory factors that drive overhead costs charged by defense firms.
- Examine new manufacturing processes and acquisition reform measures and develop methods for estimating the effects on the costs
- Continuing analytical support for the defense acquisition process, including both the Defense Acquisition Board reviews and the MAISRC process, incorporating acquisition reform efforts.

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  - Independent cost estimates prepared by the CAIG and the Cost and Operational Effectiveness Analyses overseen and reviewed by PA&E's program analysts. (Better cost and effectiveness tools, discussed below in Part II, also provide important support to the acquisition process.)
- Development of improved methodologies to support our analysts.

Forces

- Analyses of all aspects of U.S. force structure as related to the QDR.
- Assessment of the utilization and integration of reserve forces into the active structure.

Future World and Projection of Threats

- Examination of longer-term security challenges.
- Perform additional regional assessments.
- Assess issues surrounding the proliferation of weapons of mass destruction
- Analyze the evolving world and the defense threats it poses.

Congressional Mandates -- A number of reports are mandated each year by the Congress, for which PA&E has responsibility for preparation, including the annual responsibility sharing report.

Part II. Development of Analytic Tools.

- Develop databases and methods for estimating the development and production costs of next generation tactical aircraft.
- Provide critical research support for both DoD's Cost Analysis Improvement Group (CAIG) activities in support of the Defense Acquisition Board and other activities supporting the Secretary and Deputy Secretary that require cost analyses, including program review process, other special studies/reviews.
  - Through the CAIG, PA&E has a statutory responsibility to ensure that DoD develops realistic cost estimates of major weapon systems.
  - This legislation requires that the CAIG prepare independent cost estimates for these systems at prescribed milestones in the acquisition process.
- Strengthen DoD's independent cost estimating capability.
  - CAIG uses parametric and other cost estimating the likely development, production, and O&S costs of major weapons systems.
  - These models use methodologies that are highly dependent on sound historical data and statistical methods.
- Develop better tools to perform a wide range of required analyses including:
  - Cost and Operational Effectiveness Analyses for Defense Acquisition Board reviews, program review issues, support to Joint Warfare Capabilities Analyses(JWCAs), and other special studies such as mobility program analyses.
  - Replacement of tools badly outmoded in the post-Cold War environment, such as the effort to improve joint theater models(JAMIP/JWARS)

FY 1999 Plans: Evaluate readiness, quality of life, modernization, and infrastructure issues, critical in a downsized military, and as related to the Quadrennial Defense Review, outsourcing, lean logistics, and maintaining forces (active and reserve). Study long-term investment requirements, equipment aging trends, and the revolution in military affairs. Examine future security challenges, regional assessments, weapons proliferation, and global defense threats in view of the changing world scene. Build/capitalize upon effectiveness tools such as theater models or other capability analyses to look at incremental costs, effectiveness, and relative contribution of planned acquisitions. Continue FYDP reform efforts. Provide tools essential for analyzing and supporting the acquisition process; continue cost analyses of the military medical delivery system; conduct independent cost and operational effectiveness of planned weapons systems; and improve techniques to better understand and project DoD infrastructure and requirements. Continue Congressionally mandated efforts.

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General Support for USD(P):

FY 1997 Accomplishments

- Developed plans for the OSD Continuity of Operations program. Conducted a series of exercises which focused on specific problem areas. Developed a plan of action for improving continuity of operations policy and planning
- Developed a single volume on the Haiti intervention to better prepare civilian and military leaders in planning future such operations.
- Assisted in developing policy options and guidance for dealing with Russia and China as they attempt to develop stockpile stewardship and management programs for maintaining confidence in their nuclear stockpiles under the Comprehensive Test Ban Treaty.
- Conducted an analysis of how C4I will affect future combat. The effort developed three specific future conflict scenarios and demonstrated how C4I capabilities would trade against weapons systems in each of the three scenarios.
- Developed detailed analysis of planning for major revisions to the nuclear war plan, including recommendations for improvements.
- Analyzed proposed strategic nuclear force structures in support of START III discussions.
- Assessed the potential impact to the U.S. infrastructure from an information warfare attack.
- Provided support for an internal assessment of national security challenges in the Asia-Pacific region in the coming two to three decades.
- Analyzed undersea-based warfare to better understand the kinds of capabilities which may be required in the future.
- Refined and developed indicators/methodologies to help assess U.S. and allied capabilities and U.S. and allied performance toward meeting force improvement objectives.
- Analyzed U.S. policy in the Balkans with a view toward identifying ways the U.S. could, in concert with its allies, promote greater regional stability and cooperation, as well as strengthen defense cooperation.

FY 1998 Plans:

- Analyze the operational and strategic implications of biological weapons and the threats they pose in a variety of regional contingencies
- Analyze the threat posed by the use of weapons of mass destruction, specifically in the Persian Gulf and Northeast Asia, and how best to deter that threat.
- Analyze the threat from radiological dispersion devices, how those weapons might be used against U.S. forces, and how the U.S. might best respond
- Analyze the threat from biological terrorism and develop appropriate response mechanisms
- Identify and assess novel options that may be exploited by regional states for delivery of nuclear, chemical, and biological weapons.
- Analyze and assess the nuclear smuggling threat within a select number of the newly independent republics of the former Soviet Union and make recommendations for how best to respond.
- Analyze nuclear weapon employment, supporting force/operational issues, and U.S. missile defense. Analyze the relationships between missile defense, deterrence policy and counterproliferation efforts.
- Continue the development of analytical tools to better understand theater, component, and operational suppression of enemy air defense systems and battlefield operations.
- Develop and assess alternative approaches to conducting major theater wars

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- Support development of an automated force management data system to help answer questions concerning how the force is being used and what policy changes may be needed.
- Continue the development of a computer gaming capability based on a warfare simulation methodology designed to model the effects of modern forces in nontraditional engagements. The methodology will account for the impact of information technologies and advanced training methods on performance in future conflicts.
- Begin the development of a comprehensive net assessment of space capabilities.
- Develop a better understanding of the range of threats to US forward basing and power projection capabilities into the Eurasian land mass over the coming 20 years as a result of the proliferation of long range precision strike weapons and associated targeting capabilities.
- FY 1999 Plans:
- Conduct regionally-focused studies on critical issues of concern to the department. (For example, we need to better understand China's continued growth as a military power and its implications for the DoD. Continued instability on the Korean sub-continent may generate the need for external analysis.
- Analyze the threat posed by the proliferation of weapons of mass destruction and the impact on U.S. force structure, acquisition, logistics, training, and doctrine
- Examine alternate force structures, budget and strategy in anticipation of the next Quadrennial Defense Review.
- Continue assessments of the implications of the Revolution in Military Affairs and how new and emerging technologies might best be exploited to enhance combat effectiveness.
- Continue the assessment of asymmetric threats to U.S. security interests and help develop potential U.S. strategies.
- Continue development of a comprehensive net assessment of space capabilities.
- Assess implementation of nuclear employment policy guidance in the development of major options

General Support for USD(P&R):

FY 1997 Accomplishments:

Military Personnel Policy

- Developed analytical tools to build a military personnel planning model to examine changes in force inventories as a result of changes in compensation as well as recruiting, retention, and separation incentives.
- At SecDef request, continued to assess the effectiveness of current military housing policy, with the purpose of providing cost-effective alternatives (including privatization).
- Congressional mandate: Evaluated the performance of each Service in integrating women into military occupations previously closed.
- Congressional mandate: Assessed General and Flag Officer career patterns and reviewed methodology for determining authorizations.
- Evaluated the effectiveness of civilian-contracted telemarketing as a "tool" to enhance recruiting, and continued to examine the cost effectiveness of alternative mixes of national and local advertising.
- Determined retention behavior of pre-career and early-career enlisted service members and predicted their propensity to both reenlist and to make a full career in the military.
- Completed assessment of trends in military recruiting to include the effects of changes in demographic, economic, psychological, and budgetary factors.

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- Developed analytic tools to examine ways in which the military pay system and non-pecuniary factors (quality of life, promotion policies, etc.) affect overall recruiting and retention, and determine the most cost-effective mix of compensation and personnel policies in meeting force strength objectives.
- Continued to evaluate the JROTC Career Academy Program, which provides academic and vocational training, as well as a special military course of instruction, for "at-risk" high school students.

Personnel and Family Support

- Continued to assess the impact of MWR and other quality of life programs on military families, with special emphasis on the effects of major QoL programs on retention, satisfaction with military life, and spouse employment.
- Examined the impact on the military community of closing PX and Commissary facilities on BRAC installations.

Civilian Personnel Policy

- Continued to devise a cost-effective DoD civilian manpower plan in the drawdown as budgets are constrained and military force levels decline.

Reserve Force Utilization

- Examined the extent to which peacetime use of Reserves affects reserve manning and retention, as well as active/reserve missions and budgets.
- Determined the cost-effectiveness of substituting Reserve for Active Duty NATO forces in Europe.

Equal Opportunity Policy

- At SecDef request, analyzed the career opportunities of minority and female officers, with particular emphasis on promotion.
- Provided expert research for the Defense Equal Opportunity Management Institute on equal opportunity and diversity issues by university faculty members.

USD(P&R) FY 1998 Plans:

Military Personnel Policy

- Congressional mandate: Investigate aviation pay authorities, explore alternative means of compensation and retention of aviators, and develop legislative recommendations.
- Congressional mandate: Examine the effects of occupation consolidation and elimination (used as a tool to generate savings during the drawdown) on skill shortages and overall readiness.
- Continue to evaluate the effectiveness of civilian-contracted telemarketing as a "tool" to enhance recruiting, and continue to examine the cost effectiveness of alternative mixes of national and local advertising.
- Develop innovative strategies to explore new markets to enhance recruiting: attracting college-bound youth into the military.
- Continue to develop analytic tools to examine ways in which the military pay system and non-pecuniary factors (quality of life, promotion policies, etc.) affect overall recruiting and retention, and determine the most cost-effective mix of compensation and personnel policies to meet force strength objectives.
- Complete evaluation of JROTC Career Academy Program, providing academic/vocational training, and special military instruction, for "at-risk" high school students.

Personnel and Family Support

- Congressional mandate: Determine the effect of lifting restrictions on merchandise sold in exchanges on the military resale system, local retail businesses, and MWR programs.

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- Continue to assess the impact of MWR and other quality of life programs on military families, with special emphasis on the effects of major QoL programs on retention, satisfaction with military life, and spouse employment.

  Civilian Personnel Policy
- Continue to devise a cost-effective DoD civilian manpower plan in the drawdown as budgets are constrained and military force levels decline.

  Reserve Force Utilization
- Develop and evaluate alternative policies to foster more effective Active/Reserve Force integration.
- Develop programs to evaluate new uses of Reserve Forces in meeting the National Military Strategy.

  Equal Opportunity Policy
- Congressional mandate: Develop and conduct a survey that measures racial, ethnic, and gender discrimination in the military.

FY 1999 Plans: Funding provides increased capability to DoD manpower in meeting force effectiveness, combat readiness, and sustainability goals. Specifically, funds will be used to: (1) explore new concepts and develop analytical tools to measure personnel and unit readiness for Active and Reserve Components; (2) develop methods to improve the determination of the total force requirements for manpower; (3) improve the technological capability of personnel systems to acquire, distribute, train, and utilize qualified personnel for Active and Reserve forces; (4) evaluate alternatives for managing total force manpower; (5) monitor quality of life, equal opportunity and diversity of the force; and (6) address congressional mandates and directives.

General Support for the Joint Staff:

FY 97 Accomplishments

- Developed PC-based assessment tools to support evaluation of various tactical air (TACAIR) modernization alternatives for Quadrennial Defense Review
- Drafted and vetted a theater engagement plan (TEP) with CINCs. This TEP will articulate CINC engagement planning within their regions. TEP will be incorporated in VOL I and II of JOPES (Joint Operations, Planning, and Execution System).
- Provided a complete set of CINC prioritized capability requirements for the evolving CP mission based on the latest weapons of mass destruction analysis
- Recognized and reorganized current combat identification elements into a "true" joint staff organization.
- Assisted in the development of an optimization methodology for use in the Capability Based Munitions Requirement (CBMR) process.
- Supported Joint Warfighting Capabilities Assessments.
- Examined cost-effectiveness of alternative ways to improve the survivability of combat aircraft through use of stealth, electronic warfare, defense suppression weapons, and decoys.
- Examined ongoing and planned improvements to intelligence support for the CINCs in response to the Commission on Roles and Missions.
- Determined way to replace an outdated information system (AUTODIN) with an Advanced Concepts Technology Demonstration (ADCTD) tool which will be foundation for inputting new readiness information.
- A major revision of CJCS Navigation Plan was completed and is now in the final coordination process. The new plan provides for several policy changes, updates plan for currency, and highlights the importance of timing information.

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- Evaluated aperture shielding theory suggested by the Nuclear C3I Review as an inexpensive means of certifying HEMP facilities--determined the High Altitude Electromagnetic Pulse (HEMP) energy leakage through a shielded--dispelled the theory that inexpensive fixes such as metallic tape could be used to reliably repair cracks in the HEMP shielding integrity of C4 facilities.
- The projected proliferant HEMP threat assessment is well under way at LANL. Several models of proliferant weapons have been calculated for the associated HEMP environment. Preliminary results reveal that the current level of hardening required to protect C4 systems may be excessive

FY98 PLANS:

- Assess the "CJCS Master Positioning, Navigation, and Timing Plan" for modifications
- Continue analytic support for Joint Warfighting Capabilities Assessments.
- Review Joint Staff processes and organizations to determine how best to implement the Chairman's Joint Vision 2010.
- Complete Phase II of aircraft survivability study
- Develop PGM mission support "primer" to identify C4ISR capabilities required to support planned PGM weapons mix
- Provide recommendations to JRB/JROC on how to improve current JMEM product and JMEM updating process
- Finalize software configuration and produce documentation on PC tools developed to assess TACAIR force size/mix alternatives
- Begin development and incorporation of assessment process to support implementation of JV 2010 operational concept of Precision Engagement
- Conduct a comprehensive review of existing and required CINC CP capabilities-- will provide a basis for developing Joint CP acquisition strategy.
- Study possible merger between STRATCOM and SPACECOM
- Conduct general research into additional joint warfare areas of interest
- Work details for EA-6B deployment and long-term allocation
- Develop optimal space asset management, especially in the area of space surveillance
- Plan and implement JV2010 principles and goals for the Joint Staff in order to develop the armed forces necessary for the 21st Century
- Identify the warfighting scenario(s) that will provide the context within which to conduct the information superiority analysis

FY99 Plans: Continue accomplishing "quick-turnaround" assessments directed from Chairman of the Joint Chiefs of Staff and Director for the Joint Staff. JV2010 implementation will also consume a major portion of our efforts, requiring careful analysis in organization dynamics and structuring.

General Support for ASD(C3I):

FY 1997 Accomplishments:

- Submitted, as directed by both legislation and Executive Order,a report to both OMB and Congress of the resources the Department spends to protect classified information and a report of an estimate of the Department's Force Protection/Antiterrorism and Combating Terrorismresources.
- Developed the U.S. strategy for the NATO data management program in consultation with OSD, DISA, and the JS.
- Developed and supported the U.S. strategy for the upgrade of theNorth Atlantic CCIS and its proliferation throughout the SACLANT AOR.
- Developed and coordinated U.S. position/strategy on all aspects of the NATO Military Message Handling Program to include the security

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issues surrounding the U.S. offer of the MISSI technology to NATO.

- Analyzed the NATO Open system Environment and NATO Open system Interconnection Profile documents and produced concrete recommendation for merging the two efforts and the creation of a minimum set of mandatory standard requirements, akin to the U.S. common operating environment concept.
- Analyzed the NATO Maintenance and supply Agency plans for implementing a new Agency wide project management MIS and made concrete recommendation to keep the project on track and within budget.
- Research and analysis support for the C4ISR Mission Assessment

FY 1998 Plans:

- To exposit an argument that perception operations to deter malefactors may work by skillfully projecting particular capabilities (e.g. for defense) and intentions (e.g. to retaliate)
- Three reports delineating the susceptibility of each country/region to Information Warfare and their current and predicted future IW capabilities both offensively and defensively.
- Assess political, social, economic implications of a near-peer competitor's information society, trends, and implications for US national security.
- Develop a theoretical framework for the study of networks and net wars.
- Conduct war game in U.K. using techniques developed for the "Day After" series, with a scenario geared to common concerns of U.S and U.K.
- Examine infrastructure vulnerabilities
- Identify what distinguishes swarming from other approaches to offense and defense
- Analyze relationship between swarming and information in environments that range from hard combat operations to ones where symbolic and other information operations may prevail.
- Identify and recommend how U. S. forces may best begin the process of doctrinal development to achieve a "Battle Swarm" doctrine
- To submit, as directed by both legislation and Executive Order, a report to both OMB and Congress of the resources the Department spends to protect classified information and a report of an estimate of the Department's Force Protection/Antiterrorism and Combating Terrorism resources.
- Perform critical review and analysis of C3 issues of interest to the U.S. and the formulation of recommended positions and solutions for consideration by the U.S. Mission to NATO and DoD.

FY 1999 Plans:

- A game plan on the use of perception management will be developed and tested
- Complete cases studied to include: the Zapatistas, Asian Triads, radio B92 in Serbia; Hizbollah, Southeast Asian pirates; and the Chechens
- Conduct war game in the US, using techniques developed for "Day After" series, with scenario geared to common concerns of U. S. and U.K.
- As directed by both legislation and Executive Order, prepare a report for both OMB and Congress of the resources the Department spends to protect classified information and a report of an estimate of the Department's Force Protection/Antiterrorism and Combating Terrorism resources.
- Perform critical review and analysis of C3 issues of interest to the U.S. and the formulation of recommended positions and solutions for consideration by the U.S. Mission to NATO and DoD.

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B. Program Change Summary	FY 1997	FY1998	FY1999	TOTAL COST
Previous President's Budget	30.447	38.376	40.355	N/A
Appropriated Value	31.248	30.376		N/A
Adjust to Appropriated Value/President's Budget	1.665		10.334	N/A
Congressional Distributed and Undistributed Reductions		1.198		N/A
Current Budget Submit/President's Budget	29.583	29.178	30.021	N/A
Below Threshold Reprogramming	1.373	2.100		

Funding: FY1999 adjustment to former President's Budget due to Appropriations Conference Report.
Schedule: N/A Technical: N/A

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

D. Schedule Profile **N / A**

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COST *(In Millions)*			FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	FY2004
Total Program Element (PE) Cost			2,608	2.584	2.669*	2.762*	2.752*	2.814*	2.886*	Cont.
Critical Technologies Program P204			2,608	2.584	2.669*	2.762*	2.752*	2.814*	2.886*	Cont.

* PE 0605110D8Z transferred to the Agency for Defense Cooperation (ADC) into PE 0605110T

A. (U)Mission Description and Budget Item Justification

A1. (U)BRIEF OVERVIEW DESCRIPTION OF TOTAL PROGRAM:

(U)This program element supports development and publication of the Congressionally mandated Militarily Critical Technologies List (MCTL). The MCTL is the fundamental source document for identification of leading edge and current technologies which must be monitored and assessed world-wide for national security and nonproliferation control of weapons of mass destruction and advanced conventional weapons. Funds continuous technical support to interdepartmental and international processes which develop multinational control agreements on technologies of concern to DOD. Provides foreign technology assessments for the MCTL and other critical technologies efforts. Identifies and

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A1. (U)BRIEF OVERVIEW DESCRIPTION OF TOTAL PROGRAM: (Continued)

determines technical parameters for proposals for international control of weapons of mass destruction. Provides technical assessments to support treaty compliance inspections and decisions on foreign ownership of US industrial assets. Identifies foreign technologies of interest to the DOD and develops opportunities for international cooperative research and development. Includes funding for travel by OSD personnel in support of the management and technical objectives. This program element is responsive to time critical requirements established in interdepartmental and international processes required to meet Congressional mandates to identify, control, transfer and develop militarily critical technologies.

A2. (U) FY 1997 ACCOMPLISHMENTS:

(U) In concert with Department of State provided leadership and technical support in the development of United States Government (USG) proposals for multinational negotiations at the Wassenaar Arrangement (successor to CoCom) to ensure continued control of technologies critical to US military and economic security. Analyzed and documented the US and International participation on the Wassenaar Arrangement. Developed proposals for Missile Technology, Nuclear and BW/CW export control regimes. ($.5 Million)

(U) Developed and published a draft of the MCTL-Part II Weapons of Mass Destruction Technologies. Published MCTL part I Weapons Systems Technologies on the Internet and on CD-ROMs. ($.908 Million)

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A2. (U) FY 1997 ACCOMPLISHMENTS: (Continued)

(U) Provided on site support at international technology negotiations and analyzed and documented US and International Participation. ($.2 Million)

(U) In concert with industry, Government and academia conducted worldwide technical assessments of dual use technologies related to Theater Missile Defense and Defense Technology Planning to determine the militarily critical technology parameters. The assessments clearly highlight critical technologies and provided technical rationale for export control changes. ($.7 Million)

(U) Identified Commercial Technologies which are candidates for application in US weapons systems. ($.3 Million)

A3. (U) FY 1998 PLANS:

(U) Develop and publish the MCTL Part III Developing Critical Technologies. Publish the MCTL Part II Weapons of Mass Destruction and Part III Developing Critical Technologies on the Internet and CD-ROMs. ($1.274 Million)

(U)Develop control/decontrol proposals addressing DOD concerns for multinational negotiations for the Wassenaar Arrangement, Missile Technology, Nuclear and BW/CW export control regimes. ($.3 Million)

(U) Provide on-site technical support at multinational negotiations for national security and nonproliferation regimes. ($.1 Million)

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A3. (U) FY 1998 PLANS: (Continued)

(U) Monitor and assess technologies worldwide and develop technology assessments to support national military and economic security actions and identify candidate technologies for applications in US weapon systems. These accomplishments will reflect regional security concerns, effects of the proliferation of weapons of mass destruction and the rapid advancement of technology worldwide. ($.7 Million)

(U) Update on an ongoing basis MCTL Part I, Weapons Systems Technologies, and MCTL Part II, Weapons of Mass Destruction Technologies. ($.21 Million)

A4. (U) FY 1999 PLANS:

(U) Develop and publish updated MCTL Parts I, II and III in both hard copy and electronic versions incorporating results of the assessments completed in FY 1998 and changes in multinational control regimes. ($1.169 Million)

(U) Monitor and assess dual use and military technologies worldwide and develop technology assessments to support national military and economic security actions and identify candidate technologies for applications in US weapon systems. These assessments will reflect security concerns, effects of the proliferation of weapons of mass destruction and the rapid advancement of technology worldwide. ($.7 Million)

(U) Develop proposals for international control/decontrol of technologies for multinational negotiations for the Wassenaar Arrangement, Nuclear and BW/CW export control regimes. ($.3 Million)

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APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/ BA: 6	R-1 ITEM NOMENCLATURE USD(A&T) -Critical Technology Support PE 0605110D8Z*

A4. (U) FY 1999 PLANS: (Continued)

(U) Provide on-site leadership and technical support at multinational negotiations. ($.1 Million)

(U) Identify and assess opportunities for joint technology programs with other nations and US industry which would enhance capabilities of US military systems. ($.4 Million)

A5. (U) JUSTIFICATION FOR BUDGET ACTIVITY ASSIGNMENT FOR THE PROGRAM ELEMENT:

(U) The program element is correctly classified in Budget Activity 6 because it provides operational technical support for the Office of the Under Secretary for Acquisition and Technology by identifying and assessing militarily critical technologies DOD assesses as critical to maintaining superior US military capabilities. Some technologies may require protection under one of the multinational control regimes. Other technologies may be eligible for use in multinational technology programs.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/ BA: 6	R-1 ITEM NOMENCLATURE USD(A&T) -Critical Technology Support PE 0605110D8Z*

A6. (U) ACQUISITION STRATEGY:

(U) The completion of the task detailed in this program element requires technical analyses across a broad spectrum of technologies which are deemed critical to continuing US military superiority. These analyses provide the basis for: the Militarily Critical Technologies List (required by the Export Administration Act); economic and national security assessments of controls in specified technology areas; foreign technology assessments to support economic and national security policy decisions; development of export control proposals for negotiations at the Wassenaar Arrangement and multinational control regimes and the identification of international cooperation opportunities. The USD(A&T) provides the technical management and oversight but does not have the broad technical expertise required to accomplish these tasks. This breadth of technical knowledge can only be obtained from Government, industry and the academic community.

(U) These tasks are best performed by a Federally Funded Research and Development Center (FFRDC). An FFRDC can produce independent and objective analyses of multinational programs which require access to the proprietary technical data of US and foreign defense industries, the existence and nature of which must be kept secret from potential competitors. The required access to sensitive US Government policies, and decision-making procedures concerning multinational defense critical technology programs, and the close collaboration with Government agencies required to perform these tasks, would give a contractor the marketing intelligence necessary to position itself unfairly in future multinational technology markets.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/ BA: 6	R-1 ITEM NOMENCLATURE USD(A&T) -Critical Technology Support PE 0605110D8Z*

B. (U) Program Change Summary:

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	2.743	2.690	2.669*	Cont.
Appropriated Value	2.743	2.690	N/A	
Adjustments to Appropriated Value/ Presidents Budget				
Closed Account Adjustments	-1	N/A	N/A	
SBIR	-67	N/A	N/A	
Undistributed Congressional Adjustments	-67	-106	N/A	
Current Budget Submit	2.608	2.584	2.669*	Cont.

* PE 0605110D8Z transferred to the Agency for Defense Cooperation (ADC) into PE 0605110T

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

D. (U) Schedule Profile: N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **FOREIGN MATERIEL ACQUISITION & EXPLOITATION** **PE 0605117D8Z**

COST *(In Millions)*		FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		39.300	35.996	35.035	35.547	36.097	36.773	37.514	Continuing	Continuing
Project Name/No. and Subtotal Cost FMA&E/P411		39.300	35.996	35.035	35.547	36.097	36.773	37.514	Continuing	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.

Program Accomplishments and Plans: The DoD Foreign Materiel 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 1997 and outyear program is a classified activity about which information is available to cleared and authorized personnel.

The Foreign Materiel Program Review Board (FMPRB) approves annual Foreign Materiel Acquisition (FMA) lists that target high-priority foreign military materiel that is potentially acquirable. As targets of opportunity become available, materiel acquisition actions are handled with real-time responsiveness and obligation of funds.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **FOREIGN MATERIEL ACQUISITION & EXPLOITATION** **PE 0605117D8Z**

B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget (FY 1998)	39.707	37.474	38.380	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction		(1.478)		
b. OSD/QDR Reductions	(.407)		(3.345)	
Current Budget Submit/President's Budget	39.300	35.996	35.035	Continuing

Change Summary Explanation: NA

Funding:: Changes are the result of Congressionally undistributed reductions and DoD program budget decisions.
Schedule: NA
Technical: NA

C. Other Program Funding Summary Cost

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost

Procurement Line P-1 No(s), Name(s) Not Applicable
Milcon Project No(s), Name(s) Not Applicable
Related RDT&E: Not Applicable

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **FOREIGN MATERIEL ACQUISITION & EXPLOITATION** **PE 0605117D8Z**

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1996				FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones	Not Applicable															
Engineering Milestones	Not Applicable															
T&E Milestones	Not Applicable															
Contract Milestones	Not Applicable															
Other Program Events	Not Applicable															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION / BUDGET ACTIVITY **Research, Development, Test & Evaluation, Defense-wide** **B/A 6**	R-1 ITEM NOMENCLATURE **Industrial Capabilities Assessments** **PE 0605122D8Z**

COST (In Millions)	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete
P708 Industrial Capabilities Assessments	0.0	0.0	2.937	3.415	3.403	3.387	3.377	Continuing

(U) A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: This program provides support for analytical research across a broad spectrum of economic, financial, and technical areas related to vertical integration, industry concentration, and the industrial capabilities necessary to meet Defense needs. The program supports the development and improvement of Defense policies, practices, and resource allocations as they relate to the acquisition process and industrial resources. Research projects address sector areas, prime and subtier contractor competitiveness and vertical integration, government-owned industrial and technological facilities, and system/component availability. The program examines strategies to address the on-going consolidation within the defense industry at both the prime and sub-tier levels. Results and analytical findings support decision-making for actions necessary to ensure availability of adequate, competitive industrial capabilities.

The research agenda is will initially concentrate on technical analyses to identify and address concerns that could emerge from vertical integration and supplier issues the industry. Projects relating to vertical integration include identifying key defense product and technology areas and examining the prime and supplier relationships and competitiveness. Additionally, potential competitive and capability retention issues are examined to improve the Department's insight of sector, supplier, and system/component areas. Industrial capability benchmarks, analysis tools, and educational modules are developed to improve DoD managers' understanding of acquisition decision impacts on industrial resource availability and competitiveness.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY Research, Development, Test & Evaluation, Defensewide B/A 6	R-1 ITEM NOMENCLATURE Industrial Capabilities Assessments PE 0605122D8Z

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

Program Accomplishments and Plans:

FY1997 Accomplishments: Not Applicable

FY1998 Plans: Not Applicable

FY1999 Plans:
Key subtier areas will be identified and monitored using metrics to highlight potential industry vertical integration and supplier competitiveness problem areas. Sector and product industrial capability assessments will be performed to characterize industry's ability to meet the Department's production and support requirements. The competitive effects of DOD R&D investments on subtier areas will be examined to determine methods to appropriately leverage investments for a more robust supplier base. Benchmarks will be established for critical manufacturing, purchasing, or management activities. Acquisition education modules will be developed for insertion into the Defense Acquisition University curricula to familiarize acquisition management to industrial capability issues. Analysis tools and data will be developed to support Service weapon system management and defense-wide decision-making.

(U) JUSTIFICATION FOR BUDGET ACTIVITY ASSIGNMENT FOR THE PROGRAM ELEMENT:
The program element is correctly classified in Budget Activity 6 because it supports decision making and provides operational technical support for the Office of the Undersecretary for Acquisition and Technology.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE: February 1998
APPROPRIATION/BUDGET ACTIVITY: Research, Development, Test & Evaluation, Defensewide B/A 6	R-1 ITEM NOMENCLATURE: Industrial Capabilities Assessments PE 0605122D8Z

(U) B. Program Change Summary	FY1997	FY 1998	FY 1999
Previous President's Budget	0	0	0
Appropriated Value	0	0	0
Adjust to Appropriated Value/President's Budget	0	0	2.937
Current Budget Submit/President's Budget	0	0	0
Below Threshold Reprogramming	0	0	0
Congressional Distributed & Undistributed Reductions			

Change Summary Explanation:
Funding:. New start PE for FY1999
Schedule: Not Applicable
Technical: Not Applicable

(U) C. **Other Program Funding Summary Cost:** Not Applicable
(U) D. **Schedule Profile:** Not Applicable

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	8346	6768	0	0	0	0	0	0	0	27107
P529 Defense Against Paramilitary Threats	162	0	0	0	0	0	0	0	0	1301
P541 Operational Plans and Exercises	550	0	0	0	0	0	0	0	0	2455
P542 CP Architecture Studies and Mgt/ Oversight	5485	5500	0	0	0	0	0	0	0	19934
P545 Nuclear Matters	2149	1268	0	0	0	0	0	0	0	3417

Mission Description and Budget Item Justification:

In August 1994, DoD established the Counterproliferation Support Program specifically to address the DoD shortfalls in counterproliferation operational capabilities documented in the May 1994 Report to Congress titled *Report on Nonproliferation and Counterproliferation Activities and Programs*. Counterproliferation Support Program funds are used to leverage DoD acquisition programs to meet the counterproliferation priorities of the Commanders-in-Chief (CINCs) of the Combatant Commands and accelerate the deployment of enhanced capabilities to the field. Specifically, the goal of the Counterproliferation Support Program is to improve specific military counterproliferation capabilities by (1) building on ongoing programs in the Services, DoD agencies, Department of Energy and U.S. Intelligence; (2) focusing on the most critical counterproliferation shortfalls to address major gaps in deployed capabilities (as reflected in the CINCs' priorities and the Counterproliferation Review Committee's (CPRC) prioritized list of counterproliferation Areas for Capability Enhancements); (3) leveraging existing program funding to more rapidly field capabilities by accelerating the deliverables of DoD programs; (4) identifying and enhancing the development of high payoff technologies to accelerate capabilities to the warfighter; (5) identifying and promoting key non-materiel initiatives that complement technological advances; and (6) transitioning Counterproliferation Support Program projects to the Services as soon as practicable.

The FY 1998 Defense Reform Initiative (DRI) directed the establishment of the Defense Threat Reduction and Treaty Compliance Agency (DTRTCA) effective 1 October 1998. The DTRTCA will be formed through the consolidation of three existing agencies: the Defense Special Weapons Agency (DSWA), the On-Site Inspection Agency (OSIA), and the Defense Technology Security Administration (DTSA). In addition, several functions from the Office of the Secretary of Defense (OSD) and Washington Headquarters Services (WHS) currently involved in the management of associated programs will transfer to DTRTCA as well. The DTRTCA will also carry out programs to counter proliferation and reduce threats posed by weapons of mass destruction and provide nuclear weapon stockpile and related support.

As part of this budget submission, Counterproliferation Support Program funding and manpower resources programmed for FY 1999 and out are transferred to the DTRTCA. A five percent military and civilian personnel savings associated with the DTRTCA consolidation has already been applied and is reflected in the funding and personnel tranfers to DTRTCA.

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

PROJECT: P529

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P529 Defense Against Paramilitary Threats	162	0	0	0	0	0	0	0	0	1301

A. Mission Description and Budget Item Justification

Project P529 - Defense Against Paramilitary Threats: Defense against paramilitary and terrorist Weapons of Mass Destruction (WMD) threats poses particularly difficult security requirements. Project 529 identifies and evaluates systems, force structure, and operational plans to enhance U.S. capabilities to defend against these threats. This project addresses the need to enhance the capability to defend key military facilities against paramilitary threats with WMD. Exercises and studies will be conducted to evaluate the current systems and force structure for this mission and to ascertain the vulnerabilities of protected WMD facilities.

Acquisition Strategy:

FY 1997 Accomplishments:

- 150 Conducted project Iron Mike
- 12 Supported DoD/ FBI Training Program

Total 162

FY 1998 Planned Program:

Total 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning FY 1998.

FY 1999 Planned Program:

Total 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning FY 1998.

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	496	0	0	496
Appropriated Value	468	N/A	N/A	468
Adjustments to Appropriated Value	-306	N/A	N/A	-306
Current Budget Submit/President's Budget	162	0	0	162

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 EXHIBIT)	DATE: February 1998
BUDGET ACTIVITY: 6 - Management Support	PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support / PROJECT: P529

C. Other Program Funding Summary
Not Applicable

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

PROJECT: P541

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P541 Operational Plans and Exercises	550	0	0	0	0	0	0	0	0	2455

A. Mission Description and Budget Item Justification

Project P541 - Operational Plans and Exercises: This project combines exercises between the Navy's Indian Head Explosive Ordinance Disposal (NEOD) units and the Army's Chemical/ Biological Response Team (CBRT) to determine joint WMD incident capabilities and shortfalls. Selected EOD units train with existing equipment and prototypes at OCONUS locations as part of an ongoing technological evaluation program. These exercises increase the number of personnel exposed to advanced equipment and reduce the need to bring personnel to CONUS sites for evaluation and training. The exercises enable the US to have an in-theater rapid response capability for countering WMD threats. Technologies and procedures for the Nuclear Emergency Search Team (NEST) program that are relevant to the BW/ CW problem will be analyzed and applied as appropriate to the development of hardware and training exercises.

Acquisition Strategy:

FY 1997 Accomplishments:
Total 550 Continue exercise and readiness sustainment activities

FY 1998 Planned Program:
Total 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998

FY 1999 Planned Program:
Total 0 All activity under this project transferred to P535-SOF Counterproliferation Support beginning in FY 1998

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	993	0	0	993
Appropriated Value	940	N/A	N/A	940
Adjustments to Appropriated Value	-390	N/A	N/A	-390
Current Budget Submit/President's Budget	550	0	0	550

RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN (R-3)	DATE February 1998
BUDGET ACTIVITY 6 - Management Support	PE NUMBER AND TITLE 0605160D8Z Counterproliferation Management Support PROJECT P541

C. Other Program Funding Summary

Not Applicable

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

PROJECT: P542

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P542 CP Architecture Studies and Mgt/ Oversight	5485	5500	0	0	0	0	0	0	0	19934

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

Project P542 - Counterproliferation Architecture Studies and Management/Oversight: The Assistant to the Secretary of Defense for Nuclear and Chemical and Biological Defense Programs (ATSD(NCB)) has been designated by the Secretary of Defense as the OSD focal point for counterproliferation (CP) activities within the DoD. The ATSD(NCB) has assigned management responsibilities for the CP Support Program to the Deputy for Counterproliferation (DATSD(NCB) (CP/CBD)). This project provides essential technical, architectural, and integration support to the CP Support Program. The project will (1) conduct analyses and planning activities necessary for program development, project prioritization and management oversight; (2) prepare required program deliverables such as the annual CP Report to Congress and internal DoD and interagency documents; and (3) provide technical and analytical support to the established CP review groups, including the congressionally mandated Counterproliferation Program Review Committee (CPRC). This project provides the critical manpower necessary to support the DATSD(NCB) (CP/CBD) in conducting the day-to-day operations of the CP Support Program and in providing the required OSD management oversight as described in the CP Support Program's Program Management Plan.

Acquisition Strategy:

FY 1997 Accomplishments:

- 2200 Systems Engineering and Technical Analysis
- Continued CP program management, programmatic and technical planning support
- Continued CP technical analyses support and technical program oversight support
- Continued CP interagency program coordination and integration activities (CPRC, Nonproliferation and Arms Control Technology Working Group)
- Continued CPRC Annual Report to Congress
- Supported PA&E and Joint Staff analysis for WMD effects analysis
- 3285 CP architectural studies and assessments
- Continued trade-off analyses of contributions of selected DoD acquisition efforts to DoD counterproliferation capabilities
- Conducted WMD Facilities Attack Assessment
- Conducted QDR Defense of US Study
- Completed CP Vulnerability and Damage Assessment
- Conducted Proliferation Path Analysis Assessment
- Initiated CP Capabilities Working Group-Advanced Planning Initiative and evaluated SOF CT/CP Campaign Plan

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
BUDGET ACTIVITY 6 - Management Support	PE NUMBER AND TITLE 0605160D8Z Counterproliferation Management Support PROJECT P542

Total 5485

FY 1998 Planned Program:

- 2650 Systems Engineering and Technical Analysis
- Continue CP program management, programmatic and technical planning support
- Continue CP technical analyses support and technical program oversight support
- Continue CP interagency program coordination and integration activities (CPRC, Nonproliferation and Arms Control Technology Working Group)
- Continue CPRC Annual Report to Congress
- Continue support to PA&E and Joint Staff analysis for WMD effects analysis
- 2734 CP architectural studies and assessments
- Continue trade-off analyses of contributions of selected DoD acquisition efforts to DoD counterproliferation capabilities
  - assess impact of adversarial use of WMD on US campaign plans; provide support to Osprey Daisy Program
  - assess alternatives to improve campaign operations in a WMD environment
  - complete evaluation of hyper/multi/ultra spectral analysis for counterproliferation applications
  - assess merits of candidate hard target kill technologies against WMD targets

116 SBIR/STTR

Total 5500

FY 1999 Planned Program

Total 0 Funds and activities transfered to PE 0605160BR. P542

B. Project Change Summary	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	5340	5133	7764	Continuing
Appropriated Value	5048	5133	N/A	N/A
Adjustments to Appropriated Value	437	367	N/A	N/A
Current Budget Submit/President's Budget	5485	5500	0	Continuing

C. Other Program Funding Summary	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	To Compl	Total Cost
0605160BR Counterproliferation Management Support			9874	9675	10338	8529	8702		Cont	Cont
0603160D8Z Counterproliferation Advance Development	61840	65212	0	0	0	0	0		Cont	Cont

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

PROJECT: P542

0603160BR Counterproliferation Advance Development	70611	68110	64180	65004	66280	Cont	Cont

D. Schedule Profile

	FY 1997				FY 1998				FY 1999			
	1	2	3	4	1	2	3	4	1	2	3	4
• Systems Engineering and Technical Analysis	X	X	X	X	X	X	X	X				
• CP Capabilities Working Group	X		X									
• CP Architectural studies and assessments		X		X		X		X				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
BUDGET ACTIVITY 6 - Management Support	PE NUMBER AND TITLE 0605160D8Z Counterproliferation Management Support PROJECT P545

COST (*In Thousands*)	FY 1997 Actual	FY 1998 Estimate	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	Cost to Complete	Total Cost
P545 Nuclear Matters	2149	1268	0	0	0	0	0	0	0	3417

A. Mission Description and Budget Item Justification

Project P545 - Nuclear Matters: Nuclear weapons receive special consideration within OSD because of the political and military importance, their destructive power and the potential consequences of an accident or an unauthorized act. Consequently, nuclear weapons issues must receive senior level attention and action/support. Complex and demanding issues exist pertaining to stockpile levels and stockpile maintenance and stewardship in collaboration with the Department of Energy, especially in view of an aging stockpile and the moratorium on underground nuclear testing. Project 545 provides support for analysis and assessments of issues associated with the reliability, safety, security, transportation, command and control, maintenance, storage and sustainability of the enduring stockpile.

Acquisition Strategy:

FY 1997 Accomplishments:

• 449	DoD oversight of DOE stockpile stewardship activities to assure nuclear weapon revalidation, tritium supply, non nuclear testing, maintenance of the enduring stockpile
• 300	Nuclear Weapons Council (NWC) support: analyses and assessments for preparation of the Annual Nuclear Weapons Stockpile Memorandum and Long Range Planning Assessment to the President, Annual Surety Report to the President, NWC Chairman's Annual Report to Congress and NWC Standing and Safety Committee actions
• 300	Support activities for the ATSD(NCB) in the conduct of international fora such as Chairman of the NATO Senior Level Weapons Protection Group, participation in the Joint Theater Surety Management Group; technical exchanges with France, UK and Russia
• 500	Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability to include DoD Directives and related documentation; perform analyses in preparation of the Annual Nuclear Weapons Deployment Request to the President
• 300	Analyses/ support activities for senior level groups, such as the Joint Advisory Committee on Nuclear Weapons Surety and Nuclear Forces Security and Survivability Steering Group, that provide advice to the Secretary of Defense, ATSD(NCB) and Chairman of the Nuclear Weapons Council
• 300	DoD support analysis for senior level management including training, safety, security and use control
•	
Total 2149	

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

DATE: February 1998

BUDGET ACTIVITY: 6 - Management Support

PE NUMBER AND TITLE: 0605160D8Z Counterproliferation Management Support

PROJECT: P545

FY 1998 Planned Program:

•	355	DoD oversight of DOE stockpile stewardship activities
•	170	Nuclear Weapons Council support
•	175	Support activities in the conduct of international fora
•	400	Support to DoD policy formulation on nuclear weapons safety, use control, survivability, certification, transportation and reliability
•	136	Analyses and support activities for senior level advisory groups
•	32	SBIR/STTR
Total	1268	

FY 1999 Planned Program

Total	0	Funds and activities transferred to PE 0605160BR. P545

B. Project Change Summary

	FY 1997	FY 1998	FY 1999	Total Cost
Previous President's Budget	1995	1914	2300	Continuing
Appropriated Value	1887	1914	N/A	N/A
Adjustments to Appropriated Value	262	-646	N/A	N/A
Current Budget Submit/President's Budget	2149	1268	0	Continuing

C. Other Program Funding Summary

Not Applicable

D. Schedule Profile

	FY 1997				FY 1998				FY 1999			
	1	2	3	4	1	2	3	4	1	2	3	4
• Analysis and Support Activities	X	X	X	X	X	X	X	X				

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

COST *(In Millions)*		FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		2.164	.343	.439	.637	.656	.667	.680	Continuing	Continuing
Project Name/No. and Subtotal Cost Classified Programs C3I/P711		2.164	.343	.439	.637	.656	.667	.680	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description of Element: Funding provides for accomplishments of studies, assessments and technical evaluations of C4I programs and activities. Resources are used to support efforts including the integration of C4 and intelligence programs and activities, the identification and resolution of national and tactical interoperability issues, and fostering joint Defense-wide support to military forces.

Program Accomplishments and Plans:

FY 1997 Accomplishments:

- Integrated the Joint Personnel Adjudication System ($0.564 Million)
- Upgraded United States Forces Korea communications and intelligence architecture ($1.600 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

FY 1998 Plans:

- Perform special studies directed to determine future concepts and futures mixes of C4I capabilities to support the environment anticipated into the next century ($0.343 Million)

FY 1999 Plans:

- Perform special studies directed to determine future concepts and futures mixes of C4I capabilities to support the environment anticipated into the next century ($0.439 Million)

B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	2.252	0 .357	0.448	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally directed undistributed reduction		(.014)		
b. Reductions from OSD	(.088)			
c. Inflation Adjustment			(.009)	
Current Budget Submit/President's Budget	2.164	0.343	0.439	Continuing

Change Summary Explanation: NA
Funding: NA

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 6	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **CLASSIFIED PROGRAMS C3I** **PE 0605710D8Z**

Schedule: NA
Technical: NA

C. Other Program Funding Summary Cost

	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Compl	Total Cost

Procurement Line P-1 No(s), Name(s) Not Applicable
Milcon Project No(s), Name(s) Not Applicable
Related RDT&E: Not Applicable

D. Schedule Profile
Fiscal Year actual and planned events by quarter

	FY1996				FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones	Not Applicable															
Engineering Milestones	Not Applicable															
T&E Milestones	Not Applicable															
Contract Milestones	Not Applicable															
Other Program Events	Not Applicable															

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)									DATE February 1998	
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6								R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D8Z		
COST *(In Millions)*	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		Cost to Complete	Total Cost
Total Program Element (PE) Cost	1.541	1.669	1.820	1.771	1.818	1.850	1.890		Continue	Continue
SBIR Administration No. P-518	1.541	1.669	1.820	1.771	1.818	1.850	1.890		Continue	Continue

A. Mission Description and Budget Item Justification

BRIEF DESCRIPTION OF ELEMENT: Under the Small Business Innovation Research (SBIR) program, DoD and ten other federal agencies are required to allocate a small percentage of their extramural R&D budgets to fund mission-oriented R&D projects at small technology companies. The program has broad bipartisan backing in Congress, based on DoD's 1996 finding that "SBIR-developed technologies have resulted in significant improvements in U.S. military capabilities and major savings to the taxpayer," as well as favorable independent evaluations by the GAO, National Academy of Sciences, National Bureau of Economic Research at Harvard, and others. Funding for DoD's SBIR program is approximately $500 million in FY 1998.

PE 0605790D8Z is the only source of funds for the coordinated administration 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 administration that are required by law, including:

- **Coordination, publication, and distribution of DoD's SBIR research solicitations**, as required by 15 U.S.C. 638(g)(2);
- **Monitoring of DoD-wide SBIR program expenditures**, to meet Congressionally-mandated reporting requirements in 15 U.S.C. 638(g)(8), (j)(2)(F), and (*l*)(2);
- **Sponsorship of national SBIR conferences**, which are the only existing forum for small technology companies to interact directly with DoD's SBIR program managers, contracting officers, and technical personnel, and thereby learn how to prepare research proposals that serve DoD's needs.

These functions are central to the operation of the SBIR program and have been a standard part of the program since it was initiated at DoD in 1983.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D8Z

PROGRAM ACCOMPLISHMENT AND PLANS:

FY 1997 Accomplishments: This budget item funded the coordination and publication of three SBIR/STTR research solicitations, as well as their distribution to over 30,000 potential applicants. The solicitations are the means, prescribed by statute, through which DoD describes its research needs and solicits research proposals from small technology companies. This budget item also funded the monitoring of DoD-wide SBIR program expenditures, as required by law, as well as DoD's annual reporting to Congress and the Small Business Administration on the operation of DoD's SBIR program. And this budget item funded three national SBIR conferences each attracting 800-1000 companies, in which the companies met directly with DoD scientists, contracting officers, and program managers, and learned how to prepare SBIR proposals and design research projects that will serve the DoD mission. In addition, this budget item funded USD(A&T) initiatives to streamline the SBIR process and facilitate participation in the program by companies not used to doing business with the government. Such initiatives included the creation and distribution of an SBIR desk reference for DoD contracting officers and technical personnel, the operation of an SBIR Help Desk (800/382-4634) for program participants, the operation of an SBIR Home Page, and other projects. Lastly, it funded a new USD(A&T) initiative to systematically monitor the track record of multiple-award winners in commercializing their previous SBIR research, and to use that track record in the proposal evaluation process. ($1.541 Million)

FY 1998 Plans: This budget item continues to fund the core administrative functions discussed above - coordination, publication, and distribution of the solicitations; monitoring and reporting on the DoD-wide operation of the program; and sponsorship of the national SBIR conferences. It also continues to fund the USD(A&T) initiatives to streamline the SBIR process (SBIR Desk Reference, SBIR Help Desk, SBIR Home Page) and monitor the track record of multiple award winners. And it funds a new USD(A&T) initiative to evaluate the success of the pilot SBIR "Fast Track" policy, under which DoD focuses its SBIR funds on projects that attract matching funds from outside investors. This program element includes funding for travel, including invitational travel, in support of the above activities. ($1.669 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RESEARCH, DEVELOPMENT, TEST & EVALUATION, DEFENSE-WIDE, BUDGET ACTIVITY 6	R-1 ITEM NOMENCLATURE SBIR Administration PE 0605790D8Z

FY 1999 Plans: This budget item will continue to fund the core administrative functions and USD(A&T) initiatives to streamline the SBIR process, monitor the track record of multiple-award winners, and evaluate the success of the Fast Track policy and other aspects of the program. It will also fund a pilot initiative to evaluate the commercialization plans now required in all phase II SBIR proposals (commercialization in military and private sector markets). ($1.820 Million)

FY 2000 - 2003: This budget item will continue to fund the core administrative functions (solicitations, monitoring of program expenditures and operations, national conferences), as well as initiatives, such as those discussed above, to streamline the SBIR process, measure the program's success, and generally improve the program's effectiveness in converting SBIR research into affordable, high-performance new products of benefit to DoD.

B. Program Change Summary

	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	1.628	1.738	1.820	Continuing
Appropriated Value	1.628	1.738		
Adj. to Approp. Value/President's Budget	(.087)	(.069)		
Current Budget Submit	1.541	1.669	1.820	Continuing

Change Summary Explanation:

Funding: The change in funding in FY1997 and FY 1998 is the result of undistributed Congressional reductions.

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary: N/A

D. Schedule Profile N/A

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RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)								DATE FEBRUARY 1998	
					R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. **C3I INTELLIGENCE PROGRAMS PE 0305190D8Z**				
COST *(In Millions)*	FY1996	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total Program Element (PE) Cost		6.767	5.978	9.672	9.658	10.517	11.640	12.793	Continuing	Continuing
Project Name/No. and Subtotal Cost C3I Intelligence Programs/P481		6.767	5.978	9.672	9.658	10.517	11.640	12.793	Continuing	Continuing

A. Mission Description and Budget Item Justification

Brief Description and Budget Item Justification: PE 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 Program Management and technical 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, acquisition, integration and assessment of systems or applications in support of non-traditional and contingency warfare. ISSO currently provides program management for:

- ISSO Program Management Support & Administration
- Battlefield Information Collection and Exploitation System (BICES) Developmental Efforts
- Open House Program (OH)
- National Drug Intelligence Center (NDIC) for DoD –See Descriptive Summary in NFIP for program details.
- Advanced Sensor Applications Program (ASAP) - See ASAP RDT&E Descriptive Summary for program details.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

- Throttle Car (TC)- See Descriptive Summary in the Counterdrug submission for program details.
- Gulf States Counterdrug Initiative (GSCI)- See Descriptive Summary in the Counterdrug submission for program details
- Joint Technical Office (JTO)
- JPO Bio Detection Sensor Network (BIOW)
- Other Classified Programs

Program Accomplishments and Plans:

FY 1997 Accomplishments:

- Salaries for Program and Functional Managers & Administrative Staff (1.50 Million)
- Facility Leased Space (0.30 Million)
- Logistical Support (0.20 Million)
- System Engineering and Technical Support (SETA) (0.70 Million)
- Program & Technical Support to DoD/Library of Congress OPEN HOUSE Initiative (0.5)
- Technology Integration and Systems Development (0.80)
- Test TAV.1 Network for IOC (0.25 Million)
- Migration of BICES Interface Development Module to SHAPE (0.35 Million)
- Continue development of US national segment to BICES (0.50 Million)
- Continue support to US BICES Team (1.11 Million)
- Continue development of bilateral interfaces to US BICES TAV.2 (0.35 Million)
- SBIR Contribution (0.1 Million)

FY 1998 Plans:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

- Salaries for Program and Functional Managers & Administrative Staff (1.80 Million)
- Facility Leased Space (0.25 Million)
- Logistical Support (0.20 Million)
- System Engineering and Technical Support (SETA) (0.50 Million)
- Program & Technical Support to DoD/Library of Congress OPEN HOUSE Initiative (0.40 Million)
- Assess Financial Transaction Profiling (0.10 Million)
- Explore Battle Damage Assessment Technology (0.20 Million)
- US/UK High Powered Microwave Assessment (0.15 Million)
- Continue development of US national segment to BICES (0.30 Million)
- Continue support to US BICES Team (1.22 Million)
- Continue development of bilateral interfaces to US BICES TAV.2 (0.20 Million)
- Migrate US Gateway to Web technology (0.25 Million)
- Integrate BICES Target Architecture Version (TAV) 2.0 (0.40 Million)

FY 1999 Plans:

- Salaries for Program and Functional Managers & Administrative Staff (2.228 Million)
- Facility Leased Space (0.25 Million)
- Logistical Support (0.22 Million)
- System Engineering and Technical Support (SETA) (0.50 Million)
- Program & Technical Support to DoD/Library of Congress OPEN HOUSE Initiative (0.40 Million)
- Technology Integration and Systems Development (0. 14 Million)
- Conduct technology assessments for Intelligence & C3 integration efforts (3.644 Million)

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

- Continue development of US national segment to BICES (0.30 Million)
- Continue support to US BICES Team (1.23 Million)
- Continue development of bilateral interfaces to US BICES TAV.2 (0.20 Million)
- Expand TAV 2.0 to the Lower National Levels (0.30 Million)
- Stabilize the BICES Backbone Network (0.26 Million)

C3I Intelligence Programs is in Budget Activity 7, Operational Systems Development because it is consistent with established DoD definitions for BA 7. Provide an acquisition strategy. Not Applicable

B. Program Change Summary	FY1997	FY1998	FY1999	Total Cost
Previous President's Budget	6.899	6.249	6.242	Continuing
Appropriated Value				
Adjustments to Appropriated Value				
a. Congressionally-directed undistributed reduction.		(.271)		
b. Reductions from DoD and QDR	(.132)		(.284)	
c. Other			3.714	
Current President's Budget	6.767	5.978	9.672	Continuing

Change Summary Explanation:

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

Funding: Change in programmed funding is driven by DoD and QDR realignments within DoD.
Schedule: NA
Technical: NA

C. Other Program Funding Summary Cost : N/A

D. Schedule Profile

ISSO:

• Transfer of NDIC Financial Program from Counter-drug to NFIP Program at CMS	1QFY97
• Transfer of PDC Program Management to ADUST(SI)	2QFY97
• Initiated Program Development for JPO BIO-Warfare Prototype	2QFY97
• Operation support to JCS J39	2QFY97
• Initiate Foreign Military Sales Technical Support	3QFY97
• Initiate Force Protection Proof of Concept	4QFY97
• Initiate contractor sponsored C4ISR Independent Research & Development (IRAD) activities	1QFY98
• US/UK High Powered Microwave Exploration	2QFY98
• Assess Financial Transaction Profiling	2QFY98
• Explore Battle Damage Assessment Technology	3QFY98
• Assess Global Threat Information Sharing Program	3QFY98
• Develop Transnational Threat Program Concept	4QFY98
• Develop International Interoperability Architecture	4QFY99
• Pursue Industrial Base Alliances	4QFY99

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

BICES:

• Continue Migration of US Gateway to web technology	1QFY97
• Continue Integration BICES Target Architecture Version (TAV) 2.0	1QFY97
• Complete Migration of US Gateway to web technology	2QFY98
• Complete Integration of BICES Target Architecture Version (TAV) 2.0	2QFY98
• Expand Target Architectures to the Lower National Level	2QFY99
• Stabilize the BICES Backbone Network TAV 2.0	4QFY99

JPO-BIOW:

• Completed Mark II ACTD Prototype System Documentation Development	4QFY97
• Completed Mark II ACTD Prototype Baseline & Integration Testing	4QFY97
• Developed Mark II ACTD Prototype Built-in-Test & evaluation Requirements	1QFY98
• Complete Mark III ACTD Prototype Documentation Development	1QFY98
• Complete Mark III ACTD Prototype Production Engineering Evaluation	1QFY98
• Complete Mark III ACTD Prototype Test Plan	1QFY98
• Develop Integrated Production Model (IPM) Prototype	1QFY98
• Design IPM Prototype Built-in-Test	1QFY98
• Complete IPM Prototype Test Documentation	1QFY98
• Complete IPM Prototype Testing	1QFY98
• Develop IPM Production Plan	1QFY98
• Initiate Production Contract	2QFY98
• Develop Low Rate Initial Production (LRIP) Systems	3QFY98
• Field ACTD System in Korea	3QFY98

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

• Continue LRIP Schedule	4QFY98
• Field ACTD System in Middle East	1QFY99
• Continue ACTD System Deployment throughout Korea and Middle Ease	2QFY99

OPEN HOUSE:

• Installed microfilm Camera at the Hungarian Military Archives in Budapest.	1QFY97
• Installed microfilm duplicator at the Ministry of Defense Archives in Bucharest.	1QFY97
• Continued maintenance of equipment at all seven sites in Eastern Europe.	1QFY97
• Deactivated camera site in Prague, Czech Republic	3QFY97
• Deactivate film processing center in Germany.	4QFY97
• Continue site operations activities at all sites.	1QFY98
• Transfer processing equipment to program site in Moscow, Russia.	1QFY98
• Investigate site activation possibilities in Bulgaria per USD Policy request.	1QFY98
• Complete activation of film processing site in Moscow	2QFY98
• Activate new site at Russian Academy of Sciences Library in St. Petersburg	2QFY98
• Negotiate expansion of program to Russian military archives in Moscow.	2QFY98
• Perform site survey at Russian Naval Archives in Gatchina	3QFY98
• Conduct negotiations with Russian Historical Archives and General Staff	3QFY98
• Continue site operations activities at all sites	1QFY99

TECHNOLOGY NAVIGATOR (JOINT TECHNICAL OFFICE):

• Completed IC Information Technology Assessment, Briefings, and Tech Navigator (TN) prototype	1QFY97
• Initiated TN Beta Test Development	2QFY97
• Implemented TN Beta Test Operations	3QFY97
• Improve TN Functionality, expand TN technology domains, and implement transfer to Intellink	1QFY98

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE FEBRUARY 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E/BA 7	R-1 ITEM NOMENCLATURE Program Element (PE) Name and No. C3I INTELLIGENCE PROGRAMS PE 0305190D8Z

- Implement TN Intelink System upgrades and additional TN Technology domains 2QFY98
- Initiate transfer of TN Program Management to DTIC and IC(TBD) Executive Agents 3QFY98
- Implement Executive Agent responsibilities and TN system upgrades 4QFY98
- Monitor Executive Agent responsibilities and TN system upgrades 1QFY99

Fiscal Year actual and planned events by quarter. N/A

	FY1995				FY1996				FY1997				FY1998			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones																
Engineering Milestones																
T&E Milestones																
Contract Milestones																
Other Program Events																

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

COST (IN MILLIONS)	FY1997*	FY1998***	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	67.204	52.148	37.192	31.705	24.032	17.135	17.681	continuing	continuing
Total Project Cost/No. and Subtotal Cost Outrider/P801	61.446	0	0	0	0	0	0	continuing	continuing
Total Project Cost/No. and Subtotal Cost Tactical Control System (TCS)/P802	5.758	40.669	32.144	24.908	15.977	9.635	9.603	continuing	continuing
Total Project Cost/No. and Subtotal Cost Common Systems Development (CSD)/P803	[18.663]**	11.479	5.048	6.797	8.055	7.500	8.078	continuing	continuing
Quantity of RDT&E Articles		Outrider–Up to 4							

*FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

** CSD was included in the Outrider project (P801) in the FY 1997 President's Budget submission. These efforts are separately identified as individual projects in FY 1998 and future years to more clearly identify their unique requirements and costs. The amount in brackets [ ] is for information only.

*** Outrider FY 1998 RDT&E was transferred to Army Aviation Advanced Technology PE 0603003A Proj D464. Outrider FY 1999 and to complete RDT&E is in DARP PE 0305204A.

A. Mission Description and Budget Item Justification

Brief Description of Element: The non-lethal tactical UAV systems for DoD provide warfighters with a dedicated capability for day/night aerial reconnaissance, surveillance and target acquisition (RSTA); intelligence; communications/data relay; electronic warfare; weather data collection to support combat operations; minefield detection; and nuclear, biological and chemical reconnaissance in limited adverse weather. Tactical UAVs provide ground and naval commanders with near-real-time reconnaissance capability for sustained, deep RSTA support, and combat assessment (CA). UAV support to the maneuver battalions and brigades incorporates downsized, portable equipment that is capable of rapid deployment, easy to operate and maintain with minimum manpower and training requirements, and capable of launch and recovery in a constrained operating environment. The shipboard capability supports the Naval Task Forces. UAVs are intended for deployment in environments where immediate feedback is necessary and manned aircraft are unavailable or excessive risk makes the use of manned aircraft

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z	

undesirable. Current Hunter UAV assets support training and UAV commonality and interoperability efforts. Scaleability requirements are captured in the Tactical Control System (TCS) to meet users' operational needs at multiple echelons. The Outrider Tactical UAV (TUAV) Advanced Concept Technology Demonstration (ACTD) provides a single UAV that moves towards meeting Joint Services tactical UAV requirements. The TUAV endurance objective is to provide four hours flying time on station at a distance of up to 200 kilometers. The baseline payload is electro-optical/infra-red (EO/IR). Growth payloads will expand TUAV RSTA capabilities. The basic ACTD includes risk mitigation efforts of a UAV Common Automatic Recovery System (UCARS).

The Outrider ACTD program will demonstrate Joint Services (Army, Navy, and Marine Corps) tactical UAV requirements culminating in each Service's Military Utility Assessment. Low Rate Initial Production (LRIP) and Operational Test and Evaluation (OT&E) addresses the ground based and shipboard operations of tactical UAVs. In addition, efforts are underway to develop a common TCS to provide an interoperable capability for control of the spectrum of present and future tactical UAV air vehicles and payloads utilized by the military services for RSTA and CA. TCS will interface with the High Altitude Endurance (HAE) UAV systems and multiple C4I systems. TCS is structured to develop concepts of operation in conjunction with warfighters, to transform the operational concepts into a technical architecture with technical performance parameters, to demonstrate key capabilities through a rapid prototyping and demonstration effort, and to conduct supporting analyses, simulations, and trade studies leading to production in FY99. The Systems Integration Laboratory (SIL) is an integral part of the TCS development. The SIL allows the integration and simulation of air vehicles, payloads, and system upgrades prior to actual flight. Integration of software and hardware within this controlled laboratory environment reduces the cost of test and evaluation and the risks associated with actual flight test. The Common Systems Development (CSD) provides for system interoperability and commonality among UAVs. Efforts such as open architecture, payload development, joint logistics, and simulation and modeling continue to ensure reduced life cycle costs, improved supportability, and the exploitation of technological advancement having UAV application. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of operational system development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

COST (IN MILLIONS)	FY1997*	FY1998***	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	67.204	52.148	37.192	31.705	24.032	17.135	17.681	continuing	continuing
Total Project Cost/No. and Subtotal Cost Outrider/P801	61.446**	0	0	0	0	0	0	continuing	continuing
Quantity of RDT&E Articles		Up to 4							

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

** CSD was included in this project in the FY 1997 President's submission. CSD is identified as a separate project (P803) in FY 1998 and future years to more clearly identify its unique requirements and costs.

*** Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

A. Mission Description and Budget Item Justification:

Brief Description of Element: The Tactical Unmanned Aerial Vehicle (TUAV), "Outrider," provides Army brigades/battalions, USMC regiments/battalions, and Navy forces with dedicated day/night, reconnaissance, surveillance and target acquisition (RSTA) and intelligence. Outrider provides the tactical warfighting commander with critical battlefield information in the rapid cycle time required for success at the tactical level. The Joint Requirements Oversight Council (JROC) reassessed warfighter UAV priorities and reconfirmed the TUAV as the JROC's top UAV priority to meet Service requirements in JROCM 173-96, Unmanned Aerial Vehicles, 12 November 1996. The Outrider Advanced Concept Technology Demonstration (ACTD) system consists of four air vehicles, each configured with an electro-optical (EO)/infra-red (IR) sensor payload, ground control equipment, including communications equipment and launch and recovery equipment, remote video terminal, two HMMWVs and two trailers, and one mobile maintenance facility for every three TUAV systems. Common Systems Development (CSD) pursues the RDT&E of systems common to the tactical family of UAVs (Pioneer, Outrider, Predator), including growth payloads and subsystems; performs user demonstrations of emerging UAV technologies; manages UAV joint international programs; and provides cross-functional support in the areas of logistics, simulation, test, and operations research. CSD supports testing, common system integration, and subsystems development for UAVs, including the UAV Common Automatic Recovery System (UCARS) and the modular integrated avionics group (MIAG); and logistics initiatives to reduce life cycle costs, improve supportability, and exploit commercial/non developmental item (NDI) technology having UAV applications. CSD also provides user demonstration, integration, test, and qualification of JROC-prioritized growth payloads such as communication/data relay, electronic warfare, laser designator, and chemical/biological

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

reconnaissance; demonstrates alternative UAV technologies and concepts, including vertical take off and landing (VTOL), and heavy fuel engines (HFE) for the family of tactical UAVs. International program efforts include cooperative RDT&E arrangements with major NATO and non-NATO allies, and provides day-to-day management and policy oversight regarding UAV export control and foreign military sales (FMS).

Programs Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($61.446)

Outrider Tactical UAV (TUAV) ($42.783)

- Continued development, integration and manufacture of TUAV ACTD systems including first flight, test, planned user training; shipboard integration planning and support; TUAV/UCARS integration, and TCS interoperability planning/demonstration; and supported TUAV simulations and continued planning and preparations for user exercises and demonstrations ($38.708)
- DARP Integration and Support ($4.075)

Common Systems Development ($18.663)

- Completed qualification testing of UCARS baseline system and Predator UCARS feasibility study ($0.250)
- Continued limited demonstrations, integration, qualification, and flight demonstrations of growth payloads IAW JROC guidance ($0.511)
- Completed qualification of MIAG for application to the family of tactical UAVs and integrated/demonstrated MIAG on Pioneer ($0.200)
- Continued common, integration, test logistics, and international support efforts ($3.826)
- Initiated Congressionally directed flight demonstration of VTOL UAV technology ($13.876)

FY1998 Plans: ($0)

Outrider Tactical UAV ($0)
Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Common Systems Development
Identified separately in P803 for FY1998 and future years.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

Obligation time frame for all FY98 funding is from Oct 97 - Dec 98

FY 1999 Plans: ($0)

Outrider Tactical UAV ($0)
Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Common Systems Development
Identified separately in P803 for FY1998 and future years.

Obligation time frame for all FY99 funding is from Oct 98 - Dec 99

Acquisition Strategy:

Tactical UAV: The TUAV ACTD provides for the placement of systems in the hands of operational users as quickly as possible for use in demonstrations and exercises. The ACTD process provides users with the opportunity to assess the military utility of the system thereby becoming informed buyers and applying lessons learned while evolving system requirements. The TUAV ACTD contract was competitively awarded with industry being advised of the possibility of follow-on production buys should the ACTD system demonstrate a military utility sufficient to cause the users to request additional quantities of the system. To this end, the ACTD contract has an option for six (6) LRIP systems. The Outrider LRIP option supports a Full Rate Production (FRP) decision. The ACTD will address Joint Services (Army, Navy, Marine Corps) tactical UAV requirements and will validate military utility for each Service. The TUAV program will employ "cost as an independent variable" in acquiring any follow-on systems. In accordance with JROC direction, the estimated costs for the 33rd and 100th air vehicles with payloads have been established as $350K and $300K.

Common Systems Development (CSD): The CSD promotes the maximum use of common and interoperable hardware, software, and non developmental items (NDI) technology in an effort to support Joint Service UAV operations, streamline maintenance/support, and reduce life cycle cost. It exploits technology advancements that have UAV application through integration demonstrations.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

B. Program Change Summary	FY1997*	FY1998***	FY1999	Total Cost
Previous President's Budget	57.5	83.3	0	continuing
Appropriated Value	72.5			
Adjustments to Appropriated Value				
a. Undistributed Reduction	(3.9)			
b. Realignments	(4.0)			
c. Reprogramming				
d. Recission	(3.2)			
President's Budget Request	61.4**	0	0	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

** CSD was included in this project in FY 1997 and prior years. CSD is identified as a separate project (P803) in FY 1998 and future years to more clearly identify its unique requirements and costs.

***Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Change Summary Explanation:

Funding: Internal realignment was made from the ongoing Outrider HFE effort to consolidate HFE within Advanced Technology
Schedule: N/A
Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
Proc, DW				70.506	93.166	111.169	114.162	continuing	continuing
RDT&E, (A)*		45.000	75.636	4.000	4.476	5.500	5.241	continuing	continuing

* Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Outrider Tactical UAV												
Acquisition Milestones												
Acquisition Decision								X				
FRP												
Engineering Milestones												
System Integration and Demonstration							X					
UCARS Integration and Demonstrations								X				
T&E Milestones												
First Flight		X										
OT&E										X		X

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Contract Milestones												
LRIP									X			
Other Events												
Training						X					X	
1st System Delivery						X						
MUA							X					
1st LRIP Delivery										X→		

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P801

Tactical Unmanned Aerial Vehicles (TUAV)

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998***	FY1999
OUTRIDER			
1. Hardware/Software Development	29.185	0	0
2. Technical and Engineering Support	8.432	0	0
3. Management Support	0.150	0	0
4. Test & Evaluation and Demonstrations	0.941	0	0
5. Other	0.000	0	0
6. DARP Integration and Support	4.075	0	0
Subtotal	42.783	0	0
Common Systems Development			
Subtotal	18.663**	0	
TOTALS	61.446**	0	0

* FY 1997 funding is justified as part of Program Element 0305154D.

** CSD was included in this project in FY 1997 and prior years. CSD is identified as a separate project (P803) in FY 1998 and future years to more clearly identify its unique requirements and costs.

*** Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P801

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998**	Budget FY1999**	Budget to Complete *	Total Program *
Product Development organizations									
Outrider TUAV									
Alliant Tech Systems					27.436			continuing	continuing
MICOM					1.872			continuing	continuing
MICOM/RDEC					2.575			continuing	continuing
MILCOM/SIL					1.758			continuing	continuing
SNC					0.700			continuing	continuing
NAWC AD					1.645			continuing	continuing
TBD/Competitive Award									
NAVSEA					0.582			continuing	continuing
Other					1.049			continuing	continuing
	Outrider	**Subtotal**			37.617				

* FY 1997 funding is justified as part of Program Element 0305154D.

**Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P801

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998***	Budget FY1999***	Budget to Complete *	Total Program *
Common Systems Development (CSD)**									
TBD/Competitive					9.564			continuing	continuing
Other									
	CSD		**Subtotal**		9.564				
Prod Dev Org			**Subtotal**		47.181				
Support and Management Organizations									
Outrider TUAV									
Other					0.150			continuing	continuing
DARP Integration and Support					4.075			continuing	continuing
	Outrider		**Subtotal**		4.225				
Common Systems Development **									
H.J.Ford					1.750			continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.
** CSD was included in this project in FY 1997 and prior years. CSD is identified as a separate project (P803) in FY 1998 and future years to more clearly identify its unique requirements and costs.
*** Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P801

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998**	Budget FY1999**	Budget to Complete *	Total Program *
FEDSIM					1.900			continuing	continuing
Other					0.250			continuing	continuing
	CSD		Subtotal		3.900				
Support and Management			Subtotal		8.125				
Test & Evaluation Organizations									
Outrider TUAV									
OPTEC/Other					0.276			continuing	continuing
MCOTEA									
MICOM					0.235			continuing	continuing
OPTEVFOR									
EPG					0.430			continuing	continuing
YPG									
	Outrider		Subtotal		0.941				

* FY 1997 funding is justified as part of Program Element 0305154D.
** Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P801

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998***	Budget FY1999***	Budget to Complete *	Total Program *
Common Systems Development**									
Other					3.787			continuing	continuing
Test and Evaluation			Subtotal		4.728				
GFE Organizations									
Outrider TUAV									
Other									
Common Systems Development**									
Other					1.412				
	GFE		Subtotal		1.412				
Product Development Subtotal**					47.181				
Support & Management Subtotal**					8.125				
Test & Evaluation Subtotal**					4.728				
GFE Subtotal**					1.412				
PROJECT TOTAL**					61.446				

* FY 1997 funding is justified as part of Program Element 0305154D.
** CSD was included in this project in FY 1997 and prior years. CSD is identified as a separate project (P803) in FY 1998 and future years to more clearly identify its unique requirements and costs.
*** Outrider RDT&E was transferred to DARP PE 0305204A beginning with FY 1998.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	67.204	52.148	37.192	31.705	24.032	17.135	17.681	continuing	continuing
Total Project Cost/No. and Subtotal Cost Tactical Control System (TCS)/P802	5.758	40.669	32.144	24.908	15.977	9.635	9.603	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D

A. Mission Description and Budget Item Justification

Brief Description of Element: The Tactical Control System (TCS) provides interoperability and commonality for mission planning, command, control, communications, and data dissemination for the current and future family of tactical and Medium Altitude Endurance (MAE) Unmanned Aerial Vehicles (UAVs). It provides a full range of scaleable UAV capability from passive receipt of air vehicle and payload data to full air vehicle command and control. TCS functionality supports the joint warfighter with a common core operation environment to receive, process, and disseminate UAV air vehicle and payload data from two or more different UAV types for reconnaissance, surveillance, and combat assessment. TCS will also have an objective capability to receive and disseminate payload information from the Global Hawk and DarkStar endurance UAVs. TCS supports seamless integration into the existing C4I architecture and interface with other manned and unmanned reconnaissance platforms and intelligence systems providing information superiority through cross cueing. TCS maximizes the use of Commercial and Government off-the-shelf (COTs and GOTs) hardware and software whenever possible. TCS software will be interoperable and operate on existing service computer platforms and compliant with the ASD(C3I) Joint Technical Architecture, Distributed Common Ground System (DCGS), Common Imagery Ground/Surface Station (CIGSS), and the United States Imagery Standards, and Defense Information Infrastructure/Common Operating Environment (DII-COE). The UAV Joint Technology Center and Systems Integration Laboratory (JTC/SIL) supports the assessment of system integration readiness prior to actual flight testing. The JTC/SIL provides for hardware-in-the-loop tests of payloads, air vehicles (A/V), ground system components, and joint interoperable interface and UAV Concept of Operations (CONOPS) evaluations using the Multiple UAV Simulation Environment (MUSE) in Advanced Warfighting Exercises (AWEs). The NATO Industrial Advisory Group, Project 35, has undertaken a study to define a common interoperable NATO UAV ground control system architecture. Current plans include an interoperable demonstration with a German UAV.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

Programs Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($5.758)

- Continued TCS system design, development, and implementation of TCS architecture ($2.004)
- Continued refinement of JII standards for TUAV Outrider, Predator and other future UAV platform interoperability ($0.500)
- Continued rapid prototyping, system integration, test, simulation and interoperability efforts at the JTC/SIL ($0.500)
- Conducted limited TCS prototype demonstrations including receipt and dissemination of Predator/Outrider data ($1.100)
- Participated in Advanced Warfighting Experiment and Joint Service exercises for refinement of operational requirements/CONOPS JWID-97, Task Force XXI, UFL 97 ($1.104)
- Participated in International NATO Standards Study ($0.100)
- Evaluated Commercial Flight Route and Payload Planning Software Application ($0.450)

FY1998 Plans: ($40.669)

- Continue prototype demonstrations of land and sea-based TCS including mission planning, air vehicle, and payload control of Predator and TUAV ($8.373)
- Continue TCS evolutionary development, engineering and integration efforts to include demonstration of scaleability, portability, mission planning and C4I integration, and select a Systems Integration contractor ($14.276)
- Continue documentation of system requirements ($2.120)
- Continue JTC/SIL rapid prototyping, simulation and modeling, systems integration and interoperability and test including establishment of a development baseline ($6.000)
- Continue participation in joint warfighting experiments and Service exercises for refinement of CONOPS: FLTEX 98, Division XXI experiments, etc. (Contingent on funding from Services: $0.000)
- Acquire a Predator UAV and Ground Control System for TCS integration and testing ($8.000)
- Selected Logicon Corporation for Flight Route and Payload Planning Software for integration into TCS ($0.900)
- Award LRIP System Design, Test and Integration (SDTI) contract ($1.000)
- Conduct MS II review

Obligation time frame for all FY98 funding is from Oct 97 - Dec 98

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

FY1999 Plans: ($32.144)

- Mature and refine system design through continued DT, OT, of land and sea-based TCS including multiple control of Predator and/or TUAV Outrider Air Vehicles ($12.533)
- Continue TCS evolutionary development; validation of manufacturing and production; engineering, and integration efforts to include testing of scaleability, portability, and mission planning; and logistics efforts including approval and execution of Low Rate Initial Production ($10.110)
- Continue route and payload systems integration and interoperability tests ($4.501)
- Continue participation in joint warfighting experiments and Service exercises for refinement of CONOPS (Supplemented by contingent funding from the Services: $2.000)
- Continue Multiple UAV Simulation Environment efforts ($3.000)

Obligation time frame for all FY99 funding is from Oct 98 - Dec 99

Acquisition Strategy: The present TCS design and development effort is currently midway through a Program Definition and Risk Reduction phase (Phase I) that is scheduled to conclude at the end of FY98; the Engineering and Manufacturing Development (EMD) phase (Phase II) immediately follows in September 1998. A major effort during the EMD phase will be the integration of government furnished TCS hardware and software components by a Systems Design, Test and Integration (SDTI) contractor for four Low Rate Initial Production (LRIP) systems. The SDTI contract will be a full and open competitive procurement with a planned award date of 4Q FY98. Options for Full Rate Production (Phase III) of additional TCS systems will be included in the basic SDTI contract. The scheduled Initial Operational Capability (IOC) of the TCS is 2Q FY00; Full Operational Capability (FOC) is 2Q FY01. IOC will be achieved after each service has fielded one production representative system with interim Integrated Logistics Support (ILS) (training, spares, technical publications, support equipment) in place and testing (developmental and operational) completed. FOC will be achieved when full attainment of capability is provided by in-place maintenance and repair support, software support, test equipment and spares and systems are effectively employed and operated by the services's hosting unit or force.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	7.1	34.5	27.0	continuing
Appropriated Value	7.1	42.5		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(.4)	(1.8)		
b. Realignments	(.4)			
c. Reprogramming				
d. Recission	(.6)			
President's Budget Request	5.7	40.7	32.1	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: N/A
Schedule: N/A
Technical: N/A

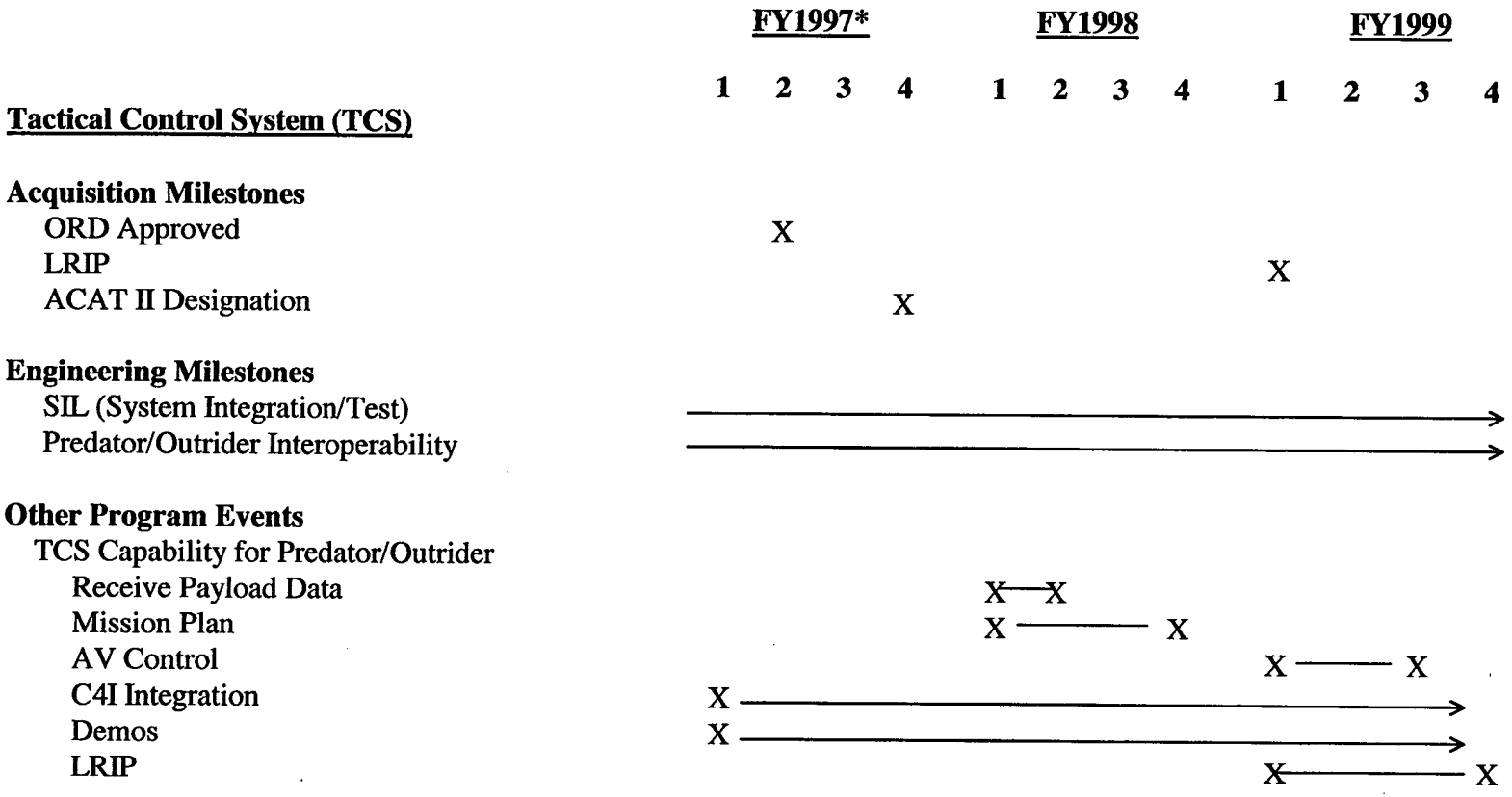
C. Other Program Funding Summary Cost

N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

D. Schedule Profile

Fiscal Year actual and planned events by quarter



* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z /P802

Tactical Control System (TCS)

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Hardware Development	0.600	6.698	1.800
2. Software Development and Integration	1.854	9.820	7.600
3. Technical Support and Program Management	0.500	3.685	3.000
4. Interface Development	0.500	3.240	2.211
5. Test, Evaluation & Demonstrations	1.100	5.739	12.533
6. Exercise/Other/MUSE	1.204	3.487	5.000
7. Predator Assets		8.000	
TOTALS	5.758	40.669	32.144

* FY 1997 funding was justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z /P802

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
SDTI						1.000	5.000	continuing	continuing
RDEC/SIL/MICOM					0.971	7.629	7.096	continuing	continuing
NSWC Dahlgren					3.900	13.031	10.900	continuing	continuing
General Atomics					0.100	2.080	0.300		
Alliant TechSystems						1.056	0.300		
APL					0.600	1.359	0.500		
Other/Test, Evaluation & Demo					0.187	6.514	8.048	continuing	continuing
Product Development Organizations		**Subtotal**			5.758	32.669	32.144	continuing	continuing
Support and Management Organizations									
Test and Evaluation Organizations									
Other						8.000			

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z /P802

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support & Management Subtotal									
Test & Evaluation Subtotal						8.000			
Government Furnished Property Subtotal									
Miscellaneous Subtotal									
PROJECT TOTAL					5.758	40.669	32.144	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	67.204	52.148	37.192	31.705	24.032	17.135	17.681	continuing	continuing
Total Project Cost/No. and Subtotal Cost CSD/P803	[18.663]*	11.479	5.048	6.797	8.055	7.500	8.078	continuing	continuing
Quantity of RDT&E Articles		6							

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D. CSD was included in the Outrider project (P801) for FY 1997 and prior years. It is identified as a separate project for FY 1998 and future years to more clearly identify its unique requirements and costs. The numbers in brackets [ ] are for information only.

A. Mission Description and Budget Item Justification:

Brief Description of Element: Common Systems Development (CSD) pursues the RDT&E and production of systems common to the tactical family of UAVs (Pioneer, Outrider, Predator), including growth payloads and subsystems; performs user demonstrations of emerging UAV technologies; manages UAV joint international programs; and provides cross-functional support in the areas of logistics, simulation, test, and operations research. CSD supports testing, common system integration, and subsystems development for UAVs, including the UAV Common Automatic Recovery System (UCARS) and Modular Integrated Avionics Group (MIAG); and supports initiatives to reduce life cycle costs, improve supportability, and exploit commercial and Non Developmental Item (NDI) technology having UAV applications. CSD also provides user demonstration, integration, test, and qualification of JROC-prioritized growth payloads such as communication/data relay, electronic warfare, laser designator, and chemical/biological reconnaissance; demonstrates alternative UAV technologies and concepts, including Vertical Take Off and Landing (VTOL). International program efforts including cooperation R&D arrangements with major NATO and non-NATO allies, and provides day-to-day management and policy oversight regarding UAV export control and foreign military sales.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

Programs Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: [$18.663]*

- Completed qualification testing of UCARS baseline system and Predator UCARS feasibility study [$0.250]*
- Continued limited demonstrations, integration, qualification, and flight demonstrations of growth payloads in accordance with JROC guidance [$0.511]*
- Completed qualification of MIAG for application to the family of tactical UAVs and integrated/demonstrated MIAG on Pioneer [$0.200]*
- Continued common, integration, test, logistics, and international support efforts [$3.826]*
- Initiated Congressionally directed flight demonstration of VTOL UAV technology [$13.876]*

FY1998 Plans: ($11.479)

- Conduct Congressionally-directed research of Multi-function Self-Aligned Gate technology (MSAG) ($3.795)
- Continue Congressionally directed flight demonstration of VTOL UAV technology, including initiation of Congressionally directed Stopped-Rotor/Reaction Drive/High Speed VTOL UAV Concept Technology Demonstration. ($7.684)

Obligation time frame for all FY98 funding is from Oct 97 - Dec 98

FY1999 Plans: ($5.048)

- Initiate and support integration, demonstration, and test of growth payloads ($1.888)
- Continue international initiatives to improve UAV integration into NATO Task Force Operations ($0.200)
- Continue exchange with allies to expand US markets and work cost-effective solutions to US requirements ($0.200)
- Improve/validate UCARS and MIAG upgrades to expand user base and enhance common applications ($0.600)
- Investigate Alternative UAV Automatic Launch/Recovery Technologies ($0.200)
- Support Small-Drone demonstrations and special payload integration in response to user community requirements ($0.500)
- Continue common, integration, test, logistics, and international support efforts ($1.460)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

*FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply to this program's portion of the total PE costs for 0305154D. CSD was included in the Outrider project (P801) for FY 1997 and prior years. It is identified as a separate project for FY 1998 and future years to more clearly identify its unique requirements and costs. The number in brackets [ ] are for information only.

Acquisition Strategy:

The CSD promotes the maximum use of common and interoperable hardware, software, and non developmental items (NDI) technology in an effort to support Joint Service UAV operations, streamline maintenance/support, and reduce life cycle cost. It exploits technology advancements that have UAV application through integration and demonstrations.

B. Program Change Summary	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	[6.1]	4.2	5.2	continuing
Appropriated Value	[21.1]	12.0		
Adjustments to Appropriated Value				
a. Undistributed Reduction	[(1.0)]	(0.5)		
b. Realignments	[(0.4)]			
c. Reprogramming				
d. Recission	[(1.0)]			
President's Budget Request	[18.7]	11.5	5.0	continuing

*FY 1997 funding is justified as part of Program Element 0305154D. CSD is justified as part of the Outrider project (P801) for FY 1997 and prior years. The above numbers in brackets [ ] are for information only.

Change Summary Explanation:

Funding: FY 1997 includes a $15M Congressional add for VTOL demonstration
FY 1998 includes Congressional adds for VTOL UAV Technology ($8M) and MSAG ($4M)
Schedule: N/A
Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z

C. Other Program Funding Summary Cost

N/A

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Engineering Milestones												
UCARS/ Predator Feasibility Study	X											
UCARS Baselined						X						
T&E Milestones												
UCARS Systems Qualification			X		X							
VTOL Flight Test						X	X					
Pioneer/ MIAG Demonstration				X	X							
MIAG Production Qualification							X	X				
Contract Milestones												
VTOL Demonstration Contract Awards					X							
VTOL Technology Development Award						X						
MSAG Contract Award						X						
Payload Demonstration Contract Award										X		

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P803

Common Systems Development

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Hardware/Software Development	[0.000]	4.000	0.500
2. Hardware/Software Development/UCARS Integration	[0.000]	0.000	0.000
3. Technical and Management Support	[3.900]	0.000	2.160
4. Test & Evaluation Demonstrations	[14.763]	7.479	2.388
5. Other	[0.000]	0.000	0.000
TOTALS	[18.663]	11.479	5.048

* FY 1997 funding is justified as part of Program Element 0305154D. CSD is justified as part of the Outrider project (P801) for FY 1997 and prior years. The above costs in brackets [ ] are for information only.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P803

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998*	Budget FY1999	Budget to Complete*	Total Program
Product Development organizations									
VTOL:									
SAIC	C/CPFF	Dec 97			[1.780]				
Bombardier	C/CPFF	Dec 97			[2.052]				
Bell Helicopter	C/CPFF	Dec 97			[2.154]				
Boeing	C/CPFF	Feb 98			[3.428]	6.684			
ITT (MSAG)						3.795			
Other					[0.150]		2.288	continuing	continuing
Prod Dev Org		**Subtotal**			[9.564]	10.479	2.288	continuing	continuing
Support and Management Organizations									
H.J. Ford					[1.750]	0.000	2.160	continuing	continuing
FEDSIM					[1.900]				
Other					[0.250]				

* FY 1997 funding was justified as part of Program Element 0305154D. CSD is justified as part of the Outrider project (P801) for FY 1998 and prior years.
The above costs in brackets [ ] are for information only.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 NOMENCLATURE Tactical Unmanned Aerial Vehicles (TUAV) PE 0305204D8Z/P803

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support & Management		**Subtotal**			[3.900]	0.000	2.160	continuing	continuing
Test & Evaluation									
NAWCAD	MIPR	Dec 97			[2.187]				
YPG	MIPR	Dec 97			[1.600]	1.000	0.600		
(TBD)									
Other									
Test & Evaluation		**Subtotal**			[3.787]	1.000	0.600		
GFE Organizations									
SNC	FFP	Sep 97			[1.412]				
Product Development Subtotal					[9.564]	10.479	2.288		
Support and Management Subtotal					[3.900]	0.000	2.160		
Test & Evaluation Subtotal					[3.787]	1.000	0.600		
Government Furnished Property Subtotal					[1.412]				
Miscellaneous Subtotal									
PROJECT TOTAL					[18.663]	11.479	5.048	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D. CSD is justified as part of the Outrider project (P801) for FY 1998 and prior years. The above costs in brackets [ ] are for information only.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

COST (IN MILLIONS)	FY1997*	FY1998**	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	198.315	184.380	178.668	26.005	14.498	16.036	15.560	continuing	continuing
Project Name/No. and Subtotal Cost Global Hawk (CONV HAE)/P804	73.225	95.169	90.051	10.829	7.524	7.624	6.829	continuing	continuing
Project Name/No. and Subtotal Cost DarkStar/(LO-HAE)/P805	62.843	42.642	40.518	6.145	3.487	3.467	3.471	continuing	continuing
Project Name/No. and Subtotal Cost Predator (MAE)/P806	7.777	0.000	0.000	0.000	0.000	0.000	0.000	continuing	continuing
Project Name/No. and Subtotal Cost HAE Common Ground Segment/P807	54.470	46.569	48.099	9.031	3.487	4.945	5.260	continuing	continuing
Quantity of RDT&E Articles	CONV HAE 3 HAE CGS 1								

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

A. Mission Description and Budget Item Justification

Brief Description of Element: This program includes the Medium Altitude Endurance (MAE) - Predator; Conventional High Altitude Endurance (CONV HAE) - Global Hawk; Low Observable High Altitude Endurance (LO HAE) - DarkStar; HAE UAV Common Ground Segment (CGS) and associated support items. These systems will provide all-weather, day/night, reconnaissance and surveillance in direct support of the Joint Forces Commander. They integrate existing airborne reconnaissance architectures for mission planning, data processing, exploitation and dissemination.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

COST (IN MILLIONS)	FY1997*	FY1998**	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	198.315	184.380	178.668	26.005	14.498	16.036	15.560	continuing	continuing
Total Project Cost/No. and Subtotal Cost Global Hawk (CONV HAE)/P804	73.225	95.169	90.051	10.829	7.524	7.624	6.829	continuing	continuing
Quantity of RDT&E Articles	3								

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

A. Mission Description and Budget Item Justification

Brief Description of Element: The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional HAE (CONV HAE) - Global Hawk and a Low Observable HAE (LO HAE) - DarkStar, and a Common Ground Segment (CGS), common and interoperable with both types of air vehicles (A/Vs). The DarkStar and HAE UAV Common Ground Segment projects are documented separately. The objective of the program is to place the assets in the hands of the warfighter as quickly as possible to assess the utility of the system in the context of military exercises with other service/theater systems. The execution of the Global Hawk project is dependent on funding of the HAE UAV Common Ground Segment project which contains the ground segment RDT&E, and government developmental and demonstration support funding for both Global Hawk and DarkStar A/Vs. The Global Hawk will provide continuous, all-weather, day/night, wide area reconnaissance and surveillance in direct support of the Joint Forces Commander. The system consists of aircraft, sensors, communications and interfaces to theater systems to support tactical warfighters at various levels of command. The Global Hawk will be a fully automatic, high altitude, long endurance unmanned aircraft that is directly responsive to Theater force tasking. The Global Hawk will integrate with the existing tactical airborne reconnaissance architectures for mission planning, data processing, exploitation, and dissemination. It will provide both wide area search radar and Electro Optical (EO) or Infrared Radar (IR) imagery (40,000 sq nm per mission) at 1m resolution and up to 1900 spot images per mission at 0.3m resolution, and will support

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

targeting accuracy of at least 20m CEP. The Global Hawk is the primary "workhorse" of the HAE UAV ACTD system and will be capable of supporting an estimated 80 percent of all military HAE UAV operational reconnaissance needs. It will be designed for long endurance, high altitude, standoff, image collection capabilities. The Global Hawk will operate in low-to-moderate air defense threat environments with the ability to fly above, standoff, and look into high threat areas. This project is categorized as Budget Activity 7 because it provides for technologies and capabilities in support of Operational System Development.

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($73.225)

- Completed factory systems integration test and moved A/V#1 to Edwards AFB for completion of hardware/software integration and checkout ($37.989)
- Completed fabrication of second sensor payload ($11.084)
- Commenced surrogate aircraft developmental flight and system performance tests (includes SAR, EO/IR and communication payload components) ($7.943)
- Initiated long lead and fabrication of three demonstration A/Vs (#3,#4,#5) ($11.000)
- Provided contractor fabrication, demonstration and evaluation support ($2.250)
- DARP integration and support ($2.959)

FY1998 Plans: ($95.169)**

- Continue development and integrate design updates ($40.886)
- Continue fabrication and integration of the demonstration A/Vs (#3, #4, #5) ($35.762)
- Provide contractor participation in planning for test and evaluation of military utility ($4.892)
- Provide contractor fabrication, demonstration and evaluation support ($13.629)

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

* * Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

FY1999 Plans: ($90.051)

- Continue integration of design updates ($2.966)
- Complete fabrication and integration of the final demonstration A/Vs (#3, #4, #5) ($31.253)
- Provide contractor participation in test and evaluation of military utility in joint exercises ($39.199) Note: Government demonstration costs are found in the HAE UAV Common Ground Segment project of this program element.
- Provide contractor fabrication, demonstration and evaluation support ($16.633)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy: The HAE system will be procured as a design-to-cost program to acquire maximum reconnaissance capability for a firm unit flyaway price (UFP) of $10M (FY94$) per vehicle (including payload). Global Hawk was selected at the end of a competition involving multiple contractor teams. Streamlined procurement, using DARPA's Other Transaction Authority, is being used to delete all non value-added tasks and documentation from the program. Under the Developmental Phase agreement, the contractor is responsible for building and testing two Global Hawk air vehicles. As part of this agreement, the contractor will also build a developmental ground segment. During the Demonstration Phase, program management responsibility will transition to the Air Force. Funding for the ACTD program ends in FY2000. Funding for the post ACTD RDT&E and production begins in FY2001.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	81.2	96.0	64.6	continuing
Appropriated Value	71.2	96.0		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(4.0)	(4.2)		
b. Realignments	3.0	3.3		
c. Reprogramming	3.0			
d. Recission				
President's Budget Request	73.2	95.1	90.1	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: DARPA realignment of $3.0M from Common Ground Station (CGS). FY 98 internal realignment within the HAE program.

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

C. Other Program Funding Summary Cost

	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
RDT&E, DW									
(PE 0305205D)									
HAE UAV	54.470	46.569	48.099	9.031	3.487	4.945	5.260	continuing	continuing
Common DarkStar	62.843	42.642	40.518	6.145	3.487	3.467	3.471	continuing	continuing
Procurement, DW									
HAE UAV					32.618	30.265	33.864	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Engineering Milestones												
Final Design Review	X											
Test & Evaluation Milestones												
Flight Readiness Review				X———		X						
Start Developmental Flight Tests						X						
Contract Milestones												
Demonstration Agreement Award				X								
Other Program Events												
Fabricate Demonstration Air Vehicles				X———								X
User Field Demonstrations with Warfighters									X——→			

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P804

Conventional High Altitude Endurance (CONV HAE) UAV - Global Hawk

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Design Studies (previously referred to as Phase I)	0.000	0.000	0.000
2. Development & Test (previously referred to as Phase II)	57.016	40.886	2.966
3. Fabrication (previously referred to as Phase III)	11.000	35.762	31.253
4. Contractor Participation in Testing & Demonstrations	0.000	4.892	39.199
5. Fabrication, Demonstration and Evaluation Support	2.250	13.629	16.633
6.. DARP Integration and Support	2.959		
TOTALS	73.225	95.169	90.051

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P804

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor/ Government Performing Activity	Contractor Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
Teledyne Ryan Aeronautical Developmental Systems Agreement (AV's #1,#2)	C/CPFF/IF	Nov 94			57.050	39.900	2.800	continuing	continuing
Teledyne Ryan Aeronautical System Fabrication Agreement (AV's #3,#4,#5)	SS/CPFF/IF	Aug 97			10.999	48.200	45.200	continuing	continuing
Raytheon Systems Group-CGS Support					2.250	0.000	0.000	continuing	continuing
Miscellaneous					2.926	.795	2.551	continuing	continuing
Support and Management Organizations									
Test and Evaluation Organizations									
Teledyne Ryan Aeronautical Demonstration Phase Agreement	SS/CPFF	May 98			0.000	4.774	37.000	continuing	continuing
Miscellaneous					0.000	1.500	2.500	continuing	continuing

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P804

Contractor/ Government Performing Activity	Contractor Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Government Furnished Property									
None									
Subtotal Product Development					73.225	88.895	50.551	continuing	continuing
Subtotal Support and Management					0.000	0.000	0.000	continuing	continuing
Subtotal Test and Evaluation					0.000	6.274	39.500	continuing	continuing
TOTAL					73.225	95.169	90.051	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

COST (IN MILLIONS)	FY1997*	FY1998**	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	198.315	184.380	178.668	26.005	14.498	16.036	15.560	continuing	continuing
Total Project Cost/No. and Subtotal Cost DarkStar (LO-HAE)/P805	62.843	42.642	40.518	6.145	3.487	3.467	3.471	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs for this year apply only to this program's portion of the total PE costs for 0305154D.

** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

A. Mission Description and Budget Item Justification

Brief Description of Element: The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional HAE (CONV HAE) - Global Hawk and a Low Observable HAE (LO HAE) - DarkStar, and a Common Ground Segment (CGS), common and interoperable with both types of air vehicles. The Global Hawk and the HAE UAV Common Ground Segment projects are documented separately. The objective of this program is to place the assets in the hands of the warfighter as quickly as possible to assess the utility of the system via military exercises with other service/theater systems. The execution of the DarkStar project is dependent on funding of the HAE UAV Common Ground Segment project which contains the ground segment RDT&E and government developmental and demonstration support funding for both DarkStar and Global Hawk A/Vs. The DarkStar will provide continuous, all-weather, day/night, wide area reconnaissance and surveillance in direct support of the Joint Forces Commander. The system consists of aircraft, sensors, communications and interfaces to theater systems to support tactical warfighters at various levels of command. The DarkStar will integrate with the existing tactical airborne reconnaissance architectures for mission planning, data processing, exploitation, and dissemination. The DarkStar will provide wide area search, over 15,000 sq nm per mission, with either the Electro Optical (EO) or Synthetic Aperture Radar (SAR) sensors at 1m resolution. In addition, the DarkStar is capable of 600 spot images per mission with either sensor at 0.3m resolution. The search and spot modes can be interleaved with attendant reductions in the overall coverage. The system will support a targeting

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

accuracy of at least 20m CEP. The stealth capabilities of the DarkStar allow the system to operate in high threat environments before suppression of enemy air defenses (SEAD) where manned reconnaissance and the Global Hawk are not viable options. The optimization of this UAV for survivability means the UAV is less capable than the Global Hawk in terms of total endurance and payload capability. This project is categorized as Budget Activity 7 because it provides for technologies and capabilities in support of Operational System Development.

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($62.843)

- Completed corrective redesign of flight controls and landing gear sub-systems identified after crash of DarkStar A/V #1 and continued rebuild and checkout of DarkStar A/V #2 ($22.387)
- Integrated EO framing technology ($3.500)
- Continued fabrication of DarkStar demonstration A/Vs (#3, #4) ($29.013)
- Provided fabrication, demonstration and evaluation support ($7.943)

FY1998 Plans: ($42.642)**

- Continue fabrication of DarkStar demonstration A/Vs (#3, #4) ($9.864)
- Complete rebuild and checkout of DarkStar A/V #2 ($14.001)
- Complete development of DarkStar to include qualification of an operational configuration air data system ($1.672)
- Provide contractor participation in planning for test and evaluation of military utility ($10.134)
- Provide fabrication, demonstration and evaluation support ($6.971)

** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

FY1999 Plans: ($40.518)

- Complete fabrication of DarkStar demonstration A/V's (#3, #4) ($4.110)
- Conduct survivability testing ($3.905)
- Provide contractor participation in test and evaluation of military utility in joint exercises ($29.420) Note: Government demonstration cost are found in the HAE UAV Common Ground Segment project of this program element.
- Incorporate Air vehicle upgrades/user recommended improvements ($3.083)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy: The LO HAE system will be procured as a design-to-cost program to acquire the most reconnaissance capability for a firm unit flyaway price of $10 million (FY94$) per air vehicle (including payload). DarkStar was a sole-source award that leveraged substantial previous government investment in low-observable technology. Streamlined procurement using DARPA's Other Transaction Authority is being used to delete all non value-added tasks and documentation from the program. During the Demonstration Phase (previously referred to as Phase III), program management responsibility will transition to the Air Force. Funding for the ACTD program ends in FY2000. Funding for post ACTD and production begins in FY 2001.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	17.4	55.0	37.9	continuing
Appropriated Value	45.9	54.6		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(3.3)	(2.3)		
b. Realignments	10.0	(9.7)		
c. Reprogramming	11.7			
d. Recission	(1.5)			
President's Budget Request	62.8	42.6	40.5	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: DarkStar test support funds were contained within CGS for demonstrations. Following the crash of the AV #1, funds were realigned to the core DarkStar account for crash recovery efforts.

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

C. Other Program Funding Summary Cost

	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
RDT&E, DW									
(PE0305205D)									
Global Hawk	73.225	95.169	90.051	10.829	7.524	7.624	6.829	continued	continued
HAE UAV Common	54.470	46.569	48.099	9.031	3.487	4.945	5.260	continued	continued

*FY 1997 funding is justified as part of Program Element 0305154D.

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Test & Evaluation Milestones												
Resume Developmental Flight Tests						X						
Contract Milestones												
Demonstration Agreement Award			X									
Other Program Events												
Fabricate Demonstration Air Vehicles	X	—	—	—	—	—	—	—	—	X		
User Field Demonstrations with Warfighters									X	→		

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P805

Low Observable High Altitude Endurance (LO HAE) UAV – DarkStar

($ in millions)

A. Project Cost Breakdown

	FY1997*	FY1998	FY1999
1. Development and Test (previously referred to as Phase IIA)	15.124	14.001	0.000
2. DarkStar Developmental Ground Segment Support	.779	0.000	0.000
3. Ground Testing and A/V Support (previously referred to as Phase IIB)	9.984	1.672	3.905
4. Contractor Participation in Testing and Demonstrations	0.000	10.134	29.420
5. Air Vehicle Fabrication	29.013	9.864	4.110
6. Air Vehicle/User Recommended Improvements	0.000	0.000	3.083
7. Fabrication, Demonstration and Evaluation Support	7.943	6.971	0.000
TOTALS	62.843	42.642	40.518

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P805

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
Lockheed Martin Skunk Works Development /Demonstration Phase Agreement for A/Vs #1 - #2	SS/CPIF	Jun 94			25.881	15.195	0.000	continuing	continuing
Lockheed Martin Skunk Works Fabrication Agreement for A/Vs #3 - #4	SS/CPIF	Nov 96			31.706	12.367	4.000	continuing	continuing
Raytheon Systems Group – CGS Support					3.270	4.250	0.000	continuing	continuing
Miscellaneous					0.761	0.350	0.544	continuing	continuing
Support and Management Organizations									
Test and Evaluation Organizations									
Lockheed Martin Skunk Works Demonstration Agreement	SS/CPIF	May 98			0.000	10.002	33.631	continuing	continuing
Miscellaneous					1.225	0.478	2.343	continuing	continuing

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P805

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Test and Evaluation Organizations									
Government Furnished Property									
None									
Subtotal Product Development					61.618	32.162	4.544	continuing	continuing
Subtotal Support and Management					0.000	0.000	0.000	continuing	continuing
Subtotal Test and Evaluation					1.225	10.480	35.974	continuing	continuing
TOTAL					62.843	42.642	40.518	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

COST (IN MILLIONS)	FY1997*	FY1998**	FY1999**	FY2000**	FY2001**	FY2002**	FY2003**	Cost to Complete	Total Cost
Total PE Cost	198.315	184.380	178.668	26.005	14.498	16.036	15.560	continuing	continuing
Total Project Cost/No. Subtotal Cost Predator (MAE)/P806	7.777	0.000	0.000	0.000	0.000	0.000	0.000	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

** FY 1998 and later funding has been transferred to RDT&E, Air Force, Program Element 0305205F

A. Mission Description and Budget Item Justification

Brief Description of Element: The Medium Altitude Endurance (MAE) Unmanned Aerial Vehicle (UAV) - Predator was an Advanced Concept Technology Demonstration (ACTD) project for the development of an endurance UAV capable of sustained (long dwell) surveillance of critical targets, under most weather conditions at a range of 500 nm from the launch area. The Predator is equipped with Electro-Optical/Infra-Red (EO/IR) and Synthetic Aperture Radar (SAR) sensors. The system also incorporates wide-band Ku-Band SATCOM datalinks capable of providing near-real-time (NRT) transmission of high resolution imagery throughout the operational envelope. The system supports the theater commander and interfaces with the Command, Control, Communication, Computer, and Intelligence (C4I) architecture. The Predator is integral to the search and destruction of Critical Mobile Targets (CMT). The success of the Predator in a number of exercises and two operational deployments in Bosnia has prompted the Joint Requirements Oversight Council (JROC) to request an additional quantity of systems and sensors. The JROC has identified a number of P3I upgrades (De-icing, UHF/VHF Voice Relay, and IFF Mode IV) to be included with production systems. Reliability improvements, UAV Common Automatic Recovery System and growth payloads are being considered for P3I upgrades.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

Program Accomplishments and Plans: ($ in millions)

FY 1997 Accomplishments: ($7.777)

- Initiated development and integration of UHF/VHF voice, Mode IV IFF, ROTAX 914 engine, deicing, and general system optimization ($5.392)
- Initiated initial operational assessment ($0.480)
- Supported multiple exercises ($1.600)
- DARP Integration and Support ($.305)

FY1998 and later funding has been transferred to RDT&E, Air Force, Program Element 0305205F

Acquisition Strategy: The ACTD strategy was to integrate presently available military and commercial technologies to field a Predator system (3 air vehicles with EO/IR/SAR, Trojan Spirit II, related support equipment and integrated logistics for the demonstration period) for purposes of operational demonstration and assessment within 30 months of the go-ahead decision and provide a residual leave behind capability if required. A total of 12 air vehicles (2 air vehicles to replace losses in Bosnia) configured with EO/IR and optional SAR sensors, and line-of-sight and SATCOM datalinks along with 3 ground stations, 3 Trojan Spirit II, related support equipment and spares were procured during the ACTD period. JROC validation of a USACOM assessment of military utility and JROC requirement to expedite further production and fielding of Predator systems combined with Congressional plus-ups led to RFPs for the procurement of additional air vehicles, ground control stations, related support equipment and spares. The Acquisition Strategy is to procure "back-fill" components for ACTD residual systems to bring them to the operationally deployable configuration and enter the formal acquisition cycle with a Production Rate Verification in FY 97, follow-on production and OT&E in FY 1999. The Predator system configuration defined at the end of the ACTD is 4 air vehicles (3 air vehicles with EO/IR/SAR and 1 with EO/IR only), 1 ground control station, 1 Trojan Spirit II, related support equipment and integrated logistics support. The current budget provides for 12 and attrition air vehicles. The contracting strategy is to integrate total system performance requirement (TSPR) in FY 1998 using General Atomics as the prime contractor to coordinate and implement hardware and engineering requirements. Engineering and integration of additional P3I stated JROC Memorandum 173-96 will be pursued during the FYDP.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

B. Program Change Summary

	FY1997*	FY1998**	FY1999**	Total Cost
Previous President's Budget	6.1	15.0	4.4	continuing
Appropriated Value	6.1	0	0	
Adjustments to Appropriated Value				
a. Undistributed Reduction	(.3)			
b. Realignments	2.0			
c. Reprogramming				
d. Recission				
President's Budget Request	7.8	0	0	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.
** FY 1998 and later funding has been transferred to RDT&E, AF, Program Element 0305205F

Change Summary Explanation:

Funding: Internal realignments made to support exercise ULCHI Focus Lens and de-icing efforts.

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
Procurement, OPN (UAV CARS)	5.577							continuing	continuing
Aircraft, PROC, AF (PE 35205F)	105.210	138.956	117.961	43.017	26.777	52.345	78.070	continuing	continuing
Other, PROC, AF (PE 27587F)	2.858							continuing	continuing
MILCON, AF (PE 27587F) FY97-98 (PE 27245F) FY99-03	4.690		15.013					continuing	continuing
MILPERS, AF (PE 27587F) FY97-98 (PE 27245F) FY99-03	7.309	21.549	23.884	26.986	29.628	30.171	30.776	continuing	continuing
O&M, AF (PE 27587F) FY97-98 (PE 27245F) FY99-03	5.800	18.455	26.187	30.560	29.498	31.984	31.083	continuing	continuing
RDT&E, AF (PE 0305205F)		14.147	4.307	4.076	3.800	3.883	3.960	continuing	continuing

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997*				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
OSD Program Review			X									
OSD Program Initiation				X								
SAE Program Production Decision				X								
Production Rate Verification Start				X								
Test & Evaluation Milestones												
TEMP Development/Approval				X								
OT&E										X	⟶	
Contract Milestones												
Production Rate Verification (PRV) Contract Award				X			X					
Production Contract Award											X	

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P806

Medium Altitude Endurance (MAE) UAV - Predator

A. Project Cost Breakdown

	FY1997*	FY1998**	FY1999**
1. Hardware/Software	2.156		
2. Demonstrations and Test	2.681		
3. System Integration and Logistics Support	1.526		
4. Other Technical/Engineering	1.109		
5. DARP Integration and Support	.305		
TOTALS	7.777		

* FY 1997 funding is justified as part of Program Element 0305154D.
** FY 1998 and later funding has been transferred to RDT&E, Air Force, Program Element 0305205F

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P806

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998**	Budget FY1999**	Budget to Complete	Total Program
Product Development Organizations									
General Atomics	SS/CPFF	Mar 97	NAVAIR		2.131				
Lockheed Martin	SS/CPFF	Mar 97	NAVAIR		0.969				
AMERIND			NAVAIR		0.238				
Misc		Dec 97			2.000				
Product Development Organizations			**Subtotal**		5.338				
Support & Management Organizations					1.959				
Test & Evaluation Organizations					0.480				
Government Furnished Property									
N/A									
Subtotal Product Development					5.338				
Subtotal Support and Management					1.959				
Subtotal Test and Evaluation					0.480				
Subtotal Government Furnished Equipment									
TOTAL PROJECT					7.777				

* FY 1997 funding is justified as part of Program Element 0305154D.

** FY 1998 and later funding has been transferred to RDT&E, Air Force, Program Element 0305205F

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

COST (IN MILLIONS)	FY1997*	FY1998**	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	198.315	184.380	178.668	26.005	14.498	16.036	15.560	continuing	continuing
Total Project Cost/No. Subtotal Cost HAE Common Ground Segment/P807	54.470	46.569	48.099	9.031	3.487	4.945	5.260	continuing	continuing
Quantity of RDT&E Articles	1								

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this years apply only to this program's portion of the total PE costs for 0305154D.
** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

A. Mission Description and Budget Item Justification

Brief Description of Element: The High Altitude Endurance (HAE) UAV Advanced Concept Technology Demonstration (ACTD) program consists of two types of air vehicles, the Conventional HAE (CONV HAE) - Global Hawk and a Low Observable HAE (LO HAE) - DarkStar, and a Common Ground Segment (CGS) which is interoperable with both types of air vehicles. The HAE UAV CGS is comprised of a Launch and Recovery Element (LRE), a Mission Control Element (MCE), and associated logistics support activities. The HAE UAV Common Ground Segment integrates many technologies for communications between the Global Hawk, DarkStar, and exploitation centers/users. Without the HAE UAV Common Ground Segment project, the Global Hawk and DarkStar projects cannot be executed. The LRE prepares, launches, and recovers the air vehicles. The MCE plans and executes the mission; dynamically re-tasks the air vehicles, including the sensors; and processes, stores and/or disseminates the data as required. The CGS supports tactical warfighters at various levels of command with digital, near real-time, high quality imagery in exploitable form. Prior to fielding of an integrated CGS, an Interim Ground Segment (IGS) composed of the Global Hawk LRE #1/MCE #1, and the DarkStar Launch Control Recovery System (LCRS) and Data Processing Element (DPE) will be used to conduct flight test and CGS development. The HAE UAV CGS project also funds government support and studies, GFE, and field demonstration support for both the Global Hawk and DarkStar systems. This Project is categorized as Budget Activity 7 because it provides funds for technologies and capabilities in support of Operational System Development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($54.470)

- Completed development, integration and testing of developmental CGS (Interim Ground Segment (IGS)) and initiated performance testing with Global Hawk A/V ($15.026)
- Completed design and development of initial CGS DarkStar imagery processing/command and control/mission planning capability ($15.200)
- Initiated development of demonstration CGS ($2.884)
- Provided government flight test and evaluation support ($3.697)
- Performed CGS, Global Hawk, and DarkStar government support, studies, and related tasks ($13.468)
- Conducted service exploitation system interface development for integration and test ($0.844)
- Continued DARP Integration and Support ($3.351)

FY1998 Plans: ($46.569)**

- Complete development, integration and testing of developmental CGS (IGS) and performance testing with DarkStar A/V ($9.745)
- Continued development of enhanced planning capability for Global Hawk and DarkStar to support military utility evaluation ($2.698)
- Continue development and test of demonstration CGS ($16.894)
- Provide contractor participation in planning for test and evaluation of military utility ($0.409)
- Provide government test and evaluation support ($6.274)
- Conduct service exploitation system interface development for integration and test ($1.745)
- Perform CGS, Global Hawk, and DarkStar government support, studies, and related tasks ($8.804)

** Funding realignment within HAE ACTD reflects program restructuring directed by USD (A&T) subsequent to FY 1998 President's Budget submittal.

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

FY1999 Plans: ($48.099)

- Complete development and test of demonstration CGS ($4.339)
- Provide contractor participation in test and evaluation of military utility ($11.314)
- Provide government support for demonstrations and evaluations of military utility with potential service users ($16.417)
- Perform CGS, Global Hawk, and DarkStar government support, studies, and related tasks ($8.359)
- Provide repair support and required improvements ($4.844)
- Conduct exploitation system interface development for integration and test ($2.826)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy: The HAE UAV Common program provides the ground segment and support items common to the Global Hawk and DarkStar demonstrations. During the development phase, the ground segment originally designed for Global Hawk will be modified to include the capability to; 1) launch and recover; 2) command and control; and 3) receive, process, and disseminate DarkStar sensor data. Addition of this capability defines the Common Ground Segment (CGS) configuration. One (1) developmental and one (1) demonstration CGS are planned to be fabricated during the ACTD. Streamlined procurement, using DARPA's Other Transaction Authority, is being used to delete all non value-added tasks and documentation from the program. During the Demonstration Phase, program management responsibility will transition to the Air Force. Funding for the ACTD program ends in FY 2000. Funding for post ACTD RDT&E begins in FY2001.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

B. Program Change Summary	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	71.6	51.1	60.9	continuing
Appropriated Value	71.6	42.1		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(3.2)	(1.8)		
b. Realignments	(13.9)	6.3		
c. Reprogramming				
d. Recission				
President's Budget Request	54.5	46.6	48.1	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: DarkStar test support funds were contained within CGS for demonstrations. Following the crash of AV #1, funds were realigned to the core DarkStar account for crash recovery efforts.

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

C. Other Program Funding Summary Cost

	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
RDT&E, DW									
PE0305205D									
Global Hawk	73.225	95.169	90.051	10.829	7.524	7.624	6.829	continuing	continuing
DarkStar	62.843	42.642	40.518	6.145	3.487	3.467	3.471	continuing	continuing
Procurement, DW									
HAE UAV						32.618	30.265	33.864	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Related Activities. The Global Hawk program cannot be executed without the complementary HAE UAV Common Ground Segment project. This project also supports the DarkStar project.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z

D. Schedule Profile

Fiscal Year actual and planned events by quarter.

	FY1997				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Engineering Milestones												
Developmental Phase Final Design Review	X											
Deliver Developmental Ground Segment (#1)	X	———		X								
Test & Evaluation Milestones												
Flight Readiness Review				X	———		X					
Start Developmental Flight Test with Global Hawk							X					
Compatibility Test with DarkStar									X			
Contract Milestones												
CGS Demonstration Agreement Award			X									
Other Program Events												
Fabricate Demonstration Common Ground Segment (CGS)			X	———	———	———	———	———	———	———	X	
User Field Demonstrations with Warfighters									X	———	———	→

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P807

High Altitude Endurance (HAE) UAV Common Ground Segment (CGS)

A. Project Cost Breakdown

	FY1997*	FY1998	FY1999
1. Developmental CGS (IGS)	15.026	9.745	0.000
2. Developmental CGS DarkStar Capability Efforts	15.200	2.698	0.000
3. Fabricate Demonstration CGS	2.884	16.894	4.339
4. Government Demonstration and Testing Support	3.697	6.274	16.417
5. Contractor Demonstration and Testing Support	0.000	0.409	16.158
6. IES Integration and Test	0.844	1.745	2.826
7. Studies and Program Office Support	13.468	8.804	8.359
8. DARP Integration and Support	3.351		
TOTALS	54.470	46.569	48.099

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P807

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
Teledyne Ryan Aeronautical Developmental Systems Agreement	C/CPFF	Nov-94			14.550	2.200	0.000		
Raytheon Systems Group Developmental Ground Station	SS/CPAF	Jan-96			15.651	10.748	1.000	continuing	continuing
Raytheon Systems Group Fabrication Ground Stations	SS/CPIF/AF/ FF	Jun-97			2.884	16.916	1.800	continuing	continuing
Raytheon Systems Group Demonstrations					0.000	0.300	17.512	continuing	continuing
Miscellaneous					2.183	2.060	3.213	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Endurance Unmanned Aerial Vehicles (EUAV) PE 0305205D8Z/P807

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support and Management Organizations									
Science Applications International Corp.	C/CPFF	Feb-96			6.800	3.500	4.500	continuing	continuing
Miscellaneous					6.964	4.531	3.916	continuing	continuing
Test and Evaluation Organizations									
Air Force Flight Test Center	Allot				1.690	3.250	4.500	continuing	continuing
NAWC-AD, Pax River	MIPR				1.078	1.000	1.100	continuing	continuing
AFOTEC-TA	Allot				0.400	1.015	3.864	continuing	continuing
Miscellaneous					1.529	1.049	6.694	continuing	continuing
Government Furnished Property									
Miscellaneous					0.741	0.000	0.000	continuing	continuing
Subtotal Product Development					36.009	32.224	23.525	continuing	continuing
					4.697	6.314	16.158	continuing	continuing
Subtotal Test & Evaluation									
TOTAL					54.470	46.569	48.099	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	108.718	188.445	162.666	185.793	167.445	157.908	168.682	continuing	continuing
Total Project Cost/No. Subtotal Cost Airborne Reconnaissance Common Data Link (CDL)/P810	17.571	43.430	35.942	34.158	46.071	39.641	47.571	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: The objective of the CDL effort within the DARP is to define an interoperable command, control and communications capability for intelligence and reconnaissance assets to include both manned and unmanned platforms. CDL will achieve interoperable communications paths by employing an architecture based on developed hardware, software, and waveforms to promote commonality among the Services. The CDL program will maintain design configuration commonality resulting in lower life-cycle costs. The CDL design will permit existing and future reconnaissance assets to operate worldwide, providing sensor data directly to ground sites or via satellite or air-to-air relay when the asset and ground site are not within line-of-sight. This effort will integrate commercial satellite communications into the available satellite relay options to ensure sufficient wideband data relay capability. The system will have sufficient bandwidth to accommodate numerous sensors collecting SIGINT, IMINT and Multi-spectral data. Modular design allows for future technology insertion. The commonality of modular components reduces non-recurring engineering and life cycle costs to the DoD user. Interoperability provides for the exchange of data across service or agency boundaries. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Program Accomplishments and Plans: The CDL program supports development of advanced communications capabilities which offer common, interoperable, and modular attributes to future warfighters under all circumstances, situations, or force structures. The CDL funds are expended for the initial development and demonstration of new data link capabilities and functions. In addition, these funds are leveraged with other Service/Agency funds to provide data link capabilities that are applicable to multiple programs. Specific initiatives include the

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

continuation of design, development, test and demonstration activities associated with common/interoperable communications and control capabilities for airborne reconnaissance platforms and sensors.

Program Plans and Accomplishments: ($ in millions)

FY1997 Accomplishments: ($17.571)

- Continued configuration control of CDL architecture, specifications and modules ($2.442)
- Began development of CDL interface on additional platforms ($1.069)
- Began testing and evaluation of covert waveform miniaturization equipment air-to-air link with U-2 under the ABIT program ($6.200)
- Supported Laser Crosslink design and development ($0.410)
- Continued CDL "next generation" surface terminal design based on an open system design architecture ($0.125)
- Continued development of commercial satellite communications network to support airborne reconnaissance platform relay requirements (expand partial coverage to four areas) ($2.270)
- Began Tactical CDL development activity ($3.010)
- Began SATCOM interoperability enhancement plans ($0.500)
- DARP Integration and Support ($1.545)

FY1998 Plans: ($43.430)

- Continue configuration control of CDL architecture, specifications, and modules ($3.491)
- Continue to assess development of commercial network interface standards and impact to CDL interface ($1.000)
- Continue development of CDL interface to additional platforms ($2.552)
- Continue engineering and integration of commercial satellite communication network to support airborne reconnaissance platform relay requirements (increase link capacity and depth of coverage) ($15.500)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

- Continue tactical CDL development activity ($8.900)
- Continue SATCOM interoperability enhancements ($1.057)
- Continue testing and evaluation of covert waveform miniaturization equipment air-to-air link with U-2 under the ABIT program ($10.930)

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

FY1999 Plans: ($35.942)

- Continue configuration control of CDL architecture, specifications, and modules ($3.317)
- Continue development of CDL interface to additional platforms ($4.045)
- Continue to access development of commercial network interface standards and impact to CDL interface ($3.244)
- Continue engineering and integration of commercial satellite communication network to support airborne reconnaissance platform relay requirements ($15.500)
- Begin engineering and integration support of airborne reconnaissance platform requirements into National Space Communications Program ($0.738)
- Complete covert waveform development/miniaturization/air-to-air link under the ABIT program for U-2 ($3.500)
- Continue SATCOM interoperability enhancements ($0.598)
- Complete Tactical CDL flight demonstration ($5.000)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy: The CDL involves a multitude of technology projects which will provide for a common, interoperable wideband data link standard that has been mandated by ASD/C3I policy. Program funds are leveraged with the Service program funds to satisfy project objectives. Funds are provided to various government laboratories and program offices to fund on-going technology efforts. The individual Services use Engineering Change Proposals (ECPs) and modify existing contracts that have been awarded both competitively and on a sole source basis to implement various technology efforts.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	29.4	44.4	36.5	continuing
Appropriated Value	22.9	45.4		
Adjustments to Appropriated Value				
a. Undistributed Reductions	(1.6)	(2.0)		
b. Realignments	1.9			
c. Reprogramming	(3.5)			
d. Recission	(2.1)			
President's Budget Request	17.6	43.4	35.9	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:
Funding: $1.9M increase is a partial restoration of early fiscal year adjustments.
Schedule: N/A
Technical: N/A

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
N/A									

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Other Program Events												
Commercial Satellite Integration Regions 3 and 4	X											
Advanced Comms Study Completed	X											
Vanishing Vendor Study Phase I Complete	X											
Laser Crosslink PDR	X											
Battlefield Awareness & Data Dissemination Demo	X											
Start Tactical CDL Phase 1 Design Studies			X									
Laser Crosslink CDR			X									
AIP/TIDGL ATM Interoperability Study Complete		X										

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
ATM Phase 2 Study Complete			X									
Airborne Reconnaissance Low CDL Demo				X								
Start Tactical CDL Phase 2 Detail Design/ CDL Interoperability Testing						X						
U-2 ABIT Prototype Delivery						X						
SATCOM Interoperability Study Complete					X							
ABIT U-2 Testing Complete									X			
Complete Tactical CDL Flight Demonstration											X	
Tactical CDL Development Program Complete												X

*FY 1997 funding is justified as part of Program Element 0305154D

Exhibit R-3, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Primary Hardware Development	4.836	13.850	8.521
2. Development Support Equipment	1.367	2.575	1.453
3. Systems Engineering	1.505	3.426	2.993
4. Reliability, Maintainability, and Availability	1.431	1.356	1.453
5. Satellite Communications	1.976	13.640	13.693
6. Configuration Management	2.030	3.491	3.317
7. Contractor Engineering Support	1.599	3.128	2.534
8. Government Engineering Support	1.282	1.964	1.978
9. DARP Integration and Support	1.545		
TOTALS	17.571	43.430	35.942

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Project Budget FY1997*	Budget FY1998*	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
L3 Communications**						6.800	1.800	continuing	continuing
Lockheed-Martin**					5.392	1.100	0.800	continuing	continuing
VEDA					0.200				0.200
Other Non-Prime Contracts and Gov't Organizations					4.646	6.100	2.034	continuing	continuing
Tactical CDL design and development								continuing	continuing
- Harris Corp					0.802	3.300	3.000		7.102
- Motorola					0.802				0.802
- L3 Communications					0.802	3.300	3.000		7.102
Networking Support vendor - TBD						0.853	2.886	continuing	continuing
Subtotal					12.644	21.453	13.520	continuing	continuing

*FY 1997 funding is justified as part of Program Element 0305154D.

**L3 Communications has become an independent company from Lockheed-Martin.

Exhibit R-3, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Airborne Reconnaissance Advanced Development (ARAD) PE 0305206D8Z/P810

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Support and Management Organizations									
COMSAT, RSI					1.638	13.640	13.693	continuing	continuing
Other Non-Prime Contractors and Gov't Organizations					3.289	8.337	8.729	continuing	continuing
Subtotal					4.927	21.977	22.422	continuing	continuing
Test and Evaluation Organizaitons N/A									
Product Development Subtotal					12.644	21.453	13.520	continuing	continuing
Support & Management Subtotal					4.927	21.977	22.422	continuing	continuing
Test & Evaluation Subtotal N/A									
Government Furnished Property Subtotal N/A									
PROJECT TOTAL					17.571	43.430	35.942	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D

*COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	26.909	26.581	10.840	5.713	5.476	5.586	5.707	continuing	continuing
Project Name/No. and Subtotal Cost Manned Reconnaissance Systems U-2/P811	26.909	26.581	10.840	5.713	5.476	5.586	5.707	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: Manned reconnaissance programs provide for a wide variety of reconnaissance tasks in support of the entire range of users from the tactical level to the national command authorities. Signals Intelligence, Imagery, Measurement and Signatures Intelligence, Target Acquisition, and Surveillance missions are performed by manned reconnaissance systems, across the spectrum of conflict. Manned reconnaissance systems also conduct missions in support of counter narcotics, disaster relief, mapping, charting and geodesy, scientific requirements, military and operations other than war. This element provides for manned reconnaissance platforms resident in the DARP. The activity ensures continued viability of both the platforms and the associated sensors as mission requirements and threats change. As the DARO fosters to greater commonality among systems, this element develops a means of compliance with the emerging architecture. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D	

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	26.909	26.581	10.840	5.713	5.476	5.586	5.707	continuing	continuing
Total Project Cost/No. Subtotal Cost U-2/P811	26.909	26.581	10.840	5.713	5.476	5.586	5.707	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: The U-2 Program provides unique capabilities to remotely collect and relay signals to Remote Operating Facility Airborne (ROFA), either directly via satellite or indirectly through ground satellite relay stations. This element provides RDT&E for the continued enhancement of capabilities to receive and exploit those signals. This program also funds the RDT&E portion of high payoff upgrades for the U-2 Advanced Synthetic Aperture Radar System (ASARS-2). ASARS-2 upgrades and modifications will extend the usable life of this critical sensor as well as enhance its area search, precision geolocation, and image quality characteristics sufficiently to support the targeting of precision guided munitions (PGMs). Several key Line Replaceable Units (LRUs) including the Process Control Unit (PCU), receiver - exciter, and waveform generator are approaching the end of their supportability life. Replacing the LRUs with next generation technology will make ASARS-2 supportable through the expected service life of the U-2 and provide capability enhancements necessary to support PGMs. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Note: The ASARS-2 portion of the U-2 Program was previously justified in separate budget documents under the title "U-2 Support for Precision Guided Munitions".

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D	

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($26.909)

- Upgraded airborne collection capabilities ($3.652)
- ASARS-2 Radar hardware development ($7.957)
- ASARS-2 Radar software development ($8.529)
- ASARS-2 Integration and flight test ($4.416)
- ASARS-2 Data link ($1.063)
- DARP Integration and Support ($1.292)

FY1998 Plans: ($26.581)

- Upgrade airborne collection capabilities ($3.689)
- ASARS 2 Radar hardware development ($8.124)
- ASARS 2 Radar software development ($9.168)
- ASARS 2 Integration & flight test ($4.600)
- ASARS 2 Data Link ($1.000)

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

FY1999 Plans: ($10.840)

- Upgrade airborne collection capabilities ($3.608)
- Upgrade ground/PME capabilities ($2.266)
- ASARS 2 Radar hardware development ($1.000)
- ASARS 2 Radar software development ($1.696)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D

- ASARS 2 Integration and flight test ($2.000)
- ASARS 2 Data Link ($.270)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy:
For airborne collection capability upgrades, modify existing platform and associated ground control equipment via Engineering Change Proposals (ECPs)/Task orders to existing USAF and NSA contracts. For defensive system capability add, select defensive system candidate from currently available systems, then evaluate and test on the U-2 aircraft. For ASARS-2, develop and test new technology line replaceable units (LRU's) for subsequent retrofit into the U-2's during normal U-2 Programmed Depot Maintenance (PDM), or during other ongoing U-2 modifications. LRUs for subsequent installation during PDM will be funded by the Air Force.

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	27.3	26.8	11.1	continuing
Appropriated Value	28.3	27.8		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(1.3)	(1.2)		
b. Realignments	(.1)			
c. Reprogramming				
d. Recission				
President's Budget Request	26.9	26.6	10.8	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D	

Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary Cost

	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
Procurement, DW (U-2 SATCOM)	1.941								1.941

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D	

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Engineering Milestones N/A												
See Note: SRR/SDR	X				X				X			
See Note: CDR		X				X				X		
ASARS Improvement Program PDR	X											
ASARS Improvement Program CDR		X										
Test & Evaluation Milestones N/A												
See Note:						X				X		
Contract Milestones												
See Note: Award	X				X				X			
Other Program Events												
ASARS Improvem't Prog Contingency IOC						X						
ASARS Improvem't Prog Production IOC												X

* FY 1997 funding is justified as part of Program Element 0305154D.

Note: This line funds Quick Reaction Capability (QRC) Upgrades to the U-2 sensor to allow response to emergency, high priority threats. Project duration varies depending on complexity—between 9 and 21 months from definition through integration and test.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAK DOWN		DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D8Z/P811	

U-2

($ in millions)

A. Project Cost Breakdown

	FY1997*	FY1998	FY1999
1. Primary Hardware Development	8.200	8.057	3.146
2. Software Development	9.254	9.624	1.781
3. Systems Engineering	4.955	5.664	2.259
4. Integrated Logistics Support	0.569	0.546	0.697
5. DT&E	0.139	0.158	2.610
6. Contractor Engineering Support	2.500	2.532	0.347
7. DARP Integration and Support	1.292	0.000	0.000
TOTALS	26.909	26.581	10.840

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAK DOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Manned Reconnaissance Systems PE 0305207D8Z/P811

B. Budget Acquisition History and Planning Information.

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
Hughes (ASARS-2)	CPIFF	3Q96	N/A	N/A	23.087	23.465	5.000		67.324
Def Sys (LMSW) (LM SANDERS, ITT)	TBD	4Q96	TBD	N/A					8.966
Various	Various	Multiple	N/A	N/A	3.822	3.116	5.840	continuing	continuing
Support and Management Organizations									
Test and Evaluation Organizations									
Government Furnished Property N/A									
Product Development Subtotal					26.909	26.581	10.840	continuing	continuing
Support & Management Subtotal									
Test & Evaluation Subtotal									
Government Furnished Property Subtotal									
TOTAL PROJECT					26.909	26.581	10.840	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.731	36.022	34.985	27.354	28.258	28.423	28.125	continuing	continuing
Project Name/No. and Subtotal Cost: Airborne Reconnaissance Ground SIGINT Systems (ARGSS)/ P812	2.252	0.399	0.000	0.000	0.000	0.000	0.000	0.000	2.651
Project Name/No. and Subtotal Cost: Common Imagery Ground/Surface Systems (CIGSS)/ P813	46.376	29.062	29.407	22.164	23.346	23.456	22.994	continuing	continuing
Project Name/No. and Subtotal Cost: Distributed Common Ground System Interoperability (DCGSI)/P814	4.103	6.561	5.578	5.190	4.912	4.967	5.131	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: The Distributed Common Ground System (DCGS) Program is a cooperative effort between the services, agencies and DARO to provide systems capable of receiving, processing, exploiting, and disseminating data from airborne and national reconnaissance platforms. The DCGS program is developing a family of systems, both fixed and deployable, that is capable of supporting all levels of conflict, is interoperable with all reconnaissance platforms and sensors, and is integrated into the Joint C4I environment. The program consists of Common Imagery Ground/Surface Systems (CIGSS) which process, exploit and disseminate imagery data; Airborne Reconnaissance Ground SIGINT Systems (ARGSS) which process, exploit, and disseminate SIGINT data; Multi-Intelligence Reconnaissance Ground Systems (MIRGS) which support inter-intelligence interoperability initiatives that process, exploit, and correlate data simultaneously from multi-intelligence sources; and Distributed Common Ground System Interoperability (DCGSI) which focuses on IMINT, SIGINT and

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

multi-discipline system flexibility and interoperability, test, and architecture compliance. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.731	36.022	34.985	27.354	28.258	28.423	28.125	continuing	continuing
Project Name/No. and Subtotal Cost: Airborne Reconnaissance Ground SIGINT Systems (ARGSS)/P 812	2.252	0.399	0.000	.0000	0.000	0.000	0.000	0.000	2.651
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: HEARTLEAF adds two additional ground station processing capabilities at a centralized facility that will receive, process, and disseminate information from national, theater, and tactical reconnaissance sensors. It provides a centralized facility that will ensure commonality between ground systems and airborne sensors. EAGLE TOT will develop hardware and software modifications for the C-ROFA to allow receipt of U.S. and Allied radar data from airborne platforms. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($2.252)

- Fielded HEARTLEAF ($0.303)
- Completed development of additional reporting channel (EAGLE TOT) ($1.839)
- DARP Integration and Support ($0.110)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

FY1998 Plans: ($0.399)

- Field additional reporting channel (EAGLE TOT) to remote sites ($0.399)

Obligation time frame for all FY98 funding is from Oct 97- Dec 98

Acquisition Strategy: Develop integrated ground architecture and distributed communications capability via ECP/Task orders to existing USAF and NSAW contracts.

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	2.4	.4		2.8
Appropriated Value	2.4	.4		2.8
Adjustments to Appropriated Value				
a. Undistributed Reduction	(.1)			
b. Realignments				
c. Reprogramming				
d. Recission				
President's Budget Request	2.3	.4		2.7

* FY 1997 funding is justified as part of Program Element 0305154D.

Program Change Summary
Funding: N/A
Schedule: N/A
Technical: N/A

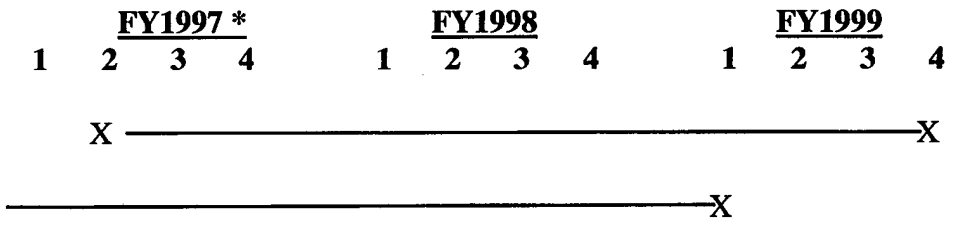
Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
ARGSS, Proc, DW		3.313	3.419						6.732

D. Schedule Profile

Fiscal Year actual and planned events by quarter



* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z/P812

Airborne Reconnaissance Ground SIGINT Systems (ARGSS)

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Primary Hardware Development	1.030	0.000	0.000
2. Software Development	0.340	0.000	0.000
3. Systems Engineering	0.296	0.094	0.000
4. Integrated Logistics Support	0.398	0.126	0.000
5. DT&E	0.000	0.030	0.000
6. Contractor Engineering Support	0.000	0.129	0.000
7. Integration and Support	0.110	0.000	0.000
8. Miscellaneous	0.078	0.020	0.000
TOTALS	2.252	0.399	0.000

* FY 1997 funding is justified as part of Program Element 0305154D.

B. Budget Acquisition History and Planning Information N/A

This program does not meet the criteria of Chapter 5, DoD 7000.14-R

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.731	36.022	34.985	27.354	28.258	28.423	28.125	continuing	continuing
Project Name/No. and Subtotal Cost: Common Imagery Ground/Surface Systems (CIGSS)/P813	46.376	29.062	29.407	22.164	23.346	23.456	22.994	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: This project supports the engineering development and acquisition of Service imagery ground/surface systems. The Common Imagery Ground/Surface System (CIGSS) is a Department of Defense (DoD) project which integrates all imagery ground/surface systems into a unified effort under Defense Airborne Reconnaissance Office (DARO) oversight. The CIGSS objective is to enable all systems to receive, process, exploit, and report any imagery source regardless of platform or sensor type to meet the intelligence and targeting needs of tactical commanders. The CIGSS project provides the warfighter with an integrated and interoperable airborne reconnaissance imagery processing and exploitation capability that can be tailored for all levels of conflict. CIGSS consolidates the JROC and DARSC approved restructure of the Joint Service Imagery Processing System (JSIPS) program including JSIPS-Army, JSIPS-Navy, JSIPS-Air Force, JSIPS-Marine Corps, Enhanced Tactical Radar Correlator (ETRAC), Modernized Imagery Exploitation System (MIES), PACAF Interim National Exploitation System (PINES), and Tactical Exploitation Group (TEG) into a single DARO project. The Navy CIGSS component, JSIPS-N, includes three major components, the Digital Imagery Workstation Suite Afloat (DIWSA), the National Input Segment (NIS), and a subset of equipment from the Tactical Input Segment (TIS). DIWSA receives, exploits, and disseminates imagery products based on multi-source imagery. The NIS and TIS provide the capability to receive, record, and process imagery from multiple sources. The Air Force CIGSS component consists of two deployable JSIPS systems and the fixed PINES system. The Army CIGSS components consists of the MIES and ETRAC systems. MIES receives and exploits imagery from national and theater sources and provides intelligence reports and exploited imagery products to the field commander. ETRAC is a C-130 drive on/off capable system that receives Synthetic Aperture Radar (SAR) data inputs from various platforms, converts the SAR data to exploitable images, and is capable of stand-alone operations. ETRAC and MIES are

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

combined in the Tactical Exploitation System (TES) to be fielded beginning in FY 1999. The Marine Corps component of CIGSS consists of a JSIPS system identical to the Air Force JSIPS and three JSIPS variants referred to as the Tactical Exploitation Group (TEG). It will be a small, highly mobile system that will provide the Marine Expeditionary Forces (MEFs) with the capability of processing and exploiting SAR and Electro-Optical/Infra-Red (EO/IR) imagery from theater and tactical reconnaissance aircraft. A mobile CIGSS testbed was developed to support the integration and test of CIGSS components and validation of interfaces prior to the introduction of CIGSS into the operational environment. The testbed will also be used by Program Offices to test interfaces with new sensors, applications, and other modifications. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($46.376)

- Continued DIWSA/TIS/NIS software development and support (N) ($4.018)
- Continued DIWSA/TIS/NIS systems engineering (N) ($1.217)
- Continued DIWSA/TIS/NIS test and evaluation support (N) ($0.075)
- Continued Independent Validation and Verification (N) ($0.440)
- Continued IESS support (N) ($0.175)
- Continued CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (AF) ($2.400)
- Continued integration of IESS into ETRAC (A) ($1.000)
- Completed integration of IESS into MIES (A) ($1.000)
- Initiated ETRAC sustaining engineering to implement upgrades to ASARS-2 sensor and the ASARS improvement program (A) ($1.679)
- Completed ETRAC II Block I P3I (A) ($0.500)
- Continued upgrade MIES with IPL/COTS workstations/ATM LAN for CIGSS compliance (A) ($3.307)
- Continued CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national interfaces (A) ($1.745)

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

- Completed JSIPS Block upgrades (AF) ($1.400)
- Continued development of Common Ground/Surface System/Testbed (AF) ($2.600)
- Continued system engineering and technical support (AF) ($1.382)
- Supported Conventional HAE and LO HAE UAV demonstration test with CIGSS testbed (AF) ($0.625)
- Continued development of Common Imagery Processor (CIP) (AF) ($11.637)
- Initiated efforts to integrate the TEG and the TIS (AF) ($8.993)
- DARP Integration & Support ($2.183)

FY1998 Plans: ($29.062)

- Continue Tactical Input Segment (TIS) systems engineering (N) ($0.495)
- Continue Independent Validation and Verification (N) ($0.447)
- Continue Test and Evaluation support (N) ($0.752)
- Complete upgrade of MIES with IPL/COTS workstations/ATM LAN for CIGSS Compliance (A) ($0.200)
- Continue CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national and tactical interfaces (A) ($4.287)
- Continue ETRAC sustaining engineering to implement upgrades to process data from ASARS-2 sensors and the ASARS Improvement Program (A) ($1.000)
- Complete integration of IESS into ETRAC (A) ($0.500)
- Continue CIGSS sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national and tactical interfaces (AF) ($9.120)
- Continue development of Common Ground/Surface System Testbed (AF) ($2.000)
- Continue system engineering and technical support (AF) ($1.300)
- Upgrades for JSIPS/TEG to remain compliant and interoperable with Distributed Common Ground Station Architecture (AF) ($2.561)
- Complete efforts to integrate the TEG and the TIS (AF) ($2.400)
- Continue evolving CIP to keep pace with current and projected modification programs (AF) ($4.000)

Obligation time frame for all FY98 funding is from Oct 97 - Dec 98

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

FY1999 Plans: ($29.407)

- Continue Tactical Input Segment (TIS) systems engineering (N) ($1.280)
- Continue Independent Validation and Verification (IV&V) (N) ($1.450)
- Continue Test and Evaluation (T&E) Support (N) ($2.236)
- Continue CIGSS elements sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national and tactical interfaces (A) ($5.912)
- Complete ETRAC sustaining engineering to implement upgrades to ASARS-2 sensor and the ASARS improvement Program (A) ($1.000)
- Integrate capabilities to receive/process radar imagery from High Altitude Endurance (HAE) Unmanned Aerial Vehicle (UAV) (A) ($2.000)
- Continue CIGSS sustaining engineering to implement software upgrades and enhancements to maintain compatibility with changing national and tactical interfaces (AF) ($8.211)
- Continue Common Ground/Surface System Testbed development (AF) ($2.200)
- Continue system engineering technical support (AF) ($1.750)
- Continue evolving CIP to keep pace with current and projected modification programs (DARO) ($3.368)

Obligation time frame for all FY99 funding is from Oct 98 - Dec 99

Acquisition Strategy: As approved by the Joint Requirements Oversight Council (JROC), Defense Airborne Reconnaissance Steering Committee (DARSC), and Under Secretary of Defense (Acquisition & Technology) a family of rapidly deployable imagery ground/surface systems, capable of operating in the Joint C4I environment and tailorable to support all levels of conflict will be developed. These systems are under the umbrella program called the Common Imagery Ground/Surface System (CIGSS). An acquisition baseline was established for CIGSS outlining JROC approved joint requirements and DARO/NIMA approved standards. All existing imagery ground/surface systems, and those currently in the pipeline, will be modified to meet the CIGSS acquisition baseline. All new imagery ground/surface systems must be delivered CIGSS compliant. Program management responsibility for CIGSS systems will rest with the individual Service or Agency developing the CIGSS system. The systems will be acquired using streamlined acquisition procedures. DARO will provide oversight to ensure compliance with joint airborne reconnaissance architectures, requirements, and standards.

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	47.8	30.4	28.1	continuing
Appropriated Value	55.3	30.4		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(4.9)	(1.3)		
b. Realignments	(1.0)			
c. Reprogramming				
d. Recission	(3.0)			
President's Budget Request	46.4	29.1	29.4	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

C. Other Program Funding Summary Cost

	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
CIGSS Proc, Defense Wide	89.945	91.824	74.016	72.071	62.032	63.053	63.834	continue	continue

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

Related Activities: To ensure no duplication of effort, this project is coordinated with the Office of the Secretary of Defense, Army, Air Force, Marine Corps, and Navy TENCAP offices, CIO, DIA, and other agencies. The Defense Airborne Reconnaissance Office (DARO) assures coordination across the DARP through program reviews.

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Milestones												
N-TIS Low Rate Initial Production (LRIP)								X				
Contract Milestones												
Integrate National RFCs	X	X			X							X
Integrate ECOs		X										
CIGSS Testbed ATARS Testing		X										
Integrate IPL/COTS WS/ATM into MIES						X						
Integrate IESS into MIES			X									
Integrate IESS into ETRAC							X					
Integrate HAE/UAV Capabilities into ETRAC								X				
Other Program Events												
JSIPS-N MS Full Rate Production (FRP)	X											
Integrate TEG and TIS			X									
Replace RL'S with DE's into MIES								X				
Engineering Milestones												
ETRAC #1 System Upgrades - (User Test)						X						
ETRAC #2 System Upgrades - (User Test)							X					

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z/P813

Common Imagery Ground/Surface System (CIGSS)

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Primary Hardware Development	17.918	6.484	0.108
2. Primary Hardware Acquisition	1.140	1.751	1.924
3. Software Development	10.617	6.714	11.982
4. System Engineering	7.125	8.501	6.928
5. System Integration & Testing	0.646	0.432	0.515
6. Training & Development	0.753	0.851	1.880
7. Program Management	0.806	0.527	0.522
8. Systems Analysis	0.352	0.282	0.719
9. Configuration Management	0.697	0.608	0.331
10. Development Test & Evaluation	0.037	0.120	0.032
11. Technical Data & Documentation	0.037	0.040	0.030
12. Contract Engineering Support	0.765	0.000	0.000
13. Operational Test & Evaluation	0.075	0.752	2.236
14. Ancillary Hardware Development (N)	3.225	2.000	2.200
15. DARP Integration & Support	2.183	0.000	0.000
TOTAL	46.376	29.062	29.407

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z/P813

B. Budget Acquisition History and Planning Information

Performing Organizations

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Product Development Organizations									
DBA Systems Melbourne, FL	CPFF	4Q94	TEC	ASPO	3.085	3.093	3.780	continuing	continuing
Northrop Grumman Baltimore, MD	CPAF	3Q93	Classified	ASPO	6.146	2.894	5.132	continuing	continuing
Northrop Grumman Baltimore, MD	CPFF	1Q97	(TBD)		11.637	4.000			27.915
GDE Systems Rancho Bernardo, CA	TBD				1.360	0.812	1.800	continuing	continuing
NAWC Pt Mugu	MIPR				.200			continuing	continuing
CIGSS Upgrades/Migration	TBD				.200	6.219	10.229	continuing	continuing
Raytheon-E-Systems Garland, TX		2Q97			5.669	.600	1.050		
Lockheed -Martin San Jose, CA		2Q97			3.128	2.500	1.050		
Other Non-Prime Government Contracts					1.503	4.262	0.700	continuing	continuing
L3 Communications Salt Lake City, UT (TEG Data Link)	CPFF				4.500	1.200		continuing	continuing

*FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z/P813

Contractor/ Government Performing Activity	Contract Method/Type or Funding Vehicle	Award or Obligation Date	Performing Activity EAC	Project Office EAC	Budget FY1997*	Budget FY1998	Budget FY1999	Budget to Complete	Total Program
Mitre	FFP	Annual			0.700	0.700	0.600	continuing	continuing
SAIC Arlington, VA	TBD	Dec 94			5.450	2.782	5.066	continuing	continuing
Support and Management Organizations Miscellaneous Organizations					2.183			continuing	continuing
Test & Evaluation Organizations									
Naval Surface Warfare Center	Airtask	Dec 95			0.440			continuing	continuing
Defense Dissemination Program Office (DDPO)	MIPR				0.175			continuing	continuing
Government Furnished Property N/A									
Product Development Subtotal					43.578	29.062	29.407	continuing	continuing
Support & Management Subtotal					2.183			continuing	continuing
Test & Evaluation Subtotal					0.615			continuing	continuing
Government Furnished Property Subtotal									
PROJECT TOTAL					46.376	29.062	29.407	continuing	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	52.731	36.022	34.985	27.354	28.258	28.423	28.125	continuing	continuing
Project Name/No. and Subtotal Cost: Distributed Common Ground System Interoperability (DCGSI)/P814	4.103	6.561	5.578	5.190	4.912	4.967	5.131	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding is justified as part of Program Element 0305154D. Total PE costs shown for this year apply only to this program's portion of the total PE costs for 0305154D.

A. Mission Description and Budget Item Justification

Brief Description of Element: The Distributed Common Ground System (DCGS) Interoperability project funds and coordinates engineering development work directed toward defense airborne reconnaissance ground processing technologies. The project will ensure that intelligence processing systems are developed to satisfy strategies and architectures that support warfighter intelligence needs in the face of rapidly developing threat technologies, proliferation of advanced weapons, and uncertain political alignments. This project supports IMINT, SIGINT, and multi-discipline system interoperability and, consolidates the R&D efforts of the Ground/Surface System Development Program (GSSDP). DCGS focuses the Department's ground system efforts to improve flexibility, commonality, interoperability, and efficiency in supporting Joint Task Force and Service unique intelligence requirements. The DCGS is a system of systems that does not need to be collocated but must be interconnected by a robust communications structure that will provide data streams between intelligence collector, exploiters, producers, disseminators, and users. The DCGS Interoperability project goal is to provide a near-real-time, day/night, all weather intelligence processing system which meets the warfighter's need for timely intelligence on enemy forces. The development of modifications to ensure interoperability among these systems will be directed under DARO oversight, implemented by Service acquisition agencies and funded under this project. This program is categorized as Budget Activity 7 because it provides for development of technologies and capabilities in support of Operational System Development.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

Program Accomplishments and Plans: ($ in millions)

FY1997 Accomplishments: ($4.103)

- Continued systems engineering and integration of UAV ground station into the CIGSS architecture ($0.585)
- Demonstrated CIGSS "clip-kit" interoperability with HAE ($0.100)
- Completed integration of Tactical Systems Reconnaissance Mission Planner & Reconnaissance Mission Control capability ($0.410)
- Supported Graphical Situation Display (GSD) development under multi-"INT" migration initiatives ($0.380)
- Tested Service P3Is in CIGSS testbed prior to installing in operational systems ($0.945)
- Continued efforts to migrate current ground/surface systems toward a DCGS ($0.678)
- Initiated and completed the integration of the Tactical Systems Manager (TSM) into CIGSS Testbed ($0.471)
- Began Joint Interoperability Test Center (JTIC) testing and certifying of CIGSS components for CIGSS compliance and certification ($0.300)
- DARP Integration and Support ($0.234)

FY1998 Plans: ($6.561)

- Demonstrate CIGSS/HAE "clip-kit" interoperability with the Common Imagery Processor and continue systems engineering and integration of UAV ground station into CIGSS ($1.120)
- Continue systems engineering, integration, and development of airborne ground/surface systems standards and interfaces to ensure commonality and interoperability with the DCGS Architecture ($1.000)
- Continue architecture and standards development and certification and testing for multi-"INT" baseline under DCGS ($0.933)
- Continue Rapid Intelligence Transmission (RIT) implementation and graph reporting module development ($0.186)
- Continue to ensure JASA is incorporated in ground/surface system migration efforts ($1.000)
- Develop additional sensor processing capability for Common Imagery Processor (CIP) ($0.300)
- Continue data recording standards and technology support ($0.300)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

- Continue DCGS and NATO Standards Imagery Format (NSIF) test and certification support ($0.100)
- Complete DCGS Capstone Requirements Document (CRD) ($0.184)
- Continue DCGS MASINT planning, architecture description and management plan ($0.105)
- Support to transition Semi-Automated Imagery Intelligence (IMINT) Processing (SAIP) support to operational systems ($0.250)
- Provide HAE Moving Target Indictor (MTI) processing support within ETRAC ($0.933)
- Continue to support NATO STANAG development for reconnaissance infrastructure elements (data links, recorders, and information exchange) ($0.150)

Obligation time frame for all FY98 funding is from Oct 97 - Dec 98

FY1999 Plans: ($5.578)

- Continue testing software block upgrades to common processor in DCGS Testbed prior to installing in operational intelligence systems ($0.845)
- Continue efforts to migrate current ground/surface systems towards a Distributed Common Ground System architecture ($1.363)
- Continue systems engineering, integration, and testing of airborne ground/surface system to ensure commonality and interoperability with the DCGS Architecture ($0.650)
- Continue to ensure JASA is incorporated in ground/surface system migration efforts ($0.400)
- Continue systems engineering and integration of UAV ground station developments into CIGSS ($0.900)
- Support definition of message passing interface (MPI) standards for Advanced Common Processor (ACP) ($0.970)
- Support NATO STANAG development ($0.150)
- Support data link, recorder, and information exchange standards development ($0.300)

Obligation time frame for all FY99 funding is from Oct 98 - Dec 99

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

Acquisition Strategy: As outlined in the Integrated Airborne Reconnaissance Strategy (IARS) and approved by the JROC, DARSC, and Under Secretary of Defense (A&T), a family of fixed and rapidly deployable Distributed Common Ground Systems, capable of operating in the Joint C4I environment and tailorable to support all levels of conflict will be developed to support the nation's Defense Airborne Reconnaissance Systems. DARO is restructuring the Ground/Surface System Development program and the other DARO Ground/Surface Programs into the DCGS Program that includes the JSIPS program, GSSDP, Multi-intelligence Reconnaissance Ground Systems Projects (CARS and KCOIC), and Airborne Reconnaissance SIGINT Ground Systems (HEARTLEAF). DARO is establishing liaison with the UAV Program Offices to ensure interoperability with DARP ground systems. The development of modifications to ensure interoperability among these systems will be directed under DARO oversight, implemented by Service acquisition agencies and funded under this project.

B. Program Change Summary	FY1997*	FY1998	FY1999	Total Cost
Previous President's Budget	5.1	6.9	5.8	continuing
Appropriated Value	5.1	6.9		
Adjustments to Appropriated Value				
a. Undistributed Reduction	(.3)	(.3)		
b. Realignments	(.7)			
c. Reprogramming				
d. Recission				
President's Budget Request	4.1	6.6	5.6	continuing

* FY 1997 funding is justified as part of Program Element 0305154D.

Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D8Z

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
N/A									

Related Activities: To ensure no duplication of effort, this project is coordinated with the Office of the Secretary of Defense, Army, Air Force, Marine Corps, and Navy TENCAP offices, CIO, DIA, and other agencies. The Defense Airborne Reconnaissance Office (DARO) assures the coordination across the DARP through detailed program reviews.

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
T&E Milestones												
ATARS Testbed Interoperability Testing	X											
Other Program Events												
CSARP/APG-73 Capability				X								
CIGSS Testing by GITC		X	—	—	—	—	—	—	—	—	—	X
Integrate TSM into CIGSS Testbed			X									

* FY funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Distributed Common Ground Systems (DCGS) PE 0305208D/P814

Distributed Common Ground System Interoperability (DCGSI)

A. Project Cost Breakdown

($ in millions)

	FY1997*	FY1998	FY1999
1. Software development	0.380	1.375	0.900
2. Primary hardware development	0.000	0.000	0.000
3. Ancillary hardware development	2.033	0.872	0.900
4. Systems engineering	1.156	4.014	3.478
5. Development Test & Evaluation	0.300	0.300	0.300
6. Contract engineering support	0.000	0.000	0.000
7. DARP Integration and Support	0.234	0.000	0.000
TOTAL	4.103	6.561	5.578

* FY 1997 funding is justified as part of Program Element 0305154D.

B. Budget Acquisition History and Planning Information N/A

This program does not meet the criteria of Chapter 5, DoD 7000.14-R

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Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

COST (IN MILLIONS)	FY1997*	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
Total PE Cost	[19.198]** 0.534***	7.216	15.701	14.491	13.575	13.969	17.670	continuing	continuing
Total Project Cost/No. Subtotal Cost DARP Integration & Support/P815	[19.198]** 0.534***	7.216	15.701	14.491	13.575	13.969	17.670	continuing	continuing
Quantity of RDT&E Articles									

* FY 1997 funding for this program is justified under PE 0305154D and recorded within the various projects supported by these activities.

** Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154D. These funds were included in the funded lines of those individual projects and the dollars presented here are for informational purposes only and not additive for this PE.

*** These funds pay for DARO civilian salaries and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay costs are now funded in this new PE (0305209D), the FY 1997 DARO Operations costs are displayed with this project for consistency in the presentations.

A. Mission Description and Budget Item Justification

Brief Description of Element: This project funds Defense Airborne Reconnaissance Office (DARO) functions required to carry out management oversight responsibilities specified in DoD Directive 5134.11 (5 April 1995). It includes DARO civilian pay costs for assigned civil service employees, System Engineering and Technical Assistance (SETA) for development, integration, and support of Defense Airborne Reconnaissance Program (DARP) activities. It includes DARO Administration, MIS and Security Support. As part of this project, DARO:

- establishes and maintains the DoD Integrated Airborne Reconnaissance Architecture to guide the development, demonstration, and acquisition of improved airborne reconnaissance capabilities; establishes and enforces commonality and interoperability standards; conducts trade-off analyses of Joint Military Department and Defense-wide manned and unmanned aerial vehicles (UAVs), sensors, data links, data relays, and associated processing systems to ensure future operational systems satisfy validated warfighter requirements; and serves as focal point for coordinating policies, standards, and architectures with all other OSD organizations.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

- supports the planning and execution of capability demonstrations and operational exercises to evaluate airborne reconnaissance capabilities with respect to evolving Unified Combatant Commander requirements.
- coordinates with the intelligence community on military intelligence needs, intelligence requirements analyses and priorities, resource planning and programming, exploitation management, and intelligence data dissemination; provides USD(A&T) advice and supporting studies and analyses directed by USD(A&T).
- provides planning and resource guidance activities to support Military Departments and Defense Agencies in the development of DARP inputs to the DoD Planning, Programming and Budgeting process, and those activities necessary to develop and support the presentation and justification of DARP budget requests to the Congress.

The activities identified in this PE were previously included as part of the individual programs within PE 0305154D. The functions are now presented in a separate PE (0305209D) to more clearly identify the work necessary to effectively oversee, coordinate, integrate, and standardize airborne reconnaissance capabilities, architectures, and technologies development within the Department and across the Services and Agencies. This program is categorized as Budget Activity 7 because it provides for the development of technologies and capabilities in support of Operational System Development.

Programs Plans and Accomplishments: ($ in millions)

FY1997 Accomplishments: [$19.198] $0.534

- Continued development of the Airborne Reconnaissance Information Technical Architecture (ARITA). Version 1.0 published consistent with Joint Technical Architecture
- Developed open systems architecture implementation plan for new and upgraded systems, to accelerate interoperable environment
- Initiated first Cooperative Airborne-Overhead Systems Architecture Study with NRO, NIMA and DIA
- Conducted first investigations with new ISR models. Highlighted key performances attributes and issues with various systems architectures
- Continued support of system-level trade-offs, airborne reconnaissance technology and industrial base analyses, technology demonstrations, exercises involving improved airborne reconnaissance systems and capabilities, development and coordination of interoperability standards and adherence to intelligence resource planning, programming and reporting

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

FY1998 Plans: ($7.216)

- Continue to assess and refine the Department's integrated airborne reconnaissance architecture ($2.403)
- Develop plans in conjunction with the program offices, services and users to transfer UAV capabilities to users ($0.734)
- Complete special studies to determine the programmatic, operational and budgetary impacts of changes to UAV requirements ($0.669)
- Continue assessments of design issues for high data rate communications, complete assessment of 100 Megapixel equivalent Infrared Framing cameras ($0.619)
- Maintain DARP financial oversight; coordinate DARP budget justifications with executing agents, provide special studies and reports as necessary to support DARSC, EDRB, and other Department and Congressional direction ($1.469)
- Assess the impact of operational, technological and industrial requirements and changes on manned reconnaissance capabilities ($0.728)
- Oversee Advanced Development initiatives for Global Broadcast Systems, High Band Prototype Demonstrations, JSAF standards development and implementation requirements ($0.594)

Obligation time frame for all FY98 funding will be from Oct 97 - Dec 98

FY1999 Plans: ($15.701)

- Continue to assess and refine the Department's integrated airborne reconnaissance architecture, determine efficient paths for migration to the DARP objective architecture and ensure the compatibility of the DARP architecture with related architectures for JSTARS, the High Data Rate Communications architecture, and others ($3.762)
- Assess the effectiveness and military worth of ACTD exercises ($1.178)
- Monitor UAV capability plans among the program offices, services and users; assess and complete special studies to determine the programmatic, operational and budgetary impacts of changes to UAV requirements ($1.675)
- In support of Services' future requirements, complete assessments of design issues for high data rate communications ($1.473)
- Assess the impact of operational, technological and industrial requirements and changes on manned reconnaissance capabilities ($0.975)

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

- Provide integration, associated oversight, and support for common ground systems, development of a Common Data Link (CDL) and leasing of Commercial Satellite Communications Initiative (CSCI) transponders ($1.570)
- Support Advanced Technology Development for Global Broadcast Systems, High Band Prototype Demonstrations and JASF standards development; ensure development of approved implementation requirements across Services ($2.582)
- Oversee implementation of airborne reconnaissance SIGINT standards ($1.047)
- Maintain DARP financial oversight; develop and coordinate DARP budget justifications with executing agents, provide special studies and reports as necessary to support DARSC, EDRB, and other Department and Congressional requirements ($1.439)

Obligation time frame for all FY99 funding will be from Oct 98 - Dec 99

Acquisition Strategy: The DARP Integration and Support line funds architecture, oversight, and standardization across all areas of the DARP including manned and unmanned, systems, sensors, infrastructure, and technology development. It consists of government civilian personnel salaries, SETA support, operations and maintenance of government facilities and equipment, security and travel support. The initial SETA contract was competitively awarded in September 1995 for a five-year period of performance. Contract taskings are issued on a delivery order basis as required to meet requirements. The DARO Director maintains stringent restrictions on the utilization of SETA contractors.

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

B. Program Change Summary

	FY1997*	FY1998	FY1999	Total Cost*
Previous President's Budget	[19.2]**	20.5	22.2	continuing
Appropriated Value	0.6***	7.5		
Adjustments to Appropriated Value				
a. Undistributed Reduction		(0.3)		
b. Realignments				
c. Reprogramming				
d. Recission				
	[19.2]**			
President's Budget Request	0.5***	7.2	15.7	continuing

* FY 1997 funding for this program is justified under PE 0305154D and recorded within the various projects supported by these activities.

** Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154. These funds were included in the funded lines of those individual projects and the dollars presented are for informational purposes only and not additive for this PE.

*** These funds pay for DARO civilian salaries and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay costs are now funded in this new PE (0305209D), the FY 1997 DARO Operations are displayed with this project for consistency in the presentations.

Change Summary Explanation:

Funding: N/A

Schedule: N/A

Technical: N/A

Exhibit R-2, RDT&E BUDGET ITEM JUSTIFICATION	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E DEFENSE WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z

C. Other Program Funding Summary Cost

	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	To Complete	Total Cost
N/A									

D. Schedule Profile

Fiscal Year actual and planned events by quarter

	FY1997 *				FY1998				FY1999			
	1	2	3	4	1	2	3	4	1	2	3	4
Contract Milestones												
Award SETA contract subtasks	X				X				X			
Architecture and Integration Milestones												
Baseline DARP Systems Architecture Developed		X										
Airborne Reconnaissance Information Technical Architecture (ARITA) - Ver 1.0 Published				X								
DARO Objective Architecture Options Completed					X							
1st DARO Systems Architecture Document Published						X						
DARO Operational Architecture Compiled/Published						X						
Airborne ISR Information Simulation Model - Rel 1 (Campaign Analysis Tool)										X		
DARO Systems/Operational Architecture Update											X	

* FY 1997 funding is justified as part of Program Element 0305154D.

Exhibit R-3, RDT&E PROGRAM ELEMENT/PROJECT COST BREAKDOWN	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, DEFENSE-WIDE/BUDGET ACTIVITY 7	R-1 ITEM NOMENCLATURE Defense Airborne Reconnaissance Program (DARP) PE 0305209D8Z/P815

DARP Integration & Support

($ in millions)

A. Project Cost Breakdown

	FY1997*	FY1998	FY1999
1. Strategic Planning and Architectures	6.613**	2.403	4.940
2. Integration and Interoperability	3.626**	0.619	3.043
3. Resource Investment Strategy	2.773**	1.469	1.439
4. Program Oversight	2.560**	2.131	2.650
5. Enabling Technologies	3.626**	0.594	3.629
	[19.198]**		
TOTALS	0.534***	7.216	15.701

* FY 1997 funding for this program justified under PE 0305154D and recorded within the various projects supported by these activities.

** Bracketed numbers are DARP Integration and Support requirements which were included as part of the individual projects in PE 0305154D. These funds were included in the funded lines of those individual projects and the dollars presented here are for informational purposes only and not additive for this PE.

*** These funds pay for DARO civilian pay requirements and were previously included in the Airborne Reconnaissance Programs, project P525 as a separate sub-project, DARO Operations. Since DARO civilian pay cost are now funded in this new PE (0305209D), and FY 1997 DARO Operations are displayed with this project for consistency in the presentations.

B. Budget Acquisition History and Planning Information N/A

This program does not meet the criteria of Chapter 5, DoD 7000.14-R

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Exhibit R-2, RDT&E Budget Item Justification	Date: February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide, Budget Activity 7	**R-1 ITEM NOMENCLATURE:** 1001017D8Z Partnership for Peace (PfP)

Cost ($ in Millions)	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003		Cost to Complete	Total Cost
TOTAL PE COST	0.0	0.0	1.957	1.941	1.932	1.922	1.920		Continuing	Continuing

A. Mission Description and Budget Item Justification:

Partnership for Peace (PfP) is a major initiative introduced by NATO at the January 1994 Brussels Summit. The Partnership is working to expand and intensify political and military cooperation throughout Europe, increase stability, diminish threats to peace, and build strengthened relationships by promoting the spirit of practical cooperation and commitment to democratic principles that underpin the Alliance.

Partnership for Peace Information Management System (PIMS) is a DoD leadership project that will enhance cooperation and coordination bilaterally and multilaterally in accordance with U.S. policy and to U.S. benefit. Firmly based on priority requirements, PIMS is part of the NATO Enlargement Facilitation Act of 1996 and one of only two specifically highlighted activities. PIMS implements the Congressional endorsement for the modernization of Defense capabilities in eligible PfP countries relative to their telecommunications infrastructure. PIMS R&D dollars in FY99 are a "new start." They are focused on tailored database development efforts supporting U.S. and NATO-approved PfP Cooperative Topics to achieve the JCS Chairman's interoperability and integration goals outlined in Joint Vision 2010 for working in concert with allied and coalition forces in future operations. In addition, R&D dollars are directed toward insuring that PIMS is compliant with the evolving Defense Information Infrastructure and follows the guidance and recommendations of the Clinger-Cohen Act. PIMS is not duplicative of any other project. This program is in Budget Activity 7, Operational Systems Development, because it supports currently employed systems and training activities.

Cost Breakout

$1.0 million	Support to OSD and Joint Staff database development, e.g., Peacekeeping, Emergency Planning, Environmental Security and Professional Military Education tailored to PfP mission enhancement
$0.5 million	Theater Interoperability initiatives including multi-level security approaches and the requisite development and integration of AIS security guards, filters, and firewalls to enhance bilateral and NATO interoperability
$0.5 million	Communications enhancements to integrate the Defense Message System and other C3I, J-6 and DISA policy driven improvements to the Defense Information Infrastructure

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide, Budget Activity 7	**R-1 ITEM NOMENCLATURE:** 1001017D8Z Partnership for Peace (PfP)

Specific Application and Process Improvements represent specific types of program and system enhancements which will directly support development of OSD databases, interoperability initiatives, and communications enhancements. In addition these funds provide direct support to the PIMS Program Office in implementing the multiple facets of the PIMS program both US and Partner.

B. Program Change Summary:

	FY1997	FY1998	FY1999	Total Cost
FY1998 President's Budget	0	0	0	0
FY1998 Appropriated Value		0	0	0
Adjustments to Appropriated Value		1.957	1.941	3.898
FY1999 Budget Estimate Submission		1.957	1.941	3.898

(Transferred in from Joint Staff).

Change Summary Explanation: Funds added for bilateral database development efforts, system enhancements, and multiple interoperability initiatives.

C. Other Program Funding Summary:

Cost ($ in Millions)	FY1997	FY1998	FY1999	FY2000	FY2001	FY2002	FY2003	Cost to Complete	Total Cost
O&M (PfP)	45.560	41.162	51.969	52.500	52.500	52.500	52.500	TBD	TBD
O&M (PfP - PIMS)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	Continuing	21.0
Total PfP	48.560	44.162	54.969	55.500	55.500	55.500	55.500	TBD	TBD

D. Schedule Profile:

	FY1998	FY1999	FY2000	FY2001
Milestone	1	1	1	1
Milestone	2	2	2	2
Milestone	3	3	3	3
Milestone	4	4 5	4	

Exhibit R-2, RDT&E Budget Item Justification	Date: February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense Wide, Budget Activity 7	**R-1 ITEM NOMENCLATURE:** 1001017D8Z Partnership for Peace (PfP)

Milestones: FY98

(1) Feb 98 - Implement PfP Collaboration Suite
(2) Apr 98 - Implement Enhanced Systemic Collaboration Tools
(3) Jul 98 - Achieve interoperability with NATO
(4) Sep 98 - Enhanced Information/Technical Support to Peacekeeping

Milestones: FY99

(1) Nov 98 - Implement Server Replication Technology
(2) Oct 98 - Develop Low-Bandwidth Video Teleconferencing
(3) Dec 98 - Integrate Defense Messaging System Technology
(4) Feb 99 - Enhance Network and System Management
(5) Jun 99 - Integration of Accredited Security Guards & Filters

Milestones: FY00

(1) 1QTR - Increase Long Haul/Wide Area Communications Infrastructure
(2) 2QTR - Implement Deployable/Tactical Communications Infrastructure
(3) 3QTR - Integration of Releasable DII/COE Segments
(4) 4QTR - Implement Voice Systems

Milestones: FY01

(1) 1QTR - Implement Defense Messaging System
(2) 2QTR - Implement Modeling & Simulation Tools
(3) 3QTR - Implement Datafusion and Correlation

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-3 Exhibit)	DATE February 1998
APPROPRIATION/BUDGET ACTIVITY RDT&E, Defense-wide/Budget Activity 7	R-1 ITEM NOMENCLATURE Partnership for Peace (PfP) - PE 1001017D8Z

(U) **A. Project Cost Breakdown** ***(in Millions)***

	FY 1997	FY 1998	FY 1999	FY 2000
Systems Engineering			.466	.502
Training Development			.250	.100
Integrated Logistics Support			.100	.100
Configuration Management			.100	.250
Operational Test and Evaluation			.250	.300
Licenses			.150	.100
Travel			.100	.150
Development Test and Evaluation			.391	.250
Miscellaneous (less than 15% of total)			.100	.089
Program Management Support			.050	.100
TOTAL	0	0	1.957	1.941

(U) **B. Budget Acquisition History and Planning Information**

Not Applicable

(U) **C. Funding Profile**

Not Applicable