RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)							DATE February 2005	
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3			R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z					
COST (In Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Total Program Element (PE) Cost	71.352	41.929	110.717	111.026	115.395	114.248	115.788	117.333
Quick Reaction Fund Project P826	14.911	20.965	29.717	29.926	31.288	31.346	32.098	32.842
Defense Acquisition Challenge Program (DACP) Project P827	17.093	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Rapid Reaction Fund Project P828 *Reprogramming Actions	26.619*	75.000**	51.283	51.174	52.819	51.556	51.591	51.650
Technology Transition Initiative (TTI) Project P829	12.729	20.964	29.717	29.926	31.288	31.346	32.099	32.841

**Note: $75.0 million FY 2005 Reprogramming Action not reflected in control totals.

A. Mission Description and Budget Item Justification

(U)The Quick Reaction Special Projects Program (Program Element 0603826D8Z) QRSP supports three separate projects that provide rapid funding to expedite new development and transition of new technologies to the warfighter. The projects that are part of the QRSP are the Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and the Rapid Reaction Fund (RRF). The FY 2004/2005 funding in RRF is the result of internal Reprogramming Actions to allow a rapid response to operations in Iraq and is used to initiate high-priority science and technology projects in the execution years. QRSP provides the flexibility to respond to emergent DoD issues and address technology surprises and needs within the years of execution outside the two-year budget cycle. The DACP and TTI programs are mandated by Congress and receive high congressional interest. The DACP program transferred in FY2005 and outyears to PE 0604051D8Z to comply with congressional direction.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z

(U) The Quick Reaction Fund (QRF) program is focused on responding to emergent needs during the execution years that take advantage of technology breakthroughs in rapidly evolving technologies. Examples of the types of projects that are envisioned include: accelerating promising research that will enable transformation; or will fill critical gaps in DoD acquisition programs and will last no longer than 12 months; or maturation of technologies critically needed by combatant commanders for operations. Typically these projects are on the technology maturity scale where an idea or technology opportunity is proven and demonstrated. In FY 2004, over 100 proposals were reviewed and 12 projects were funded.

(U) The Technology Transition Initiative addresses the funding gaps that exist between the time a technology is demonstrated and the time it is procured for use in an intended weapons system. The Technology Transition Initiative was authorized under Title 10, Section 215 of the Defense Authorization Act to facilitate the rapid transition of new technologies from S&T into acquisition programs. The initiative's objectives are to accelerate the introduction of new technologies into operational capabilities for the armed forces.

B. Program Change Summary:

	FY 2004	FY 2005	FY 2006	FY 2007
Previous President's Budget	46.566	64.389	89.927	90.408
Current FY 2006 President's Budget Submission	71.352	41.929	110.717	111.026
Adjustments to Appropriate Value	+24.786	-22.460	+20.790	+20.618
Congressional Program Reductions				
Congressional Rescissions				
Congressional Increases				
Program Increase (Rapid Reaction Fund (RRF))			+50.000	+50.000
Reprogrammings (Rapid Reaction Fund (RRF))	+26.619			
Defense Challenge Program Transfer		-25.713	-28.975	-29.238
SBIR/STTR Transfers				
Other	-1.833	+3.253	-0.235	-0.144

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z

C. Other Program Funding: N/A
D. Acquisition Strategy: N/A
E. Performance Metrics:

QRF/RRF: Program completion and success will be monitored against program schedule and deliverable stated in the proposals.

DACP: For FY2003, initiated the new start of twenty (20) new start DACP Projects.
For FY2004, initiated the new start of eight (8) new start DACP Projects.

TTI: In FY2005, initiate the new start of 13 projects and conclude activities on many continuing projects with the result of at least 10 technologies transitioning to the warfighter.
In FY2006, initiate the new start of 18 projects and conclude the activities on many continuing projects with the result of at least 12 technologies transitioning to the warfighter.
In FY2007, initiate the new start of 19 projects and conclude the activities on many continuing projects with the result of at least 14 technologies transitioning to the warfighter.

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)							DATE February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3				R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z Quick Reaction Fund (QRF), Project 826			
COST (In Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Quick Reaction Fund Project P826	14.911	20.965	29.717	29.926	31.288	31.346	32.098	32.842

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

The Quick Reaction Fund (QRF) provides flexibility to respond to emergent warfighter needs in the execution years. It takes advantage of technology breakthroughs in rapidly evolving technologies with expected completion within 6 to 12 months.

B. (U) Accomplishments

(U) Quick Reaction Fund - A data call was released on October 20, 2003 requesting proposals in response to emergent operational needs and to capitalize on technologies. To assist in prioritizing the proposals, the call letter requested the Service and Agency Science and Technology Executives and the DDR&E principles submit their top ten proposals. A notification on the DDR&E website was also posted so there was another avenue to submit proposals. Candidate proposals were focused in the areas of technology required to reduce the unanticipated risk in acquisition programs, technology opportunities in rapidly evolving disciplines or technology maturation opportunities to support real-time operational needs. Each proposal addressed the description of the technology/concept, description of any demonstration testing required, description of technical, funding, and schedule risk, proposed executing Service/Agency and User. The proposals were reviewed for technical and warfighter relevance review. Projects awarded with FY 2004 funding include Surveillance Systems for border security, and Greaseless M-4 Demonstration and Fielding, both of which were successfully used in the CENTCOM theater of operation. Other projects were PING, two Change Detection efforts, Alternative materials for SAPI, Fieldable Automative Surveillance and the TACSAT system. Below is more in-depth discussion of the projects. Because these programs are one time efforts, there are currently no plans to fund them in other years. However, for the overall QRF program, FY 2005, 2006 and 2007 plans are to continue to respond to critical operational needs and technology opportunities.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
High Value Target Detection and Surveillance	SOCOM/Army	3.500	0.000	0.000	0.000

High Value Target Detection and Surveillance is a system used to monitor border crossings in the CENTCOM theater of operations. This project was funded from the QRF and RRF (see below for RRF). This project provided project management, engineering support and test and evaluation for integration and rapid prototyping of equipment to survey mobile and fleeting targets that threatens US Military forces in the AOR. This system consists of tactical camera and optical systems with video and audio recording as well as tagging and tracking capabilities.

	Service/Agency	FY 2004	FY 2005	FY 2003	FY 2007
PING	Air Force	1.500	0.000	0.000	0.000

The PING technology based concept uses a fixed-point ultra wideband microwave-based interrogation system to identify concealed weapons such as RPGs, Suicide Bomber Vests, and AK 47s out to 100 meters in the open (just underneath clothing or behind people, not behind walls or foliage) with an 80% confidence in unique target identification. The PING system is intended for use at checkpoints, fixed-point entry sites, and buildings. The system radiates a human-safe electric field impulse (60kV/m at 1m; the DOD, IEEE Permissible Exposure Limit for unlimited exposure is 100kV/m) toward the target, which causes the target's metallic and dielectric substructures to resonate at their natural frequencies. The antenna receives the resonate responses, which are then analyzed by an algorithm contained in a laptop computer. The resonance combinations serve to uniquely identify the target or targets in question and the range for each. Once identified, a picture of the weapon, range, and the confidence level of the identification are displayed on the computer screen is a concealed weapon detection system developed by the Air Force Research Laboratory using high power microwave. The system is designed to be deployed on a HMMWVEE.

	Service/Agency	FY 2004	FY 2005	FY 2003	FY 2007
Change Detection	Lincoln Lab	1.000	0.000	0.000	0.000

This effort will assess the feasibility of detecting improvised explosive devices (IEDs) by using airborne sensors and change detection. Change detection analyzes changes to a specified area over time and is complex due to the size of the IEDs, size of terrain and amount of material (garbage) in the AOR. This assessment will involve both field measurements and theoretical analysis. Measurements will use an existing Lincoln Laboratory airborne sensor platform called ALIRT (for Airborne Ladar Imaging Research Test bed). Using the upgraded ALIRT

system Lincoln Laboratory will conduct a series of flight measurements at the IED test range that has been established at Yuma, AZ. These tests involve a wide range of IED-like targets in background environments similar to those being encountered in Iraq.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Change Detection	Air Force	.800	0.000	0.000	0.000

AFRL/SNHI has developed a crossed-dispersion prism (CDP), visible/MWIR wide field of view spectral imaging sensor to support theater surveillance and intelligence. The emerging technologies sensor will employ wide area spectral imaging to increase countermeasure effectiveness to combat explosive projectile threats based on three factors: detection, tracking, and classification. The crossed-dispersion prism system has been proof of concept demonstrated by AFRL/SNHI on an optical bench. AFRL/SNHI will conduct both ground and air tests with the CDP on targets of opportunity to show technology maturation to support real time operational needs. AFRL/SNHI will deliver a fieldable prototype system with software and documentation that could be transferred to production in nine months. Completed initial design work and procurement of long lead materials.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Greaseless M-4's Demonstration and Fielding	Army	.560	0.000	0.000	0.000

The extreme environmental conditions in Iraq are proving that the available suite of weapon cleaning solutions and lubricants are not sufficient to ensure continuous and effective operations of their armaments. Failure to properly clean and apply lubrication to a weapon can have devastating consequences to both weapon and soldier. Even when lubrications are properly applied, the lubrication itself attracts sand, dust, dirt and other foreign materials that cause malfunctions and lower system reliability. The multi-functional Nickel Boron coating, known as UltraCem, exhibits a unique combination of physical properties to provide friction and heat reduction, wear and abrasion resistance, lubricity, temperature tolerance and extreme hardness. The Army, SOCOM and UCTD have performed feasibility demonstrations on a greaseless M-9, M-4, and MK-19 weapons, with 14,000 rounds fired on the M-9 and 3,600 rounds fired on the M-4.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Alternate Material for SAPI	Army	.800	0.000	0.000	0.000

The Interceptor Body Armor system combines a soft Outer Tactical Vest with two Small Arms Protective Inserts (SAPI). As of September 30, 2003, 135,860 SAPI sets have been fielded. However, there is a limited SAPI production due to lack of ceramic tiles and backing materials (Spectra Shield). Proposed work will focus on several materials, such as Metal Matrix Ceramics, Carbon matrix ceramics, and other materials as alternatives for high performance ceramic tiles (SiC, B4C), and domestic Dyneema (similar to Spectra) as alternative for Spectra Shield material. This effort will look at ceramic tile production to provide new material source for SAPI production. The proposed work will be mainly testing and evaluation of various materials which can be used to produce SAPI plates. Prototype materials were made and ballistic tests are planned.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Fieldable Automative Surveillance Technology	Army	.623	0.000	0.000	0.000

This effort will mature a commercial automated video surveillance technology to fieldable systems supporting operational needs in the war on terrorism, particularly in protecting ports, cargo staging areas and possibly pipelines. GuardianWATCH, uses advanced computer vision to detect subtle targets and analyze the motion of potential targets, allowing it to ignore insignificant motion, such as blowing trees or waves on water, while tracking targets, such as camouflaged soldiers or small rafts. The GuardianWATCH system controls the cameras to actively follow targets as well as to respond to other system alarms to automatically provide video for assessment of the cause. The cameras communicate their results via wireless (IP) networking with self-adapting bandwidth. Initiated R&D effort to provide the extension necessary for general field operations of a surveillance system. This includes supporting longer distance, satellite communication, support of military coordinates/maps, and integration with existing and emerging sensors, improving power consumption/supply, and reducing system weight while improving power and system ruggedization.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Tactical Satellite (TACSAT) – 2	Air Force	2.0	0.000	0.000	0.000

The Tactical Satellite (TacSat) program is a series of space missions designed to place rapidly evolving technologies in the Warfighters' hands on nine to twelve month delivery cycles. TacSat-2 will provide the warfighter with near-real-time 1-m resolution visible imagery from a

microsatellite. Warfighters with SIPRNET access can request and receive imagery from a Roadrunner spacecraft. AFRL has fully funded the primary space and ground segments of the mission. The QRF funds the Advance Target Indicator payload, launch, and military utility assessment. TacSat-2 has approximately a one-year development effort with a launch planned during CY 2005 and a military utility assessment planned for the following 12 months. The Advanced Target Indicator will geo-locate a wide range of radio frequency emitters and also cue the visible imager. Autonomous operations and check-out will be performed with an anticipated five times reduction in support staff. Operational concepts include a series of experiments over the first six months to demonstrate improvements over current operations.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Ground Data Collection System for Force Protection	Air Force	2.155	0.000	0.000	0.000

The objective of fielding the Ground Data Collection System is to continuously collect wideband data, with the expectation that events related to IED detonation will be recorded and post-event be detected and correlated with the time of the IED event itself. If the IED is RF-dentonated, signal analysis of IED-related RF will reveal the method of detonation and lead to the development of IED countermeasures. COMINT signals related to IED events and/or ambushes will also be captured and analyzed.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Yuma Proving Ground's Test Site	Navy	.482	0.000	0.000	0.000

Yuma Proving Ground's (YPG) is a dedicated test site for end-to-end evaluation under realistic real world environments. This includes construction of representative rural village, expansion of representative rural environment, development of representative urban environment and application of a range instrumentation. The YPG is a comprehensive test site for these purposes in a geographically remote area within DoD controlled restricted airspace. Over 20 systems have utilized the site as a representative environment to conditions in Iraq before deployment to Iraq. These funds were used for environmental and site improvements.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
OSPREY QUAHOG	Navy	.153	0.000	0.000	0.000

Classified program.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
U.S. Air Defense Capabilities and Plans Study	MDA/DARPA/DHS	.800	0.000	0.000	0.000

This study is a joint effort examining capabilities and efforts to include the North American Aerospace Defense Command, the Missile Defense Agency, the Department of Homeland Security, and the Defense Advanced Research Projects Agency, all of whom play a significant role in developing or operating air defense systems. The study examines both theater and homeland air defense, highlighting both similarities and differences between the two problems. The study develops a time-phased approach to deploying air defense architetures for both the theater and homeland arenas. Strategies for providing various levels of capability as a function of investment level is also described.

C. Other Program Funding: N/A

Exhibit R-2a, RDT&E Budget Item Justification				Date: February 2005				
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3				R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z Defense Acquisition Challenge Program (DACP), Project P827				
COST (In Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Defense Acquisition Challenge Program P827	17.093	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

*Out year funding for this program is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

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

Authorized by Title 10, Section 2395b, the Defense Acquisition Challenge Program (DACP) provides increased opportunities to insert innovative and cost-saving technologies into acquisition programs of the Department of Defense. DACP funds the test and evaluation of technologies and products that have the potential to improve performance, affordability, manufacturability, or operational capability of current acquisition programs at the component, subcomponent, or system level.

In FY 2003/2004, DACP was a sub element in the Quick Reaction Special Projects Program (Program Element 0603826D8Z), which had three sub-elements: Defense Acquisition Challenge Program (DACP), Technology Transition Initiative (TTI) and Quick Reaction Special Projects (QRSP). A fourth project, the Rapid Reaction Fund (RRF) was added for FY2004 only, to allow a rapid response to operations in Iraq and funded through a BTR and FY01-14 PA Reprogramming.

In FY 2005, the Defense Appropriation Act directed the Department of Defense to transfer the Defense Acquisition Challenge Program (DACP) from Budget Activity 3 to Budget Activity 5. The DACP for FY 2005-2011 will execute under Program Element 0604051D8Z, Budget Activity 5.

As a result of the Defense Acquisition Challenge Program's rapid establishment in mid-FY 2003, the Comparative Testing Office and its Foreign Comparative Testing (FCT) Program were selected by OUSD(AT&L) as the infrastructure to support the DACP pilot business model. Currently, U.S. Special Forces Command, U.S. Army, U.S. Marine Corp, and the Navy's Naval Sea Systems Command, Naval Air Systems Command, and Naval Space and Naval Warfare Systems Command are supporting DACP with the current FCT service infrastructure. The U.S. Air Force is supporting DACP through Secretary of the Air Force for Acquisition (SAF/AQ).

Proposal Solicitation Process

The DACP process is a two-phased annual process. During Phase I, interested parties, within and outside the DoD, are invited through a Broad Area Announcement (BAA) to submit summary proposals. Summary proposals are evaluated and prioritized based on merit and their potential to benefit a DoD Program of Record (POR). In Phase II, candidate summary proposals are matched to the PORs that have the potential to benefit from the proposed technology. POR Program managers, in collaboration with the weapon prime where applicable, evaluate and either "accept" or "reject" the proposed technology. A "reject" is defined as the POR has determined that the technology can not benefit the POR. An "accept" is defined as the POR determines the technology has potential benefit and wishes to compete for funding. The POR then develops a final proposal to compete for DACP funding to test and evaluate the proposed technology. The final proposal contains a brief description of the issue and how the proposed technology resolves the issue, test and evaluation strategy, and procurement and transition strategy if the technology meets the PORs requirements. Final proposals are submitted into OSD DACP by the POR where the proposals are evaluated and prioritized, and selected for funding by the OSD DACP Program Manager.

The DACP pilot business model leverages off the successful FCT personnel and business processes, where possible, except OSD DACP will issue a Broad Agency Announcement (BAA) annually inviting interested parties to submit summary proposals. As a result of DACP's rapid establishment in 2nd Quarter FY 2003, the FY 2003 BAA served as the only call for proposals in FY 2003 and FY 2004. The FY 2005 cycle began with a BAA release in mid-February 2004 and is addressed under the Defense Acquisition Challenge Program (DACP) PE 0604051D8Z.

Results of FY 2003/2004 BAA Solicitation

More than 300 summary proposals were submitted during Phase I by industry and government representatives in response to the March 2003 BAA. Approximately one third of the proposals were rejected during an administrative review for lack of proper documentation. The remaining proposals were prioritized for potential benefit to the POR. Nearly 125 Program Managers were contacted during Phase II and asked to consider proposed technologies for use within their program. Program Managers from all Services and USSOCOM submitted more than 80 final proposals, covering a broad range of technologies, to compete for FY 2003 and FY 2004 new start funding. Twenty proposals were selected for FY 2003 new start funding. An additional eight proposals were selected for FY 2004 new start funding.

B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Automated EPLRS Planner	Marine Corps	0.464	0.000	0.000	0.000

The Automated Enhanced Position Location Reporting System (EPLRS) Planner is a "technology insertion" into the Systems, Planning, Engineering, and Evaluation Device (SPEED) software application. The product fills a critical USMC need to automate planning for communications networks. This technology supports the tactical data network at Regiment and below; including the more efficient use of reduced manpower to plan and manage an EPLRS network, and the potentially life saving ability to step through planning processes of a military operation prior to deployment.

Vendor: Northrop Grumman Information Technology, Winter Park, FL
Program Office of Record: PM Communications, Marine Corps Systems Command, 2200 Lester Street, Quantico, VA 22134

FY2004 Accomplishments: Contract signed 17 May 2004. Drafted quality assurance plan and initiated in-process review working group. Completed systems requirement specifications and systems design document.
FY2005 Plans: Deliver final software design. Complete EPLRS planner coding and unit testing for SPEED v.10 (nearly 90% complete). Execute integration testing, conduct functional qualification testing to support procurement, and final acceptance test. Provide software test report and fielding decision.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Common Tactical Picture Ground Mobile and Air Based Command and Control Systems	Marine Corps	1.610	0.000	0.000	0.000

The Common Tactical Picture (CTP) is integrating spray cooling technology into the C^2 advanced rugged mobile enclosure of the Expeditionary Fighting Vehicle (EFV)(C) and EFV(P) variants. The EFV needs to effectively integrate multiple coordinated Army Fire Zone and USMC blue and red force databases to provide a ground, mobile CTP. By utilizing spray cooling technology into the C^2 hardware, COTS technology can be utilized in the C^4I suite for on the move capability, hardened for harsh environments, be readily

integrated with satellite communications, and provide for much faster processing time. The enclosure will be qualified for use in wheeled, tracked, and air systems.

Vendor: Isothermal Systems Inc., Clarkston, WA
Program Office of Record: DRPM AAA, Worth Avenue
Technology Annex, 14041 Worth Ave,
Woodbridge, VA 22192

FY 2004 Accomplishments: Contract awarded on 13 May 2004. Conversion of MPUs 4-6 to HEUs to incorporate C2 systems of EFV(P). Conducted technical interchange meetings and APM(C)/ISR meetings for HEU. No Cost, Restructure Mod completed for HEU build. MPU-II test articles nearly complete (85%). HEU-II specifications complete and test articles are being manufactured.
FY 2005 Plans: Conduct System and Integration; Receive test articles (6 systems); Conduct qualification testing; Conduct Quarterly Integrated Product Team (IPT) Meetings; Conduct Wheeled Vehicle Demonstration (MCSC UoC); Conduct Rotary Wing Demonstration (USMC AH1 or Army H60); Procurement Decision 4th quarter FY05.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Dismounted Infantry Virtual Simulation for Military Operations in Urban Terrain	Army	0.753	0.000	0.000	0.000

This project is evaluating a virtual training system that if successful will lay the foundation for rapid technology insertion into three major acquisition programs: (1) Integrated Military Operations in Urban Terrain (MOUT) Training System (I-MTS); (2) Virtual Emergency Response Training System (VERTS); and (3) Soldier Combined Arms Tactical Trainer (Soldier CATT). This dual use technology can be used to immerse a war fighter or emergency responder into a networked simulation, providing a training capability for homeland security, urban operations, and Weapons of Mass Destruction (WMD) detection. This capability is critical due to the ever increasing scarcity of real-life training resources, such as time, space (terrain), and funding.

Vendor: Advanced Interactive Systems/Reality by Design, Orlando, FL
Program Office of Record: Army PEO Simulation, Training and Instrumentation (PEO STRI)

FY 2004 Accomplishments: Performed government inspection (July 2004). Deliver, install and test the system at Fort Campbell (Aug 2004). Conduct user evaluations with the 101st Airborne Division (Sept 20-30, 2004).
FY 2005 Plans: Complete development of the virtual Fort Campbell database. Procure initial spares for sustainment.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Embedded Integrated Broadcast Service (IBS) Receiver (EIR)	USSOCOM	1.209	0.000	0.000	0.000

This project is evaluating the next generation IBS receiver which is smaller, lighter, and less costly than current equipment. EIR will provide timely receipt of intelligence data required by the tactical war fighter. The tactical war fighter, especially aircraft, relies heavily on near real-time intelligence information for threat avoidance, detection, targeting, blue force tracking and personnel recovery.

Vendor: L-3 Communications, Telemetry-West, San Diego, CA
Program Office of Record: USSOCOM PEO, Intelligence and Information Systems (IIS)

FY 2004 Accomplishments: Award contract for design modifications and production-representative systems. Completed Phase 1 and Phase 2 Firmware Developments. Initiated software modifications. Test items built and delivered.
FY 2005 Plans: Technical, verification and validation testing. Conduct an interoperability assessment. Compile test results and prepare project close out documentation. Incorporate results into production configuration. Submit DACP Close-out Report.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Enhanced Gunfire Detection System	USSOCOM	0.631	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is evaluating system enhancements (i.e., addition of sensors and processors) which have the potential to significantly improve the accuracy of the Gunfire Detection System (GDS) and locate a sniper prior to the sniper's first shot. This improved technology will be brought about through the integration of selected sensors (e.g., hyper-spectral imagers, unattended ground sensors, visible micro-sensors, infrared sensors, etc.) in the GDS and through the inclusion of automatic processing software.

Vendor(s): Metravib, France
Program Office of Record: USSOCOM PEO, Special Programs (SP)

FY 2004 Accomplishments: Fielding & Deployment Release (F&DR) approved. Successfully integrated a Vehicle GDS with the Kongsberg (Norway) Remote-controlled Weapon System (weapon turret) on a HMMWV in support of the Anti Sniper Vehicle program (sponsored by the Rapid Equipping Force Office) and conducted live-fire testing of the combined system with excellent

results. Let a contract modification to procure 32 GDS Vehicle systems for USSOCOM. Project Manager awarded contract for system modification. Complete integration of sensors into the gunfire detection system. Initiate technical testing.
FY 2005 Plans: Complete technical testing. Conduct operational testing and user evaluation. Compile test results and prepare documentation in support of a milestone decision. Award contract for production buys. Incorporate plans for a rotary wing version of gunfire detection system for testing in FY 2005-2006. Submit DACP Close-out Report.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Enhanced Optical System – Rolling Airframe Missile (RAM)	Navy	0.294	0.000	0.000	0.000

This project will evaluate an alternative optical system to an existing production design that will improve performance, manufacturability, and operational capability while providing several million dollars in cost savings.

Major Vendor(s): Axsys - IR Systems (formerly Telic Optics, Inc.), North Billerica, MA;
Janos Technology, Townshend, VT;
Optical Coating Corporation, Natick, MA;
Exotic Electro-Optics, Murrieta, CA;
Surmet Precision Optics (formerly Precise Surface Finishing), Murrieta, CA;
Scarrott Metallurgical, Los Angeles, CA;
Schmitt Measurements Systems, Inc., Portland, OR;
Parallel Ventures, Inc., Tucson, AZ;
Optimum Optical Systems, Inc., Camarillo, CA;
Program Office of Record: PEO (IWS3) RAM/CIWS project office

FY 2004 Accomplishments: Multiple material subcontracts have been fulfilled. Sapphire domes have successfully been polished and coated with an anti-reflection coating. Titanium and aluminum optical assemblies have also successfully been produced and tested. The feasibility of both bonding and brazing the domes has been demonstrated. All remaining components will be forwarded to the RAM Prime contractor, for design evaluation, missile incorporation

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Enhancements for Fly Away SATCOM (FASC)	USSOCOM	0.857	0.000	0.000	0.000

This project is evaluating operational enhancements to SOF's Fly Away Satellite Communications (FASC) Terminal tracking for inclined satellites, and improve satellite acquisition while providing Built-in-Test and Training. This project, if successful, will provide critical operational enhancements to the FASC terminals enabling faster world wide deployments, higher transmit and receive high bandwidth/performance, ease-of-use, and Ka Band communication satellite integration.

Vendor: SWE-DISH Satellite Systems, Inc., Washington, DC
Program Office of Record: USSOCOM PEO, Intelligence and Information Systems/Special Projects (IIS/SP)

FY 2004 Accomplishments: Tested and evaluated the Enhanced FASC hardware and software deliverables in a lab and field environment (auto tracking capability). A SWE-DISH (CoBRA) users' group/program review was conducted April 26-30, 2004, at SPAWAR, Charleston and June 2, 2004, at Reston, VA., to validate enhancements and upgrades.
FY 2005 Plans: If operationally feasible, upgrades will be inserted into operational systems and deployed for real world testing. Test and evaluate software enhancements that will automatically initiate SATCOM acquisition. A SWE-DISH (CoBRA) users' group/program review will be scheduled. Facilitate the awarding of a $29 million full and open contract with SWE-DISH Satellite Communications Inc. Submit DACP Close-out Report.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Friction Stir Processing for Virginia Class Submarines	Navy	0.263	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is assisting in the transition of a new manufacturing technology into the US Navy's propeller manufacturing infrastructure. In FY 2002, friction stir processing showed feasibility to significantly improve the surface condition of Ni Al bronze propeller castings by repairing inherent surface defects while also greatly improving the strength of the processed area. In FY 2003, an aggressive effort was initiated to refine processing parameters and tools for Ni Al bronze castings. This process is continuing, in parallel with the equipment design and manufacturing effort. Because the process is adaptable to the numeric controlled machining process, which is used extensively at the Naval Foundry and Propeller Center to finish the propeller castings, developing a prototype attachment that could both machine the surface of the propeller and repair it, without moving the propeller, will result in time and cost savings.

Vendor(s): TBD; likely candidates are General Tool Company, Cincinnati OH, and Friction Stir Link, Waukesha, WI who produce similar equipment
Program Office of Record: Virginia Class Submarine Program Office, PMS 450

FY 2004 Accomplishments: Developed FSP attachment specification. Initiated contracting efforts to design and manufacture the prototype unit for the US Navy production facility.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Integrated Defensive Countermeasures Alternative	Air Force	0.315	0.000	0.000	0.000

This project is evaluating a fiber optic (FO) alternative to a towed decoy presently deployed to the warfighters. This proven technology has shown superior performance in the laboratory and requires engineering efforts to establish a qualified commodity for Air Force platforms integration and testing.

Vendor: Raytheon Space & Airborne Systems, Goleta, CA
Program Office of Record: Air Force Towed Decoy

FY 2004 Accomplishments: Procured 80% of the material purchases for the building of 12 FO-50 mass models and 6 full-up decoy rounds for F-15 testing. Delivered 40% of the material, remaining 40% on-order. Assembly of some of the decoys has begun but will not ramp-up until the majority of the material is in place. Towline design refined based upon FY 2003 flight testing. Conducted flight test of upgraded configuration in Aug 2004. Completion of the operating software with the IDECM hardware finalized prior to integration testing at the F-18 laboratory at Point Mugu.
FY2005 Planned Actions: Final integration testing followed at the F-18 IDECM integration facility and was successfully completed at Pt. Mugu on 17 Nov 04. Track delivery of 12 mass models with new towline configuration for testing on F-15 aircraft at Eglin AFB in 2 Qtr FY 05. The AFOTD effort successfully completed two milestones: Critical Design Review (CDR) (14 Dec 04) and software Preliminary Design Review (PDR) (15 Dec 04). Track progress of material deliveries and build-up of 6 electrical decoys for anticipated delivery in Jun 05. Begin Test Working Group discussions to prepare for AFOTD future effectiveness range testing. Using the AFOTD hardware, the program office will perform airborne effectiveness testing to all the AF and Navy to see the performance of this product against ground threats on government ranges. Completion of these tests will allow the joint services to evaluate transition to procurement during the FOTD MS III decision in 4th Qtr FY 06.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Integrated Schedule/Process for Global Hawk Spiral Development	Air Force	0.335	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

To date neither industry nor Government program offices have developed an effective means of implementing existing integrated scheduling techniques into the spiral development process. This project seeks to provide the Global Hawk program with an integrated schedule to be used daily with schedule risk tools and at all reviews, to optimize program management and reduce future program risk. If successful, this project will provide defense organizations a more robust and disciplined process to use in scheduling spiral development (multiple spirals) programs.

Vendor: Dayton Aerospace, Inc., Dayton, OH
Program Office of Record: Global Hawk Program Office

FY 2004 Accomplishments: Researched existing state of practice. Explored how various companies and government organizations are currently incorporating evolutionary acquisition approaches into their program schedules. Researched new acquisition guidance and assessed changes in the evolutionary acquisition environment. Interviewed DAU, ASC and AFRL ACE teams, several acquisition programs, AFMC/DRA, AT&L. Reviewed existing individual Global Hawk spiral schedules and recommended a restructure approach. Facilitated joint Global Hawk SPO/Northrop Grumman Information Management System (IMS) development meeting. Reached concurrence on upper level program events; drafted accomplishments/criteria. Initiated process for linking existing individual IMSs to overall integrating schedule. Guided activities to ensure all functional areas from SPO and government were represented in the products. Completed initial draft of final report. Prepared briefing of draft results and presented at the Global Hawk SPO/Northrop Grumman IMS offsite meeting.
FY 2005 Plans: Provide recommendations for growth to full program IMS. Incorporate additional Global Hawk lessons learned into report. Complete final report and briefing.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Low Cost Aerogel Insulation for Shipboard Fire and Thermal Protection	Navy	1.157	0.000	0.000	0.000

This project is evaluating a flexible aerogel thermal insulating blanket for use on the DD(X). The proposed nano-porous material has the potential to provide a fire barrier protection layer with large weight and volume savings compared with compatible composite and steel structures. The Aerogel Insulation has the potential to provide a thermal barrier, reduced signature and blast mitigation.

Vendor: Aspen Aerogel, Marlborough Massachusetts
Program Office of Record: PM for Auxiliaries, Recoverability and Materials

FY 2004 Accomplishments: Vendor has completed the UL1709 screening testing at Southwest Research Institute and is down selecting the material selections for the remaining tests. Configurations tested consisted of different combinations of facing materials, i.e., Marine Board, FyreRoc and Avtec Coated Fiberglass.
FY 2005 Plans: Initiated full scale fire testing on Ex-USS Shadwell. Develop cost analysis-benefit report comparing using aerogel for shipboard applications vs. baseline method. Develop transition plan for full-scale aerogel installation. Cost analysis-benefit report and transition plan will address issues concerning the acceptance and transition of the aerogel insulation material for shipboard applications by the end user and fabrication community.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Mini Combat Trauma Patient Simulation System	Army	0.336	0.000	0.000	0.000

This project is evaluating a newly developed low cost, physiologically modeled Emergency Care Simulator (ECS^{TM}) that can provide a military medical simulation system for training, test and evaluation. The ECS in a Mini Combat Trauma Patient Simulation (CTPS) configuration will enhance portability, affordability and ease of deployment with active forces. It is hoped that training on this system will lead to more quick and realistic assessments of battlefield casualties, thus greatly increasing Soldier survivability.

Vendor: Medical Education Technologies, Inc. (METI), Sarasota, FL
Program Office of Record: Army PEO Simulation, Training and Instrumentation (PEO STRI)

FY 2004 Accomplishments: Acquired and integrated hardware. Modified the Combat Trauma Patient Simulation (CTPS) infrastructure to make it much more scalable and flexible. Now CTPS and Mini-CTPS systems can be tailored to the specific training levels as needed. Delivered prototype to USNS Mercy for 5 day training cruise and user test. Feedback was positive. Delivered the prototype system to the Field Medical Service School (FMSS) at Camp Pendleton where it has been integrated into the curriculum for corpsmen supporting the marines. The vast majority of graduates from the FMSS are being deployed to the Middle East immediately upon graduation.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Miniature – Controlled Receive Pattern Antenna (MCRPA)	Navy	1.272	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

The Miniature–Controlled Reception Pattern Antenna (M-CRPA) will provide anti-jamming (A/J) GPS capability to the Navy's platforms that have size and weight restrictions for antenna systems, such as the UH-1Y and AH-1Z helicopters and submarines. The small footprint, integrated antenna electronics, light weight, and low cost of M-CRPA all make it a viable solution for the size and weight restrictive platforms than the only other production CRPA available to the Navy today, the GAS-1.

Vendor: Titan Corporations, Greenbelt, Maryland
Program Office of Record: PEO C4I, PMW/PMA-170 (formerly 156) Navy

FY 2004 Accomplishments: Designed and fabricated three M-CRPA GPPO prototype antennas. Preliminary range measurements went well. The three antennas are being tested at NAVAIR before a final design is selected to produce.
Preliminary mechanical design is complete. This includes the antenna, radome, ground plane, mounting bracket, and housing.
Safety of Flight (SOF) test plan was completed.
Preliminary M-CRPA antenna electronics (AE) design 95% complete. The AE outline and mounting drawings, AE performance specification, and AE ICD are essentially complete. The detailed AE design and fabrication has begun.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Mortar Plating System using Vacuum Arc Vapor Deposition (VAVD)Technology	Marine Corps	0.584	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is evaluating a process for plating the interiors of worn 60mm and 81mm mortar tubes that are wearing faster than expected. Specifically, the project examines the use of Vacuum Arc Vapor Deposition (VAVD) technology. If this process is successful, the USMC will be able to plate material in worn areas and economically restore the infantry mortar tubes to a serviceable condition, providing a more cost-effective method in restoring mortar tubes to combat ready status.

Vendor: Alpen Technology Group, Inc., Brownsboro, AL
Program Office of Record: USMC Warfighting Laboratory, Quantico, VA 22134

FY 2004 Accomplishments: Phase I Contract awarded March 2004. Initial IPT was conducted at Huntsville, AL. Finalized Phase I timeline and objectives. Samples of Mortar steel were machined into test coupons, cleaned, and furnished to Alpen Technologies Group (ATG) per the requirements of the contract. ATG acquired the vacuum test chamber and other critical items to conduct Phase

I plating activities. ATG plated the mortar steel sample coupons and furnished them to NSWC Dahlgren for Testing. Initial tests of Phase I plating indicated that the VAVD technology failed. Plating was 40 times too thin and the bonding failed during cleaning.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
New Secure Version of Army Wireless Intercommunication System	Army	0.368	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is the adaptation of an existing, certified wireless encryption device to an aircraft wireless intercom system to provide a close range secure communications capability for tactical rotary wing operations. This technology will decrease the risk of mission compromise and increase mission effectiveness and soldier safety. This technology is an excellent candidate for horizontal technology insertion with ground or mounted soldier small team communications devices and has joint service application potential.

Vendor: Telephonics Corporation, Communication Systems Division, Farmingdale, NY
Program Office of Record: Army PEO Soldier/PM Air Warrior

FY 2004 Accomplishments: Awarded contract with prime vendor and developed a preliminary hardware and system certification plan. Briefed the National Security Agency (NSA) and requested support.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
"On Aircraft" Laser Additive Repair of Titanium Components	Air Force	0.756	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is implementing the process of Laser Additive (on Aircraft) repair of damaged titanium B-2 airframe surfaces. This technology will improve mission readiness, currently compromised by cracks which develop on the aft deck. The proposed technology insertion program will improve the maintenance of mission readiness which is currently compromised by cracks which develop on the Aft Deck. The program will be enabled by the integration of a laser head and titanium feeding mechanism with a portable, adaptive, multifunctional machine tool pod incorporating a conformal inert gas shielding shroud and the development of a comprehensive process to fill cracks with micro-welded titanium alloy to restore the stealth integrity of the damaged surfaces.

Vendor: Triton Systems, Inc., Chelmsford, MA

Program Office of Record: B-2 Systems Program Office

FY 2004 Accomplishments: Program is currently in the final stages of contract award. Before receiving a contract proposal, the B-2 SPO, AFRL/VA, AFRL/ML and Triton Systems established a go/no-go decision point. The SPO and AFRL are concerned that the laser weld may not work on titanium (Ti) 6-2-4-2. The contractor must first demonstrate that the laser weld repair works on Ti 6-4, before proceeding to Ti 6-2-4-2. AFLR has provided the $275K in SBIR funding for this additional work, which will add six months to the schedule, but will mitigate program risk.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Precision Parachute Delivery System (PPDS)	USSOCOM	0.789	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is evaluating the High Altitude-Low Opening/High Altitude-High Opening (HALO/HAHO) Navigation Aid which will allow Special Operations Forces (SOF) infiltration capabilities in all environmental situations. Currently teams have little ability to navigate to a target unless it is seen at exit. This system makes it possible to land precisely during adverse weather conditions, which greatly reduces the possibility of detection, i.e. clouds, rain, and snow. This program will give the SOF community the capability and the confidence to accomplish the infiltration portion of their mission safely, accurately, and undetected in a wider range of environmental conditions.

Vendor: Prescott Products, Lockhart, Texas (Prime); European Aeronautical Defense and Space (Sub)
Program Office of Record: USSOCOM PEO, Special Programs (SP)

FY 2004 Accomplishments: A Basic Ordering Agreement (BOA) was initiated thru Yuma Proving Ground's contracting center to support tests and evaluation. A firm fixed price contract was awarded to Prescott Products. Discussions regarding equipment integration conducted with the user community as well as the prime contractor. Development of an IPT is underway with NSC, USSOCOM and USASOC. The Special Operations Airborne Test Board completed six High Altitude High Opening Free Fall operations to collect eight data sets, which defines the flight characteristics of the standard free fall parachute system (MC4 / MC5).

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Portable Continuity of Operations Communication Appliance	Army	0.699	0.000	0.000	0.000

This project is evaluating the capability of Web Assured Response Protocol (WARP) to provide disaster recovery and continuity of operations (COOP) solutions to the U.S. government. WARP, if successful, will provide a solution to enable users to continue to perform vital IP-based functions over damaged or overloaded networks. This capability is vital in Continuity of Operations environments. This is extremely critical during periods of emergencies, such as terrorist attack, severe weather, etc.

Vendor: Circadence Corporation, Boulder, CO
Program Office of Record: Army Chief Information Officer/DoD COOP Integrated Network (DCIN)

FY 2004 Accomplishments: Contract awarded, test plan generated, work plans (spending plans) developed for testing facility scope of work defined for implementation PM (PENREN/C) Tentative Pilot Program Defined. Initiated testing. Test plan revised from information gathered in preliminary tests. Phase One testing completed, results published in report from USAISEC-TIC. Test results indicated a very strong match in a tactical go-to-war capability. CIO/G6 received permission to shift testing emphasis from original intent to this tactical capability. Phase Two testing will now be completed in partnership with Battle Command Battle Lab (BCBL) Ft. Gordon. Agreement has been reached on MIPR'ing funds to this effect and actual transfers are expected in January 2005.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Restore Effective Survival in Shock (RESUS)	Air Force	1.262	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This is a trial of bovine polymerized hemoglobin for the prehospital resuscitation of casualties in hemorrhagic shock. The item is a low volume and weight, room temperature stable substitute for blood transfusions. It is expected to significantly decrease combat casualty morbidity and mortality. Hemorrhage accounts for 60% of potentially salvageable combat casualties. Because 90% of these deaths occur prior to evacuation to a forward surgical theater, decreasing combat morbidity and mortality must focus on optimizing pre-evacuation resuscitation. Unlike older WWII and Vietnam resuscitation fluids, such as plasma, new products are effective as oxygen carriers and are highly likely to decrease hemorrhagic shock casualties, which remain at 30-100% depending on severity. The benefit of this program is that it will save lives of combat troops. Hemopure circulates directly in plasma when infused, increasing oxygen diffusion to the body's tissues and is compatible with all blood types, can be stored for 3 years without refrigeration, and is pathogen free. RESUS is a two-stage phase IIb/pivotal clinical trial project to compare the relative efficacy and safety of Hemopure with standard care products.

Vendor: BIOPURE Corporation, Cambridge, Massachusetts

Program Office of Record: 311 HSW, Human Systems Program Office, Brooks Air Force Base, Texas

FY 2004 Accomplishments: NMRC Institutional Review Board process initiated and close to completion. NMRC prepared and submitted a pre-IND (Investigational New Drug) package to the FDA in February 2004 and are preparing for IND submission to the FDA. The FDA pre-IND meeting took place on 14 April 2004; subsequent teleconferences and correspondence with the FDA has led to protocol and IND optimization. Key issues were agreed to.

1st, the FDA concurred that the predicted risk/benefit ratio for HBOC-201 is favorable and reasonable for an IND allowance in the prehospital trauma setting where blood transfusion is not available.

--2nd, the FDA concurred that RESUS may proceed in parallel (rather than in series) to Biopure's response to the FDA Complete Response Letter.

--3rd, the FDA accepted preclinical data for prehospital use of HBOC-201 in HS based on 2 series of studies (i.e., uncontrolled HS studies performed at UNC-Chapel Hill and controlled and uncontrolled HS studies completed at NMRC as part of the Hematomimetics Core Program).

--4th, protocol modifications are required as part of the final IND submission—most notably, the FDA insisted on 28-day survival [rather than survival to hospital arrival] as the 1o outcome measurement).

--5th, lab validation (HBOC interference) and animal husbandry/bovine veterinary techniques QA data must be submitted.

--6th, a preclinical HS/traumatic brain injury (TBI) study must be completed prior to an IND allowance. WHMC just completed an HBOC-201 rat HS/TBI study which will be submitted to the FDA.

·6 sites have been recruited as stage 1 trauma centers. Recruitment of additional trauma centers (8) for Stage II of the project is ahead of schedule. Thus, more rapid enrollment is expected in FYs 05 and 06, such that the FY06 completion date has not changed.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Ship Hull Inspection and Harbor Security Autonomous Underwater Vehicle	Navy	0.828	0.000	0.000	0.000

This project is evaluating a Ship Hull Inspection and Harbor Security Unmanned Underwater Vehicle (UUV) System, designed to inspect ship berthing, piers, and ship hulls for explosives or weapons of mass destruction. The system is comprised of a portable un-tethered UUV with unique inspection sensors and navigation capabilities and supporting hardware and software, which reduce manpower requirements and risks. If successful, UUVs will result in a 450% increase in search rate and reduce risk to both divers and shipboard platforms.

Vendor: Lockheed Martin Perry Technologies, Riviera Beach, FL
Bluefin Robotics Corp / Massachusetts Institute of Technology, Boston, MA

Program Office of Record: PEO Littoral and Mine Warfare (PMS EOD)

FY 2004 Accomplishments: Established an IPT team (March 2004) with representatives from vendors, government labs and EOD Fleet. Letter of intent authorized for procurement prior to contract award. A planned demonstration of UUV in San Diego was postponed from May 2004 and again in July 2004 to November 2004 due to reliability problems with thrusters and Desert Star Navigation System.

FY 2005 Accomplishments (1st Quarter): Planned demonstration of CETUS II was accomplished on 17 Nov 2004. Due to these reliability concerns, the decision was made to modify the contract to extend delivery of two Harbor Security Configuration (HSC) CETUS II vehicles. Additional non-DACP (EOD UUV/ONR funding) was provided to Lockheed Martin to initiate a reliability enhancement program before build of the CETUS II vehicles in accordance with subject contract. Delivery date extended to 15 July 2005 (CLIN 0001) and delivery date for test and evaluation support extended to 16 Dec 2006 (CLIN 0002). SPAWARSYSCEN San Diego is developing a one-way fiber optic data tether for CETUS II and currently conducting integration tests.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
SOF Machinegun Enhancements - (Collapsible Stocks for Special Operations Machine Gun & MK48 Semi-Rigid Ammunition Container)	USSOCOM	0.164	0.000	0.000	0.000

This project is incorporating an enhanced collapsible stock and ammo container for the MK46 and MK48 machine guns. Incorporating a collapsible stock and ammo container will make the weapons more effective when operating in an urban environment, close quarters combat and in vehicles. This project combined the previously approved and funded Foreign Comparative Test Project for the MK48 Semi-Rigid Ammunition Container and the Defense Acquisition Challenge project Collapsible Stocks for Special Operations Machine Gun. The ammo container technology has been transferred from FN Herstal (Belgium) to FN Manufacturing in South Carolina.

Vendor: FN Manufacturing Inc., Columbia, South Carolina.
Program Office of Record: Special Operations Peculiar Modification (SOPMOD) Program Office,

FY 2004 Accomplishments: Contract awarded for design modifications and prototype systems. PM conducted technical, operational and interoperability testing. Compiled test results and prepare project close out documentation to support procurement decision.

FY 2005 Plans: Technical and Operational testing of the collapsible buttstock will be completed and documented. Delivery of ammunition containers will be completed and Technical/Operational testing and documentation of the ammunition container will be processed. Final procurement decisions will be made. Project Manager will produce close-out report.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Speed QoS Planner	Marine Corps	0.371	0.000	0.000	0.000

The Systems, Planning, Engineering, and Evaluation Device (SPEED) Quality of Service (QoS) Planner is a "technology insertion" into the SPEED software application. The project is enhancing the capability of radio frequency (RF) path engineering to ensure the quality performance for tactical networks such as the Enhanced Position Location Reporting System (EPLRS) with applicability to the Joint Tactical Radio System (JTRS). The SPEED QoS Planner will enable the communications operator to dynamically engineer and plan networks as needed to ensure that data flow and priority are supportable prior to tactically deploying a network.

Vendor: Northrop Grumman Information Technology, Winter Park, FL
Program Office of Record: PM Communications, Marine Corps Systems Command, 2200 Lester Street, Quantico, VA 22134

FY 2004 Accomplishments: Contract signed 17 May 2004. Completed Quality Assurance Plan. Established work breakdown structure and schedule. Initiated IPR working group. Completed Software Requirements Specification and Systems Design Document. Delivered final software design.
FY 2005 Plans: QoS Planner coding and unit testing for SPEED v.10 nearly complete (90%). Execute integration testing, conduct functional qualification testing to support procurement, and final acceptance test. Provide software test report and fielding decision.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Spray Cool ™ Counter Targeting System (CTS)	Army	0.096	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is evaluating a new technology insertion to enable spiral development of the Counter Targeting System (CTS). CTS utilizes an infra-red (IR) sensor at high frame rates to detect sniper, mortar, RPG, and large caliber weapons fires. This system will assist in near real-time targeting and situational awareness for direct support of combat troops in operations such as Iraq and Afghanistan. If successful, the Spray Cool technology will reduce CTS weight of 400+ pounds to less than 100 pounds. First test articles will be field tested in Iraq.

Vendor: Isothermal Systems Research (ISR), Inc., Clarkston, WA
Program Office of Record: Army Intelligence and Security Command

FY 2004 Accomplishments: Compiled and submitted evaluation. Initiated sensor miniaturization effort to obtain a form and fit processor of ~ 18 – 20 lbs. Conducted successful Military Utility Assessment (MUA) resulted in sensor being selected for integration as the primary queuing sensor into INSCOM's Persistent Threat Detection System (PTDS) supporting OIF. Integrated enhanced target detection sets. designed miniaturized CTS processor, FPGA and Chip Scale Packaging to conform to military needs.
FY 2005 Plans: Receive delivery of miniaturized processors (Jul 05). Integrate into network centric operations and aerial vehicle configuration for wide area surveillance. Integrate into the CENTCOM Counter Strike Task Force system for combating terrorism in OIF.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Transcritical CO2 Environmental Control System	Army	0.681	0.000	0.000	0.000

This project is evaluating CO_2 environmental control technologies (refrigerant, compressors, and heat exchangers) for insertion into the Up-Armored HMMWV program as logistics improvements. If successful, CO_2 technologies will replace current environmentally-harmful synthetic refrigerants and systems with smaller, lighter and higher-capacity systems which are vital to the legacy fleet, the Future Tactical Truck System (FTTS), and the Future Combat System (FCS). This is extremely critical for the US Army to meet international environmental protocols, in order to allow it to operate worldwide in several different countries.

Vendor: Modine Manufacturing, Harrodsburg, Kentucky
Program Office of Record: Army PM-Light Tactical Vehicles (LTV), PEO Combat Support & Combat Service Support (CS/CSS)

FY 2004 Accomplishments: The CO_2 system was installed in test vehicle, tested in a laboratory (wind tunnel) and field-tested at the Society of Automotive Engineers Alternate Refrigerant System Symposium, demonstrating quicker and deeper pull-down of the vehicle's interior temperature. Designed and fabricated a CO_2 system with new components incorporating lessons learned from the first system.
FY 2005 Plans: Perform Operational/ Integration Testing of the latest improved design at a Test Range/Proving Grounds.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
WDM Fiber Optic Global Position System Anti-Jam Antenna	Navy	0.158	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

This project is evaluating Wave Division Multiplexing (WDM) technology with shipboard GPS Anti-Jam antenna assembly to determine if it can provide transmission of multiple RF signals through a single optic fiber. If successful, this project will enable relocation of the GPS antenna electronics from high on the mast to below decks where it is protected and readily accessible for maintenance.

Vendor(s): Gould Fiber Optics, Millersville, MD; Optiwork, Freemont, CA; JDS Uniphase Corp., San Jose, CA; Tempo Research, Camarillo, CA; Fiber-Span LCC, Piscataway, NJ
Program Office of Record: SPAWAR PEO Command, Control, Communications, Computers, and Intelligence and Space (PMW/A-170)

FY 2004 Accomplishments: Request for Quote (RFQ) was released in Jun 04 with contract award in Sept 04. Proofs of concept (3-channel) and follow-on (7-channel) test effort have been completed. WDM GPS feasibility has been briefed at the Position, Location and Navigation symposium in April and the Joint Navigation Conference in May. The filters used in the WDM implementation are also being evaluated to improve current antenna systems design. The CWDM design approach, using uncooled DFB lasers, have been proposed and are in review for additional design considerations. However, further test effort will evaluate requirements it imposes on cable lengths and ship logistics issues.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
X-Cor as a Replacement for Conventional Honeycomb	Army	0.841	0.000*	0.000*	0.000*

*Out year funding for this project is provided under the new Defense Acquisition Challenge Program (DACP) PE 0604051D8Z

X-Cor is a lightweight, damage tolerant core material that replaces conventional honeycomb in aerospace structures. A 10% weight reduction over the baseline honeycomb on Black Hawk is estimated. This is critical because weight reduction is quite significant to the program in two respects. First, it greatly increases helicopter performance, particularly in vertical lift/rise capability, which greatly

increases aircraft survivability and capacity; and, second, this 10% reduction could amount to a 25% RDT&E cost avoidance over other weight reducing alternatives.

Vendor: Aztex, Inc, Waltham, MA
Program Office of Record: PM-Black Hawk

FY 2004 Accomplishments: Core design optimization is complete. Sikorsky has completed a weight analysis based on the higher density Rohacell foam needed to prevent core crush. As described in the last report, some core crushing was exhibited by cores made with very low density foams in the 1.2 – 1.5 pcf range. Based on these results, Aztex will change the density range of the foam specification to 1.8 +/-.2 pcf (from 1.4 +/-.2 pcf) FY 2005 Plans: Complete qualification program and produce 4 ship-sets of finished detailed parts. Develop and secure approval of the quality plan and all the necessary production control documentation

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

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)		DATE February 2005			
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3	R-1 ITEM NOMENCLATURE Quick Reaction Special Projects (QRSP), PE 0603826D8Z Rapid Reaction Fund (RRF), Project 828				
COST (In Millions)		FY 2004	FY 2005	FY 2006	FY 2007
Rapid Reaction Fund (RRF) Project 828		26.619	75.000*	51.283	51.174

*Internal Reprogramming Action (not reflected in control totals).

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

The Quick Reaction Special Projects Program (Program Element 0603826D8Z) QRSP supports three separate projects that provide rapid funding to expedite new development and transition of new technologies to the warfighter: The projects that are part of the QRSP are the Quick Reaction Funding (QRF), Technology Transition Initiative (TTI), and Defense Acquisition Challenge Program (DACP).

A fourth project, the Rapid Reaction Fund (RRF) was added for FY2004 only, to allow a rapid response to operations in Iraq and funded through a BTR and FY01-14 PA Reprogramming.

B. (U) ACCOMPLISHMENTS

IEDs have been a significant problem in Iraq, causing numerous casualties and affecting operations. The RRF was focused to develop new technologies or apply existing technologies to counter the threat of IEDs.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Active Denial System (ADS)	Air Force	8.430	0.000	0.000	0.000

The ADS is a high energy weapon that provides an invisible beam that while causing pain, does not maim or kill the target. The purpose was to provide standoff, non-lethal counter-personnel capabilities. The funds requested were used to purchase critical long-lead items to support the future production of a copy of the Active Denial System ACTD original prototype and the project completed in FY 2004.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007

Epoxy Foam	Marine Corp	.277	0.000	0.000	0.000

The Joint Non-Lethal Weapons Division (JNLW) through Marine Corps Systems Command, designed and tested the feasibility of developing an Epoxy Foam Denial System (EFDS). EFDS dispenses an Expanding Epoxy Polymer Concrete (EEPC) onto captured enemy ammunition, weapons and equipment to prevent these items from being used to make Improvised Explosive Devices (IEDS) for use against US Forces. Phase 1 efforts included Safety Testing on inert munitions to investigate the thermal effects of the chemical reaction and ensure that it would not initiate the munitions. Testing complete and the compound performed as expected. Awaiting decision to deploy to the theater.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Automated Adversarial Targeting Assessment (AATA)	Navy	2.000	0.000	0.000	0.000

AATA is a predictive tool that conducts high resolution modeling and analysis of terrain and cultural features to identify insurgency threat areas (details classified). In FY 2004, system completed and tested in CONUS. System deployed to Iraq for final testing in September 2004.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
High Value Target Detection and Surveillance	SOCOM/Army	4.500	0.000	0.000	0.000

High Value Target Detection and Surveillance is a system used to monitor border crossings in the CENTCOM theater of operations (details classified). This project was funded from the QRF and the RRF (see above for QRF) in FY 2004. This project provided project management, engineering support and test and evaluation for integration and rapid prototyping of equipment to survey mobile and fleeting targets that threaten US Military forces in the AOR. This system will be installed to monitor borders and consists of tactical camera and optical systems with video and audio recording as well as tagging and tracking capabilities.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007

Persistent Threat Detection System (PTDS)	Army	3.000	0.000	0.000	0.000

This effort deployed the PTDS onto an aerostat that is located within proximity to US forces in Baghdad to conduct surveillance to defend against MANPADS and mortar attacks. The PTDS effort integrated sensors into an existing aerostat system for continous airborne surveillance of high value targets. These EO/IR and UV rocket threat warning sensors were installed onboard an aerostat that surveys a specific threat area to provide video to a Sensor Fusion Station. The Sensor Fusion Station goal is to then interface with Q37 Fire Finder Radars and the AAR-57 UV Detection systems to detect both mortar and MANPAD threats emanating within a 30 km range of the system. Relevant threat information is to be automatically plotted on resident common operating picture and viewed in real time through full motion video, which allows the Warfighter to immediately respond with a mitigating force or capability. Design and test completed in FY 2004 and an aerostat was initially fielded in Iraq in November 2004 for testing in critical theater locations.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Biometrics	Army	1.780	0.000	0.000	0.000

The Biometrics Automated Toolset (BAT) is a system used to conclusively identify people by taking a biometric measurement and comparing it to a database of stored templates of biometric data. The BAT system has been successfully fielded in Operation Enduring Freedom, Operation Iraqi Freedom, and Kosovo. The system is used to enroll and track detainees, host nation workers, human intelligence sources, and other persons of interest. In its current configuration the system consists of a laptop computer and three biometric sensing devices: fingerprint scanner, iris recognition reader, and a digital camera for facial recognition. System design and test completed in FY 2004 and an initial prototype was deployed to Iraq.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Data Dissemination	DTIC	1.500	0.000	0.000	0.000

This effort is in support of an ongoing content management initiative, the Antiterrorism Enterprise Portal (ATEP). Funds were used to procure hardware and software and support from Vignette to implement a companion ATEP environment on the NIPRNET.
The objective was to continue seamless development and implementation of leading edge information technology management strategies, applications, processes and procedures to improve and /or maintain the electronic information gathering, storage and dissemination capabilities associated within ATEP from an IED perspective. This effort integrated and disseminated currently stove piped information allowing users to quickly aggregate information, established a coherent situational awareness, and performed analysis to determine the best course of action to mitigate the IED. The support infrastructure was extended to the NIPRNET, at a sensitive but unclassified level (NIPRNET-SBU) to support

information dissemination to US and coalition forces. Design and test completed in FY 2004 and awaiting installation in Iraq.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Test Site	Navy	2.300	0.000	0.000	0.000

This effort provided a dedicated site for end-to-end evaluation of force protection technology (e.g., IED detect and defeat technology) under realistic real world environments at the Yuma Proving Ground (YPG). In addition to providing test and evaluation studies, this effort included construction of representative rural village, expansion of representative rural environment, development of representative urban environment and application of range instrumentation. This effort also resulted in the establishment of a comprehensive test site for purposes of testing prototype force protection echnologies before deployment to Iraq in a geographically remote area, within DoD controlled restricted airspace. Site design completed in FY 2004. Over 30 systems have utilized the site as a representative environment to conditions in Iraq, before deployment to Iraq.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Testing of a Prototype Fiber Surveillance System – JACK RABBIT	NSA	.100	0.000	0.000	0.000

This effort performed field evaluation of a surveillance system to support counter-insurgency operations in Iraq. The fiber surveillance system is a self-contained, portable system that has many applications, including detecting and locating disturbances and damage or interference to fiber cables, intrusion into buildings, attempted crossing of perimeters or borders, vibration from structures or machines and audio surveillance. The program was completed in FY 2004.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Support of Testing a LIBS Standoff Sensor	Army	.117	0.000	0.000	0.000

This effort reconfigured and tested the existing standoff laser induced breakdown spectronscopy (LIBS) instrument that is used to identify vehicle borne improvised explosive devices (VBIEDs) by detection of trace elements of explosive residue on vehicle surfaces. The improved LIBS instrument may used for dual-pulse operation. The LIBS system is currently in test at YPG for consideration as possible deployment to Iraq pending successful testing.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007

Cave Urban Assault Kit – Multi-spectral Vision System	Army	.201	0.000	0.000	0.000

This effort allows soldiers to operate in tight spaces and in complete darkness. The system is comprised of multiple cameras each imaging in separate spectral bands and with the output presented to the soldier via a high-resolution micro-format display. The project completed in FY 2004 and the technology was transitioned to the Army.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Force Protection Needs in Support of OIF Military Forces	Air Force	1.000	0.000	0.000	0.000

This effort developed a prototype and evaluated a compact system that can detect RF devices used to detonated IEDs., and was completed in FY 2004.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Classified Sensor Testing Support	Air Force/Navy	1.000	0.000	0.000	0.000

This project enables standoff detection of indications of threat activity. FY2004 provided funding for technology evaluation and determination of operational constraints.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Video Change Detection	DARPA	.200	0.000	0.000	0.000

This project employs newly-developed vision and graphical techniques to analyze video of repeated observations of field events in order to flag visible changes. Applications include IED detection, monitoring of ammunition storage sites, and tamper detection for special operations. Can be configured for use as a vehicle-mounted roadside IED detector or as a standalone tool for use with video from UAVs, aerostats or handheld cameras.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007

Industry Assessment on IED Threat	Air Force	.084	0.000	0.000	0.000

This project supported an industry conference in FY 2004 focused on IEDs. The conference provided industry with information on the nature of the IED threat and the process for communications between DoD and companies so that industry could more effectively develop responses to the threat.

C. OTHER PROGRAM FUNDING: N/A

RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2a Exhibit)				Date: February 2005				
APPROPRIATION/BUDGET ACTIVITY RDT&E/Defense Wide/BA 3				R-1 ITEM NOMENCLATURE Quick Reaction Special Projects/Technology Transition Initiative (TTI) Program, PE 0603826D8Z P829				
COST (In Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Technology Transition Initiative (TTI) Project P829	12.729	20.964	29.717	29.926	31.288	31.346	32.099	32.841

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

The Quick Reaction Special Projects Program (Program Element 0603826D8Z) has three sub-elements: the Technology Transition Initiative (TTI), the Defense Acquisition Challenge Program (DACP), and Quick Reaction Fund (QRF). The fiscal controls above represent the investment of the QRSP Program funding for the TTI Program.

Authorized by Title 10 and Section 215 of the FY2003 Defense Authorization Act, the TTI Program addresses the funding gaps that exist between the time a mature technology is demonstrated and the time it can be funded and procured for use in an intended weapons system or operational capability for the warfighter. Typically, these technologies are completed in the laboratories and shelved until procurement funding is made available by the respective Service to transition the item from S&T base into the acquisition community. The TTI Program facilitates the rapid transition of mature technologies from the S&T base into procurement or acquisition programs. The TTI objectives are to accelerate the introduction of new technologies into operational capabilities for the armed forces and to successfully demonstrate new technologies in relevant environments.

Technology Transition projects are selected by the Technology Manager in consultation with representatives of the Technology Transition Council (TTC). (The TTC is comprised of the Acquisition and S&T executives from each service and Defense Agency and representatives from the JROC.) The call for Technology Transition proposals is distributed to the DoD Services and Agencies through the Technology Transition Working Group (TTWG) members, designated by the TTC. The TTWG gather the proposals from the service/agency S&T base and then prioritizes them based on Joint, Service or Agency capabilities needed and submits them to the Technology Manager. The Technology Manager's senior staff consolidates the proposal submissions, evaluates the Service/Agency recommendations, compares with

available resources, and prepares a recommended list to the Technology Manager for funding. The Technology Manager in coordination with the TTC select the highest priority proposals for funding.

B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Projects funded with FY2004 TTI Program Funding:

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Battlespace Terrain Reasoning Awareness (BTRA)	Army	1.015	0.000	0.000	0.000

Battlespace Terrain Reasoning Awareness (BTRA) is a software product constructed on the stability of a premier Commercial-Off-the-Shelf (COTS) Geographic Information System. BTRA tactical decision aids (TDAs) integrate terrain and weather (current and forecasted) data and provide actionable, integratable, predictive information regarding their effects on platforms, sensors, systems, small units, large forces and their associated tactics and behaviors. BTRA provides specific analysis tools addressing positions of advantage, mobility and maneuver and effects on sensors (imaging, seismic and acoustic). BTRA also provides predictive terrain and weather decision tools addressing maneuver, situation and threat analysis and Intelligence, Surveillance and Recognizance (ISR) management within Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) processes. BTRA capability addresses several joint systems requirements for terrain and weather tactical decision aids (TDAs) from Army (Digital Topographic Support System (DTSS) and All-Source Analysis System-Light (ASAS-L)), Air Force (Time Critical Targeting Facility (TCTF) of their Theater Battle Management Core System (TBMCS) C4ISR), and DISA/NGA's Commercial Joint Mapping Toolkit (CJMTK) Software Requirement. The BTRA TTI project will transition five (5) information generating TDAs, four (4) decision tools, and one (1) Service Architecture. The benefit of TTI funding for this project was a successful transition in 17 months which was estimated to be 28 months without the influx of the TTI Program funding. Through this TTI transition, functionality to CJMTK has been increased and improved the quality and OPTEMPO in C4ISR.

FY 2004 Accomplishments: Fully transitioned three phases of three information generating TDAs; partially transitioned a phase of a fourth TDA. Fully transitioned one phase of all four decision tools.
FY 2005 Accomplishments: Completed transition of BTRA v2.0 which included: a) two decision tools supporting C2 (planning and COA) and IPB; b) four decision aids to calculate terrain and weather effects; and c) eight data prep engines. The BTRA greatly expanded CJMTK utility resulting in redundant system investment in terrain and geospatial analysis. Transition of BTRA to CJMTK supports 137 programs. Through the BTRA TTI project, a partnership with NGA was established to create and maintain the CJMTK Portal. Additional enhancements to BTRA and the CJMTK Portal, funded by NGA and other sources, which will tear down

"stovepipes" within the Joint geospatial community and will greatly increase the "sharability" of common geospatial information. Close Out Brief presented to OSD TTI Program Manager on 12 January 2004.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Unmanned Vehicle Spiral Upgrade (IROS3 Spartan)	Navy	0.620	0.000	0.000	0.000

IROS3 is a network centric overarching Anti-Terrorism/Force Protection (AT/FP) system which integrates sensor information while combining semi-automated engagement capability to provide shipboard protection, pier side, at anchorage and transiting restricted waterways. Spartan is a modular, reconfigurable, multi-mission, high-speed, semi-autonomous unmanned sensor and weapon system against asymmetric threats. This project will conduct a spiral upgrade of the IROS3 system to accommodate the integration of an unmanned vehicle. Concept will be proven using the Spartan USV ISR/FP module as a sensor inputs to IROS3.

FY 2004 Accomplishments: Completed the open system-to-system communication design baseline, integrating SPARTAN into the IROS^3 system. The necessary interfaces have been developed to support full-scale system integration, and were successfully tested as part of a full-scale demonstration of SPARTAN sensor control via the shipboard IROS^3 systems console. The test was conducted 27 May 2004 at NUWC, Newport, Rhode Island, successfully demonstrating the integration of the SPARTAN USV with an ISR Mission Module and the IROS^3 system architecture and validating the open architecture and increased potential AT/FP mission capabilities. IROS^3 is in use on the USS RAMAGE and demonstrated on the USS GETTYSBURG during its last deployment to Naples. System transitioned to the PEO(LM&W) and PEO (IWS) Program Offices.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Lightweight Steel Track	Marine Corps	0.365	0.000	0.000	0.000

The U.S. Marine Corps is seeking a lightweight steel track for the Advanced Amphibious Assault Vehicle (AAAV). The German track manufactured by Diehl has a candidate ultra-light steel prototype track, which has the potential to meet or exceed AAAV's track performance criteria. This track weighs approximately 40% less than typical steel track (at comparable cost) and is expected to have a minimum life of 3,000 miles. This ultra light steel track is significantly more robust than the current aluminum now being used on AAAV, is less expensive, and weighs the same. The goal of this TTI project is to procure and test the Diehl Ultra-light Steel Track on an AAV with the intent to purchase additional track sets if performance meets expectations. Test will demonstrate and validate the track integrity and robustness suitable for a harsh Marine field environment.

FY 2004 Accomplishments: Project was planned for FY 2003 new start. Due to contract award issues, project start was delayed until FY2004 with a funds release in 3rd Qtr FY2004. Awarded contract to General Dynamics (prime vendor) Sep 2004. Contract award to Diehl Remschied (test track vendor) in Dec 2004.
FY 2005 Plans: Receive and install test track on prototype EFV test vehicle. Conduct initial track testing to evaluate durability (3,000 miles per track; 1,000 for track pads). Conduct analysis and prepare final close out report.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Low-Cost Flame Resistant Coveralls	Army	0.350	0.000	0.000	0.000

There is a critical need to address the high cost of flame resistant material used to protect our warfighters. Currently aviators and tankers wear protective clothing made from woven Nomex and Kevlar fiber. However, these fabrics are too expensive to issue to every infantry soldier. A study was undertaken to evaluate and develop new materials that provide a 30%-50% cost savings over existing flame resistant materials as well as camouflage protection, comfort and durability. This new fabric is a lightweight, open, air-permeable construction, spun-laced and non-woven fabric that is enhanced to military specifications. It is estimated to save more than 40% in costs from the current materials, potentially increasing the number of warfighters protected by 40%.

FY 2004 Accomplishments: Commercial garment sizes were not relative for military user wear. Resized and redesigned military unique version to provide appropriate sizing and additional pockets/straps to accommodate equipment the warfighter attaches to the coveralls. Manufactured military version in required test quantities

FY 2005 Plans: Procure large quantities of coveralls for the final field evaluation planned for February 2005. Complete analysis and conduct TTI Project Close Out Brief (March 2005).

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Overwatch	Army	0.509	0.000	0.000	0.000

Overwatch helps the warfighter detect, locate, and classify hostile firings. It also conducts area surveillance in real time to assess, neutralize, and mitigate the enemy by providing counterfire targeting data. Overwatch is focused on developing and testing an on the move tactical Overwatch Weapon Recognition Equipment tactical, which is mountable on ground vehicles. The current risk reduction program is enhancing this capability by extending the field of view to 120 degrees by providing a higher bandwidth interface between the electro-optic/infra-red sensor and processor, and incorporating a laser ranger for precise geo-location.

FY 2004 Accomplishments: Completed the build and testing of the STARE; transitioned to PACOM/ONR for integration into Spiral 1 Gunslinger Project objective in 3rd Quarter FY 2004.
FY 2005 Plans: Conduct TTI Project Close Out brief to OSD TTI Program Manager.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Special Operations Forces (SOF) Demolition Kit	SOCOM	0.395	0.000	0.000	0.000

This project is an acceleration of existing initiative to provide SOF operators with a replacement of the Army's 1950 vintage demolition kit, using improved pre-loaded explosively formed penetrators (for fence piercing and cable cutting). Payoffs include increased performance, wider range of targets, and equipment that can be easily tailored for mission requirements.

FY 2004 Accomplishments: Conducted first iteration of "scaled down" design of medium to small Special Operation Forces Demolition Kit (SDK) PAX-2A Explosively Formed Penetrator (EFP).
FY2005 Plans: Conduct second design iteration (1QFY05). Conduct design validation repeatability tests of final design (2QFY05). Fabricated and delivered 55 units of final design delivered (2QFY05). Conduct TTI Project Close Out Brief to OSD TTI Program Manager.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Special Operations Forces (SOF) Alternative Power Sources	USSOCOM	1.375	0.000	0.000	0.000

The SOCOM Advanced Technology Program has been exploring alternative power sources to reduce the weight that Tactical Operators must carry and extend the life of equipment while in the field. Numerous mature technology products have been identified in both the S&T base and in the commercial world. This effort transitions advanced alternative power sources (e.g., fuel cell, solar panels, and mini diesel engines) of various DoD Science and Technology efforts. TTI funding provided will be used for the SOF Alternative Power Source project to bridge the gap between DARPA funding and SOCOM procurement funding in FY 2005.

FY 2004 Accomplishments: Procured and demonstrated four (4) additional power sources for application in the SOF environment. These sources are: MTI Fuel Cell – SISA; MTI Fuel Cell – PDA; AET Generator and Uni-Solar Uni-Pac. Conduct TTI Project Close Out Brief.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Titanium Nitride (TiN) Coating for T-58 Engine Compressor Blades	Marine Corps	0.485	0.000	0.000	0.000

The U.S. Marine Corps H-46 helicopter is experiencing a high rate of premature engine removals while operating in Afghanistan and Iraq. Substantial engine performance loss results from compressor airfoil erosion due to particle ingestion during routine operation in desert environments. TiN coating for the T-58 engine will double compressor life in a sand environment and is projected to save about $56 million in Life Cycle Costs through FY12 and will increase compressor life in a sand environment by a minimum factor of two. The airfoils will be installed in nearly 300 new T-58-16A ERIP compressor cores procured for USMC CH-46 helicopters beginning in FY 2005 through FY 2007.

FY 2004 Accomplishments: Completed fatigue testing of coated airfoils; fully coated two (2) sets of T58 compressor airfoils; initiate and completed the build of a Lead the Fleet engine with coated airfoils to be evaluated in South West Asia; built two (2) sand ingestion test engines, one coated – one uncoated. For final qualification of coating; completed the design change and approve the ECP; performed all coating vendor substantiation engineering; and modified the ERIP contract to include coated airfoils in module production.
FY 2005 Plans: Begin Fleet Introduction.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Water Purification System/ Water Pen	DARPA	0.425	0.000	0.000	0.000

For tactical situations in which deployed troops do not have quick and easy access to potable water, the water purification pen will allow soldiers to treat up to 300 liters of any available, non-brackish water source, eliminating the risk of their exposure to diseases and bio-chemical pollutants.

Mixed oxidants electrochemically generated from common table salt via several small lithium camera batteries kill a wider range of resistant microorganisms (e.g., Cryptosporidium, Giardia, and E.Coli) present in contaminated, non-brackish water than more traditional means of disinfection (e.g., chlorine and iodine).

FY 2004 Accomplishments: Through a GSA Schedule contract, procured 4,157 additional water purification pens and distributed them throughout the Services and U.S. Special Operations Command. After all water purification pens (total 6,651; 2,494 distributed in FY 2003) are procured and distributed, each Service (Army, Air Force, Navy and Marine Corps) and U.S. SOCOM will receive 1,200 pens each with remaining pens distributed to stock testing units who will evaluate item.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
High Altitude Performance Improvements for Global Hawk	Air Force	1.130	3.650	0.000	0.000

The technology to be transitioned is increased high altitude electrical power generation capability that will provide the Global Hawk with 75kW of payload power at high altitude (65K feet). This is triple the current onboard power capability and allows the Global Hawk to support planned payloads that cannot be supported with the existing power system. The improved electrical power generation provides the additional power for the Global Hawk system to meet Mission Area Needs for expanded data fusion, ground/airborne target ID, and EO/IR countermeasures. The proposed concept extracts power from the AE3007 engine's low pressure (LP) turbine instead of the high pressure (HP) turbine. LP spool power extraction versus HP spool power extraction enables the Global Hawk to achieve U-2 sensor parity. The system benefits to Global Hawk of LP spool power extraction relative to HP spool power extraction are: 5.1% increase in endurance, 6.7% increase in maximum altitude, and 4.2% increase in range. The TTI initiative accelerates the transition of this technology by 24 months.

FY 2004 Accomplishments: Conducted stand alone altitude test of LP Generator; performed revisions to AE 3007 Engine Generator Interface.
FY 2005 Plans: Install LP Generator on AE 3007H and perform calibration runs; ship engine-generator set to Rolls Royce/Allison Advanced Development Company and perform altitude tests.
FY 2006 Plans: Planned integration on Global Hawk.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Automated Change Detection	Army	2.260	1.830	1.850	0.000

This effort accelerates transition of an automated Change Detection capability from the JAC ACTD into the U.S. Army, Airborne Standoff Minefield Detection (ASTAMIDS) and Ground Standoff Minefield Detection (GSTAMIDS) programs. This new capability will be used by the warfighter to address a critical need to rapidly identify and locate landmines and Improvised Explosive Devices (IEDs) along routes. The CERDEC-NVESD Change Detection Workstation (CDWS) has been demonstrated under the Joint Area Clearance (JAC) Advanced Technology Demonstration (ACTD) and consists of a field-portable workstation with user-friendly interface that supports the detection of recently buried mines by means of change detection. The system can accept a wide variety of imagery from various sensors. The current configuration is dependent upon an operator to analyze, process, and identify possible landmine and improvised explosive device (IED) signatures in the imagery. This effort will automate the change detection process by adding an algorithm designed to detect landmines and IEDs which will significantly increase the detection rate. TTI project accelerated a capability into current operations 12-24 months faster and accelerated a capability from the Joint Area Clearance (JAC) ACTD into acquisition 18-24 months sooner. Based on CTTTF results and TTI progress, the USMC requested five (5) Change Detection systems for use with their UH-1N helicopters and F/A-18 fixed wing aircraft.

FY 2004 Accomplishments: Developed automated algorithms and data collection POD. Conduct test and evaluation of algorithm and hardware/software integration. Automation progress demonstrated. Results identified the need for better imagery to yield acceptable probability of detection with low false alarms. FY2005 Science & Technology Objective (STO) will provide better imagery for TTI automation effort.
FY 2005-2006 Plans: Complete systems engineering and systems integration with JAC ACTD CDWS. Continue data collection (real-world) to enhance database of target geometries, essential for finding roadside threats. Capability will transition to Project Manager for Close Combat Systems (PM-CCS) into ASTAMIDS program in FY2007.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Low Cost, Light Weight Unitized Composite Manifolds for Attitude Control (ACS) Systems	MDA	0.900	0.000	0.000	0.000

This effort will explore the replacement of the Theatre High Altitude Defense (THAAD) system's Aluminum Attitude Control System (ACS) manifold with a composite version that utilizes a unitized HyperVARTM process, and demonstrate applicability of the composites technology to the Exoatmospheric Interceptor Kill Vehicle (EKV) Divert Attitude Control System (DACS). The THAAD ACS composite manifold development will produce a 24% reduction in unit cost and manufacturing processing and improve system reliability. The effort will also improve system operability and reliability by through a 29% weight reduction. The EKV DACS composite development will reduce costs and provide lightweight shock and vibration damping solutions for the DACS nozzle support structures.

FY 2004 Accomplishments: Developed requirements, design and process of Integrally Composite Manifold -Altitude Control Section (ICM-ACS). Conducted material characterization tests and performed design upgrade (as necessary). Perform full scale prototype fabrication.
FY 2005 Plans: Conduct prototype full-scale test and article fabrication/structure testing. Prepare final report and TTI Close Out brief.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Seal Delivery Vehicle Advanced Reconnaissance System (ARS)	SOCOM	0.375	0.475	0.000	0.000

The SDV ARS project is developing a stabilized low light color video camera and thermal imager configured in a MK 8 MOD 1 SDV-compatible mast-mounted device. The system will provide SDV operators the ability to clandestinely maintain situational awareness, while tracking, recording and storing target data in the SDV. The project is being executed under a US/UK Cooperative R&D agreement established in FY 2002.

(1) The reconnaissance and surveillance Modular Mast Device will be configured as a Mission Kit that will include: (1) the periscope controller, which provides required computer processing, interface and controller boards, recording media, and a monitor for viewing imagery, (2) interfaces, connectivity and cabling between the camera control unit (Figure 1) and the camera unit, as well as ports or plugs for interface to future transmission or storage devices, and (3) a camera, which provides a mast-mounted image capture device.

(2) The SDV ARS project's advances include camera stabilization in Sea State 3 conditions and use of uncooled IR microbolometer technology.

FY 2004 Accomplishments: Obtained one (1) prototype optical sensor and integrated into SDV ARS Mission Kit.
FY 2005 Plans: Fabricate a new or enhanced periscope controller and integrated into SDV ARS Mission Kit. Conduct SDVARS Mission Kit testing to verify performance and reliability. Provide completed Periscope Mission Kit to SDV Teams for operational testing.
FY 2006 Plans: Achieve Milestone B Approval and initiate production of prototype.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Wide Field of View Goggles (WFOV)	SOCOM	1.265	0.549	0.000	0.000

The goal of the Night Vision Electro-Optics (NVEO) project is to improve operator night vision devices with respect to increased range, magnification, field of view (FOV), sensitivity, and resolution, during periods of both good and obstructed visibility. Project technologies that can be applied to existing night vision goggles (NVG) through modifications or retrofit. Initial efforts focused on increasing the FOV and anti-blooming technologies. The NVEO project will reduce NVG blooming, increase system sensitivity, and create a Wide Field of View (WFOV) goggle with enhanced range, field of view (current NVG is 40 degrees), and sensitivity. Eventually, these WFOV goggles, which have been developed in two phases, will replace all current SOF ground operator NVGs. Funding support from the TTI Program accelerated the WFOV NVG capability by 3 to 4 years.

(1) Phase I - Research and design a WFOV Image Intensifier (I^2) device.

(2) Phase II - Develop and fabricate up to eight (8) prototype WFOV I^2 systems IAW the approved design in Phase I. Nine prototype systems (see Figure 1) were developed and sent to SOAL-T for evaluation. The evaluations continue, and initial tests found user acceptance of the system to be good - except in the area of weight.

FY 2004 Accomplishments: Completed product/process development for eight (8) prototypes.
FY 2005 Plans: Conduct product demonstration to determine if prototypes meet the weight and wider field of vision objectives. Transition to PEO for Special Programs (PEO-SP) will be driven by the positive user feedback during evaluations and operational testing in 4Q FY2005.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Accelerate Transition of Area Security Operations Command & Control (ASOCC)	DISA	0.675	0.250	0.000	0.000

The CRASOC2/ASOCC system integrates IT tools critical to Anti-Terrorism/Force Protection (AT/FP) missions. The system provides assured C2 to forward bases around the world and ties together information and data from DoD, the Intelligence Community, Federal Agencies, and Force Commanders.

The ASOCC system integrates numerous COTS and GOTS components including:

- Deployment Visualization Toolkit (DVT)
- Java Imagery Video Exploitation (JIVE)
- Defense Collaboration Tool Suite (DCTS)
- Knowledge Board (KB)
- eX-Panel
- eXtensible Information System (XIS) and Adaptive Battlespace Awareness Common Operational Picture (COP)
- Baseline Microsoft Suite
- Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) documentation

FY 2004 Accomplishments: Intiated technology development of web-based capabilities. Expanded command and control pilot opportunities in multiple communities (Navy IMPP, Fort Monroe, Guardian, NYPD and NJ Regional Test Bed). Transitioned to NORTHCOM InfraLynx Van for scene-of-action presence and communications. Accelerated CONOPS development to support PACOM adoption of ASOCC as AT/FP C2 tool.
FY 2005 Plans: Conduct ASOCC System Hardening Distribute ASOCC system to Combatant Commanders/Services. Conduct Joint Military Utility Assessment (JMUA).
FY 2006 Plans: Transition system to Global Command and Control System (GCCS) and Joint Command and Control.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Semantic Web Network	NGA	0.585	0.780	0.000	0.000

An XML-based content routing system technology that enhances Command and Control by delivering more relevant and complete information from across Intel Community databases in real-time matured faster than expected and is now ready for transition to the Marine Corp System Command (MARCORSYSCOM), Marine Expeditionary Force-Intelligence Analysis System (MEF-IAS). The USMC wants to deploy this technology as part of current combat operations. Extensive functional testing of the capability was accomplished during the Joint Warrior Interoperability Demonstration (JWID) in June 2003.

The TTI funding will support two phases of the Semantic MEF IAS Integration, Testing and Transition to Operational Forces program by enabling combat readiness testing and support of the deployed system. Phase Two will integrate the Tactical/National Integrated Environment (CPX) with the Semantic Web capability across the SIPRNet at the Marine Corp Intelligence Activity. In addition, it will evaluate integrated data access to MCIA and other IC databases for Rapid Response Planning Process (R2P2) requirements. Finally, Phase Two will combine tactical, operational, and national IC resources with critical command and control information results for unprecedented level of streamlined intelligence support to operations. The resulting system will reduce search time and allow the warfighter more time for collaborative planning and course of action analysis and deployment. Phase III will deliver two Equipment Suites and Software Licenses to the MEF-IAS. The resulting system will reduce search times and allow the warfighter more time for collaborative planning and course of action analysis and deployment.

FY 2004 Accomplishments: Integrated the Tactical/National Integrated Environment (CPX) with the Semantic Web capability across the SIPRNet at the Marine Corp Intelligence Activity. Initiated evaluation of integrated data access to MCIA and other databases for Rapid Response Planning Process (R2P2) requirements. Complete system transition to support 1st and 2nd Marine Expeditionary Forces (MEF) in combat operations.

FY 2005 Plans: Complete transition of Phase III of the Semantic MEF IAS Integration, Testing and Transition of the technology to 3rd MEF by enabling combat readiness testing in support of the deployed system to Okinawa, Japan.

FY 2005 TTI New Start Projects:

The TTI Program selected thirteen (13) projects as new start initiatives. Selected projects were proposed by the Air Force, Army, Navy, Special Operations Command (SOCOM and the Missile Defense Agency. Funding to support the FY2005 TTI New Start projects totaled $13.430 million.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Ultra Long End Power Generation for Battlefield Air Operations (BAO) Special Ops Warfighter	Air Force	0.000	0.780	0.000	0.000

During a typical deployment, the BAO Special Tactics Warfighter will often need to jump into a forward position carrying more than their body weight in equipment and support ancillaries. The batteries required to support these devices represent a hefty and expensive component of the BAO kit. In an example 72 hour mission, total power consumption of the BAO kit is expected to be approximately 2200 Whrs. If this power were to be supplied conventionally via BA-5590s then 13 separate batteries would be required, translating into more than 29 lbs. The TTI project program will incorporate inexpensive, injection-molded fuel cell technology into a common BA-5590 form factor which can easily be included in to the PRC-117 field radio, which is an essential part of the BAO kit. If this technology were adopted, then the power weight required to complete the example 72 hour mission would drop by more than 13 lbs.

FY2005 Plans: Refine design of refill cartridge and integrate fuel cell sub-systems into BA-5590 battery replacement.
FY2006 Plans: Demonstrate power source in field to facilitate LRIP procurement. Development will produce 40% reduction in weight, 50% reduction in cost and improvement in power capability. Conduct TTI Project Close Out briefing for OSD TTI Program Manager.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Advanced Lightweight Ceramic-Based Armor	Air Force	0.000	1.215	1.120	1.120

The availability of lightweight modern Small Arms Protective Insert (SAPI) body armor has been a critical issue in the Iraqi battle theater. The Air Force and Navy in-house R&D programs working in collaboration with Excera Materials Group of Columbus, Ohio (via Phase I and II SBIR's) have developed a novel ceramic strike face material for use in armor systems. The material has been used in conjunction with traditional polymer-based backing and has passed first article testing by the Army PM. Furthermore, the Army has issued purchase orders for ceramic strike faces that contain the first generation of these materials. Excera has developed a robust manufacturing process concurrently with the material. As a result they have a lightweight, high ballistic performance system that has several manufacturing advantages over traditional armor ceramics. Specifically, the material has a lower manufacturing cost and is easily shaped to meet complex human or vehicle contours. The work proposed in this TTI project will allow for wider availability of this material across the various Agencies and increase its range of capability (i.e., increased ballistic threats) and application (i.e., advanced personnel, vehicle, etc.). Through funding provided under this TTI project, it is estimated to accelerate transition 24 months sooner than originally planned.

FY2005 Plans: Conduct analysis of SAPI materials to address new DOD specifications (to address BZ armor piercing Incendiary tracer rounds). Perform modification of current SAPI materials to meet new requirements. Initiate production of improved SAPI plates (at 2,000 plates per month).
FY2006 Plans: Increase production of improved SAPI plates (5,000 plates per month).

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Medical Scancorder	Air Force	0.000	1.160	1.065	0.000

Current detection systems used for vital signs monitoring during urban search and rescues are limited by several factors. Medics and Pararescuemen (PJs) are unduly endangered in determining location of casualties because of the "hands-on patient" requirement. Delay in detecting casualties means a delay in treatment. The sooner the patient is found; the sooner care may be given, which may result in more lives saved. The medical scancorder keeps the medic out of the line of fire unless absolutely necessary to treat the most serious casualties and it permits the medic to quickly know which casualties are those needing attention. Thus, it improves the medic's efficiency as well as providing needed attention to the most seriously wounded.

MIR (Micro Impulse Radar) technology, invented at Lawrence Livermore National Laboratory, emits extremely short, low-power pulses over a wide bandwidth. These pulses are able to detect minute motions, such as those of the heart walls, as well as the boundaries between different materials. Because it is radar technology, it can detect these motions over relatively long ranges—in the case of heart motion it detects at distances up to 20 ft and possibly further.

The project will be conducted three phases. Phase 1 has already been completed and funded by other S&T funding sources. TTI Program funding will support Phases 2 and 3, potentially accelerate product transition by 12 months. The first phase permitted a medic to point the device at a casualty and detect heart rate and breathing. Data will be recorded onto the device with enough storage to record 100 data points for 20 casualties.

FY2005 Plans: Initiate Phase 2 to shrink the radar to a size of 1"x2"x2" which will be placed on each casualty's chest. These devices will detect the heart rate and breathing and on demand wirelessly (and with low probability of detection) transmit that data through a range up to 40 ft so it can be stored on the device of Phase 1. A go-no go decision will be made before proceeding into Phase 3.

FY2006 Plans: Initiate Phase 3 to automate the entire process so that the medic receives the data automatically from the radar device on the casualty's chest. The medic can access that data at any time. Conduct TTI Project Close Out Briefing for OSD TTI Program Manager.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Countermeasures Protection System (CMPS)	Army	0.000	2.440	0.000	0.000

The CMPS is a field-programmable Electronic Countermeasures (ECM) system designed to provide force protection against Remote Controlled Improvised Explosive Devices (RCIEDs). The CMPS utilizes a new architecture optimized to defeat both categories of threats, includes multiple upgrades, and is field-programmable. The programming feature provides the crucial capability for gaining units to tailor countermeasures as required during the mission. The CMPS is a vehicle mounted system, thus meeting all elements of the ONS requirement. The prototype system used components currently not mechanically or electronically ruggedized or in a form factor and function for the harsh environment of the intended theater of operation. Further technique development and resource expansion are required to increase the system's capability to meet full ONS requirements. The CMPS system will not be transitioned to PM Signal Warfare until these implementation issues are resolved. It is estimated that TTI Program funding will accelerate these efforts by 6 months.

FY2005 Plans: Complete ruggedization, the refinement of techniques, and resource expansion, while maintaining and potentially reducing size, weight, and power of the system. Transition system to PM Signal Warfare end of FY2005. Conduct TTI Project Close Out briefing for OSD TTI Program Manager.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Command Post of Future (CPOF) and Army Battle Command System (ABCS) Server Software Integration	Army	0.000	0.600	2.240	1.345

The Command Post of the Future (CPoF) is a high priority DARPA-sponsored technology program that will provide a suite of collaboration tools used as an executive decision support system from Corps down through Battalion. CPoF currently has an established 50 user network with the 1st Cavalry Division in Iraq and will expand to a 200 user network with the 3rd Infantry Division for OIF 3. CPoF is scheduled to transition directly to the Army Acquisition community in 2006 based on a formal agreement between Army G-3 and DARPA. The current CPoF system consists of both clients and servers. In the near/mid-term OIF rotations, CPoF hardware will be fielded side-by-side with ABCS hardware. CPoF is currently scheduled to transition to Project Manager Ground Combat C2 (PM GCC2) under PEO C3T in 2006.

The Army has currently allocated procurement funding for CPoF beginning in FY08. The TTI Program will bridge this three year gap in funding. TTI Program funding will accelerate the merger and integration of CPoF server software and ABCS Information Server (AIS) software by at least one year and expedite the elimination of additional hardware in the field.

FY2005 Plans: Document CPOF Server software development environment, server configuration guide, client-server interface design and APIs, and internal (CSCI) interfaces. Initiate comparative analysis of evolving CPOF and AIS server functionality, processes, and data threads.

FY2006 Plans: Continue comparative analysis against final CPOF and AIS V6.4 Server software builds. Define and document target system architecture operating environment. Define and document unified server target software and hardware environments. Initiate and examine software coexistence and integration approaches. Develop initial CPOF-AIS server software prototype build. Test, evaluate, and analyze server prototype performance and identify critical-path technical risk areas.

FY2007 Plans: Develop courses of action and conduct ongoing analysis of technical alternatives to simplify CPOF-AIS server software code, processes, and interfaces. Generate subsequent CPOF-AIS server software builds and test/evaluate/analyze via the spiral software development process.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Digital Planning Tools for Joint Ground Warfare	Army	0.000	1.040	0.840	0.000

The Agile Commander ATD has successfully built digital planning solutions for the Army that are being used throughout the Service. The primary product, CAPES, has been identified as one of the non-ABCS “good enough” systems and has been selected as one of the “10 greatest AMC achievements” for 2002. The focus of this TTI project is to use proven planning and decision support solutions from Agile Commander and CAPES to transition a planning capability for Joint Forces via the Joint Common Tactical Workstation (JCTW).

A number of units are using CAPES today. Units that have taken CAPES to Iraq have generated a list of desired features to support SASO and MOUT operations. USFK has generated a list of joint capabilities that would facilitate Ground Component planning in theater. These requests clearly indicate a warfighter need, and are an indication that CAPES provides value in many types of operations.

CAPES is currently scheduled for integration with the Joint Common Tactical Workstation during FY ’05. Unfortunately, there is insufficient funding to completely transition all CAPES components into JCTW. TTI Program funding will allow a full and complete integration of CAPES, including Joint planning tools requested by USFK, and SASO/MOUT features requested by 18 ABC, 101st, III Corps,

and 4 ID into JCTW by FY '06. TTI Program funding will accelerate the fielding of digital planning solutions for Joint Ground Warfare by at least one year.

FY2005 Plans: Conduct analysis of CAPES infrastructure and applications to complete modifications allowing for integration of CAPES into JCTW.
FY2006 Plans: Incorporate requested SASO and MOUT features into JCTW. Transition JCTW to the Program Manager for the Army's Maneuver Control System (PM-MCS) and the U.S. Marine Corps Command and Control Personal Computer (C2PC) Programs.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Integrated Precision Underwater Mapping (I-PUMA) Sonar for Small UUVs	Navy	0.000	1.210	1.120	0.000

The objective of this TTI initiative is to provide area search, mapping, and target identification capabilities in very shallow water, harbor, port, and ship berthing environments. This will be accomplished by engineering the submarine precision underwater mapping (PUMA) and 21" UUV Littoral-PUMA (L-PUMA) sensing technologies into a miniaturized integrated-PUMA (i-PUMA) that is capable of operating in these shallow areas on a 12" UUV. In addition to integrating i-PUMA with a small UUV, this project will also develop object detection processing and vehicle processing suites to enable wide area search with change detection and target identification.

The sensor will enable a small easily deployable UUV to efficiently search large areas to a specified level of confidence. The only capability today is via diver teams. The UUV system will greatly improve the effectiveness, efficiency and safety of port surveillance and monitoring operation, lessening the exposure of human divers to explosive devices by minimizing the time to accomplish the mission. The i-PUMA will also enable effective searching of a much higher percentage of domestic and foreign ports, especially those harbor environments with higher amounts of clutter, irregular bottom profiles and large quantities of in-water volume obstacles. This is a goal of EOD AT/FP Program and also of the United States Coast Guard. The eventual product will also meet targeted requirements in the EOD UUV program and the PMS-403 SMCM UUV program.

FY2005 Plans: Conduct i-PUMA requirements and design analysis. Initiate engineering development to miniaturize the 21" UUV L-PUMA for use on a 12" UUV.
FY2006 Plans: Conduct full scale i-PUMA fabrication, sensor integration and testing. Develop final report and conduct TTI Program Close Out brief.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Swimmer Defense	Navy	0.000	1.100	1.000	0.000

Terrorist attacks have heightened the level of interest in enhancing maritime military force protection. An easily deployable system is needed to provide ships with the real time capability to detect and engage swimmers or divers that pose a threat to high value assets while in port or at anchor. Both the Navy and the Coast Guard have identified swimmer detection and swimmer engagement as critical, high priority capability gaps. Swimmer Defense is designed to provide an integrated capability for swimmer detection and engagement, which does not exist today. Swimmer Defense has been identified as a potential spiral development system to be integrated into the Navy Shipboard Protection System (SPS). The current SPS configuration, scheduled to be fielded in FY05, contains only the Integrated Radar Optical Surveillance and Sighting System (IROS^3) which is only intended for use as a detection system for potentially hostile small craft.

The TTI initiative will transition SDS and SES system technology to acquisition and support the procurement of an additional test article allowing for multiple sonar head interface development, thus reducing the time to field the end item by one to two years. Multiple sonar heads are required to protect large ships in foreign ports and anchorages. TTI funding for SES will allow for testing of two acoustic impulse systems.

FY2005 Plans: Define swimmer defense requirements and develop CONOPS. Initiate system characterization tests.
FY2006 Plans: Complete system characterization tests and conduct design update. Begin fabrication of full scale prototype. Conduct prototype testing.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Special Operations Forces (SOF) Virtual Interpreter	SOCOM	0.000	0.600	0.675	0.000

The SOF Virtual Intrepreter (SVI) involves four different technologies: the Phraselator, the Foreign Language tutorial software, the voice to voice translater and the NIPRNET Connectivity. The Phraselator is a ruggedized, one-way, voice-to-voice, handheld translation device designed specifically for the US Military. Since the Phraselator's prototype launch in 2001, it has been used by American Soldiers worldwide more than any other translation device. The Phraselator is a field –proven force multiplier capable of gaining intelligence, providing life-saving direction and enabling civilian outreach efforts.

A substantial new capability (not currently available in the Phraselator) is the ability for the software to record and translate a foreign languge response back into English. A two-way capability allowing for the gathering of invaluable time sensitive intelligence information or in a

medical emergency scenario it would assist in the assessment of a non-English speaking patient's severity of wounds or ailment. Additional capabilities such as communications and language tutorial software would enhance the user's abilities to reach back through the World-Wide-Web to obtain system upgrades and conduct language training from abroad.
The goal of this effort is to enhance and transition twenty (20) SOF Virtual Interpreters (SVI) Systems with the following technology modifications for evaluation by USSOCOM forces and others to effect a rapid transition into acquisition.

FY2005 Plans: Process development and assessment of prototype capabilities. Initiate and continue two-way capability assessment. Perform engineering for web communication, integration of tutorial software tools, and design update, laboratory and initial field testing.
FY2006 Plans: Down select two-way hardware and software. Integrate selected technologies into platform. Field test deliverables. Prepare final report and conduct TTI Program Close Out brief.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Rugged ENTR Device (RED)	SOCOM	0.000	2.685	0.000	0.000

The Embedded National Tactical Receiver (ENTR) provides the tactical war fighters with a small, low cost, low power, near-real-time, intelligence data reception capability. It will simultaneously receive, demodulate, and decrypt four independent, Integrated Broadcast Service (IBS) broadcast channels. The IBS architecture disseminates strategic, operational, and tactical intelligence and information to the war fighter. The ENTR form factor allows it to be embedded directly into a variety of host systems (e.g., workstation, laptop, tactical radio). The objective of this TTI is to integrate the ENTR circuit card and IBS message processing software into a rugged, tactical, IBS receiver system, referred to as the Rugged ENTR Device (RED).

RED will be the next generation, technological advancement to fulfill an approaching gap in capability by replacing obsolete and aging legacy IBS receiver systems throughout the Department of Defense (DOD). Unlike most legacy IBS receiver systems, RED also supports the IBS migration to the Common Interactive Broadcast (CIB) and mandated DOD Cryptographic Modernization directives. RED will support air-, ground-, and maritime-based missions in a single, rugged, lightweight package. Supporting multiple platforms and environments in a single design will significantly reduce life cycle management costs and redundant development efforts.

FY2005 Plans: Perform environmental analyses to productize the chassis and final RED design that will meet the RED specification. Conduct qualification testing for electromagnetic interference, environment and TEMPEST requirements. Obtain JITC and NSA INFOSEC certification endorsement for RED.

	Service/Agency	FY 2004	FY 2005	FY 2006	FY 2007
Lightweight and Conformal Photovoltaic Solutions for the SOF Warrior	SOCOM	0.000	0.600	0.695	0.950

The photovoltaic (PV) technologies being offered through the U. S. Army's Natick Soldier's Center (NSC) will provide our SOF operators with unique power generating PV textile systems that are lightweight, conformable, versatile and stealthy for renewable power and potential electronics integration into C4ISR systems and mobile/fixed site systems currently used by SOF forces.
Lightweight and conformal PV systems that will be integrated into SOF Warrior Systems where potentially "any" surface could be power generating. These SOF PV systems could include, but, not limited to, unattended ground sensors, tags, command and control equipment (handheld radios), weapons sights, unmanned ground and aerial vehicles, shelter overheads, portable mats, manned ground and maritime platforms, etc.
This technology offers the SOF operator an unsurpassed versatility for use as a direct energy source and/or battery recharging (hybrid systems) to complement legacy generator and battery systems. This TTI project will focus on the development of four prototype PV devices for lightweight and renewable power generation using two different PV technologies (Iowa Thin Film – Amorphous Silicon and Konarka Technologies – Dye Nanocomposites). The four PV prototypes include: a) PV Bare Base Shelters - provide minimum of 1KW power and reduce solar load 80-90%; b) PV's for remote sensing – support 30W continuous power load for sensors and remote sensor workstations, c) AA battery and BB2590 battery rechargers -- mini-pocket size and rollable portable solar panels.

FY 2005 Plans: Modify all prototype devices to meet specifications for operational use. Conduct operational test and evaluation of prototype AA battery and PV Solar shade shelter. Analyze test and evaluation data.
FY 2006 Plans: Conduct operational test and evaluation of prototype BB2590 battery rechargers and PV remote sensors. Analyze test and evaluation data. Develop final report on all PV items. Transition to USSOCOM Program Executive Office for Special Projects (PEO-SP).

FY 2006 New Start Projects:

The selection process for the FY 2006 TTI Projects will begin in late 3rd Qtr or early 4th Qtr FY2005 with the distribution of a call for proposals to all Services and Defense Agencies. The Panel Review of the TTI proposals received is scheduled for October 2004. Final

selection of FY 2005 New Start TTI Projects will be conducted by the Technology Transition Manager (Deputy Assistant Secretary of Defense (Advanced Systems and Concepts)). Distribution of FY 2006 funding for the selected FY 2006 New Start TTI Projects will begin in December 2006. The total funding available to support the initiation of FY 2006 New Start Projects is $19.113 million.

C. OTHER PROGRAM FUNDING: N/A