

# UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET  
Exhibit R-2

DATE: Feb 2005

BUDGET ACTIVITY: 06  
PROGRAM ELEMENT: 0604256N  
PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
<b>Total PE</b>	26,320	23,287	23,918	24,457	25,299	26,082	26,764	27,429
R0672 EFFECTIVENESS OF NAVY E/W SYSTEMS (ENEWS)	13,295	12,367	12,396	12,611	12,983	13,427	13,759	14,068
W0602 ELECTRONIC WARFARE ENVIR SIMULATION (ECHO)	13,025	10,920	11,522	11,846	12,316	12,655	13,005	13,361

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This is a continuing program that consolidates the design, fabrication and integration of Naval Electronic Warfare (EW) threat simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic Developmental and Operational Test and Evaluation (DT&E/OT&E) environments to test Tri-Services EW systems and defensive tactics. These projects develop former Soviet and Free-World Anti-Air and Anti-Ship weapon systems simulators in accordance with the Services' requirements.

The R0672 Project, Effectiveness of Navy EW Systems (ENEWS), is a DON unique project that supports Test and Evaluation (T&E) of Ships EW efforts. ENEWS provides T&E for surface and subsurface shipboard systems and tactics in digitally modeled battle scenarios at the component, fully integrated single ship, multi-ship and full-up multi-platform battle group levels. ENEWS also provides a secure anechoic closed loop T&E facility specifically designed to test shipboard systems at the stand alone subsystem or fully integrated systems level. The last and largest portion of this project addresses the flyable Infrared and Radio Frequency simulators flown on specially configured NP-3D aircraft to provide at-sea open air T&E for systems and tactics. All ENEWS assets are developed, operated and maintained by the Naval Research Laboratory (NRL), Washington, DC.

The W0602 Project, Electronic Warfare Environment Simulation (ECHO), directly supports the T&E resource requirements for all Naval Air EW development programs to include multi-spectral situational awareness and

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countermeasures. Programs in development and future programs include: Advanced Anti-Radiation Guided Missile (AARGM), ALR-67 (v) 2 and (v) 3, Integrated Defensive Electronic Countermeasures Suite (IDECM) ALQ-214, AAR-47 (v) 2 and the AAR-47 (v) 3, AVR -2, Advanced 6" Expendable, Advanced Strategic Tactical Expendable (ASTE), ALQ-144A, Directed Infrared Countermeasures (DIRCM), EA-6B Improved Capability Program (ICAP III), LR700 and the Low Band Transmitter (LBT). This project also supports Joint Service EW systems with initial operational capability in the mid to late 2000's.

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**PROGRAM CHANGE SUMMARY:**

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
FY 2005 President's Budget Submission	27,692	23,866	24,190	24,585
FY 2006/2007 President's Budget Submission	26,320	23,287	23,918	24,457
Total Adjustments	-1372	-579	-272	-128
Cong Rescissions/Adjustments/Undist. Reductions	0	-573	0	0
Execution Adjustments	-1,100	0	0	0
Non-Pay Inflation Adjustments	0	0	17	33
Program Adjustments	0	-6	-384	-402
Rate Adjustments	0	0	95	241
SBIR Assessment	-272	0	0	0

**PROGRAM CHANGE SUMMARY EXPLANATION:**

Technical: Not applicable.

Schedule: Not applicable.

# UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET  
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PROJECT NUMBER: R0672

PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT TITLE: EFFECTIVENESS OF NAVY E/W SYSTEMS (ENEWS)

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R0672 EFFECTIVENESS OF NAVY E/W SYSTEMS (ENEWS)	13,295	12,367	12,396	12,611	12,983	13,427	13,759	14,068

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** The objective of the Effectiveness of Navy Electronic Warfare (EW) Systems (ENEWS) Project is the development and application of necessary simulation assets to determine the effectiveness of EW for navy ships in simulated real-world engagement situations. The project primarily supports the introduction of modern, effective shipboard and offboard EW systems, and tactics for the Surface Navy. The heavy use of ENEWS resources by Naval Sea Systems Command (NAVSEA), Operational Test and Evaluation Force (OPTEVFOR), Special Operations and other EW Research Development Test and Evaluation (RDT&E) agencies speaks to the overall importance of this project. The project provides support for EW system design Engineering Test (ET), Development Test (DT), Operational Test (OT), and the development of utilization tactics. Its quick reaction capabilities have had great impact on crisis situations such as the Lebanon and Libyan crises, Iran Harpoon threat, Persian Gulf crisis and Operation Desert Shield/Storm. Builder, an ENEWS digital modeling tool that was developed and is maintained to support surface EW Test and Evaluation (T&E) has migrated outside the T&E arena and is being used by special forces and carrier battle groups as a mission planning tool. Simulation Display (SIMDIS) is another ENEWS modeling tool that was developed to support T&E and has been adopted by most Department of Defense (DoD) T&E and training ranges to provide visualization of T&E and training scenarios. The primary threat to surface ships is Anti-Ship Capable Missile (ASCM) systems. The ENEWS Project is unique in that it is the only project within the Department of Defense (DOD) dedicated to developing and providing realistic ASCM assets to test and evaluate the effectiveness of shipboard EW systems and tactics against these type threats. The ENEWS Project is a critical part of the Office of the Secretary of Defense (OSD) Test Resource Master Plan. This plan employs many of the ENEWS assets for planning, analysis, testing and verification of shipboard and offboard EW systems, techniques and tactics. As part of its normal activities, ENEWS provides Development Test and Evaluation (DT&E), Operations Test and Evaluation (OT&E) and Follow-on Operations Test and Evaluation (FOT&E) support to the Surface Navy for all ship classes. DT, OT and FOT&E support includes AN/SLQ-32 Surface Electronic Warfare Improvement Program (SEWIP), R17.OX (NULKA), Rapid Anti-ship Integrated Defense System (RAIDS), all MK245 Giant tests, advanced Infrared (IR) decoys, decoy placement (Littoral), ship IR signature and Radar Cross Section (RCS) measurement of DDG-51, LPD-17, DD-21 and PC class ships, High Power Microwave (HPM) program, and other ship self-defense initiatives,

R1 Line Item 142

Page 4 of 16

# UNCLASSIFIED

# UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET  
Exhibit R-2a

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including test and evaluation of Future Naval Capability (FNC) process. In addition, ENEWS assets are regularly employed to test the effectiveness of North Atlantic Treaty Organization (NATO) ships' EW systems in joint allied exercises.

**B. ACCOMPLISHMENTS/PLANNED PROGRAM:**

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATOR HARDWARE UPGRADES</b>	754	724	70	80

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides simulator upgrades to Effectiveness of Navy Electronic Warfare (EW) System (ENEWS) flyable and shore based Infrared (IR) and Radio Frequency (RF) simulators. FY 2004 reflects Alternative Aircraft Implementation task which was a one year effort. This effort was driven by reduced availability of existing support aircraft. In FY 2005 funds for the Simulation Hardware Upgrade task were reduced by the level of effort budget reductions. These reductions resulted in modifying the task to eliminate the passive mode of the planned dual mode ALQ-170 Multi-Threat simulator upgrade. With the elimination of the passive mode, this task will be completed in FY 2005. Beginning in FY 2006 the focus of this task will be intelligence upgrades to existing hardware simulators with no new starts planned.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATOR SOFTWARE UPGRADES</b>	705	700	60	70

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides software upgrades to existing Effectiveness of Navy Electronic Warfare Systems (ENEWS) flyable and shore based simulations required due to either hardware upgrade of the computer or new intelligence information. This task includes upgrades to the ALQ-170 Multi-Threat simulator upgrade that completes in FY 2005 and minor VICTOR simulators. The focus of this task will be intelligence upgrades to existing simulators with no new starts planned in FY 2006 - FY 2007.

# UNCLASSIFIED

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PROJECT TITLE: EFFECTIVENESS OF NAVY E/W SYSTEMS (ENEWS)

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATOR CHARACTERIZATION</b>	145	123	26	31

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides characterization of Infrared (IR) and Radio Frequency (RF) simulators as part of the periodic checks on simulator performance and to collect performance data to be used in validation reports. This includes the characterization of six simulators annually. Starting in FY 2006 most of the existing Effectiveness of Navy Electronic Warfare Systems (ENEWS) simulators will have been characterized and the older simulators will be examined for any changes to original characterization data.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATOR MAINTENANCE</b>	1,009	1,000	1,114	1,115

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides required simulator maintenance to ensure that the hardware simulators are available for customer testing. Preventative maintenance, troubleshooting and repairs are performed as required. This includes annual maintenance on 21 simulators. Beginning in FY 2006, additional simulators will transition from hardware upgrades and will be added to the simulator inventory.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATOR CONTROL PANELS</b>	184	202	257	254

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Supports the development and maintenance of all simulator control panels, including Infrared (IR) FOXTROT in a Standard Instrumentation Pod (SIP), IR VICTOR in a SIP, NOVEMBER III and NOVEMBER IV simulator control panels. The gradual increase in annual funding is required to build, maintain and upgrade additional control panels required to operate the increased inventory of simulators.

# UNCLASSIFIED

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PROJECT TITLE: EFFECTIVENESS OF NAVY E/W SYSTEMS (ENEWS)

	FY 2004	FY 2005	FY 2006	FY 2007
<b>LABORATORY FACILITIES</b>	1,003	1,000	1,041	1,069

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides maintenance and upgrades to the (indoor laboratory) and outdoor land-based facilities required to perform testing of surface electronic warfare systems. In FY 2006 and FY 2007 an increase in maintenance and upgrades are required to support Surface Electronic Warfare Improvement Program (SEWIP) and NULKA testing.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATION THREAT REPOSITORY</b>	10	10	40	45

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides management, access and configuration control of the classified document and simulations library. In FY 2006 and FY 2007 the repository will be transitioning to advanced software management tools, incorporating more models and threats, environmental data and threat scenarios.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATION INSTRUMENTATION</b>	304	233	490	589

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides for the development, procurement, repair and maintenance of digital data collection and analysis systems. In FY 2006 and FY 2007 collection and analysis systems will be upgraded or replaced.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>SIMULATION VALIDATION</b>	502	430	687	631

**Accomplishments/Plans:**

# UNCLASSIFIED

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**FY 2004 - FY 2007:** Provides for the validation of hardware and software simulators and digital models. Develop reports that contain detailed descriptions of the threat simulators or digital models and the threat missile seekers. Simulator parameters are compared to actual threat parameters and differences are documented in the Validation Reports. Develop an average of four validation reports a year, increasing to six reports per year in FY 2006 and FY 2007.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>ELECTRONIC ATTACK/ELECTRONIC SUPPORT SIMULATIONS</b>	498	545	576	594

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides improvements and intelligence upgrades to Anti-Ship Capable Missile (ASCM) Digital Models to include fly-out models, NULKA and other off-board decoys including chaff models. Also, supports maintenance of the Threat Database to provide threat intelligence for the development of Test and Evaluation digital scenarios. FY 2006 incorporates NULKA and FY 2007 incorporates off-board decoys into threat scenarios.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>PROGRAM MANAGEMENT</b>	481	400	335	433

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Provides technical management functions in support of the Effectiveness of Navy Electronic Warfare Systems (ENEWS) project; engineering and technical support required for the overall efforts of ASCM Simulator and Digital Models development to meet Development Test/Operational Test (DT/OT) testing requirements, development of detailed test resource requirements and providing an interface between N-912, ONR, and other ENEWS oversight activities. Also, provides technical leadership to the Navy Surface Anti-Ship Cruise Missile Threat Simulator Validation Working Group (SVWG).



# UNCLASSIFIED

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	FY 2004	FY 2005	FY 2006	FY 2007
<b>CLASSIFIED PROGRAM</b>	7,700	7,000	7,700	7,700

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Details are of a higher classification.

**C. OTHER PROGRAM FUNDING SUMMARY:** Not applicable.

**D. ACQUISITION STRATEGY:** Not applicable.

# UNCLASSIFIED

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 PROJECT NUMBER: W0602      PROJECT TITLE: ELECTRONIC WARFARE ENVIR SIMULATION (ECHO)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
W0602 ELECTRONIC WARFARE ENVIR SIMULATION (ECHO)	13,025	10,920	11,522	11,846	12,316	12,655	13,005	13,361

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** The objective of this project is development of necessary simulation facilities and approaches to allow determination of the effectiveness of Electronic Warfare (EW) in real world engagement situations and to support the introduction of modern, effective systems into Naval Aviation. The heavy use of test resources by all Services demonstrates the importance of these assets. The Navy has been very successful in executing all of its major programs, and to date has had no major technical problems.

The EW Environment Simulation (ECHO) project is unique in that it is the only program within the Department of Defense (DOD) which develops and provides Naval anti-air warfare threat assets for Testing and Evaluation (T&E) and is a critical part of the Office of the Secretary of Defense (OSD) Test Resource Master Plan. The OSD Master Plan employs many ECHO project resources for planning, analysis, testing and verification of airborne EW equipment.

This project directly supports the Test and Evaluation resource requirements for all Naval Air Electronic Warfare (EW) development programs, to include multi-spectral situational awareness and countermeasures. Programs in development and future programs include: Advanced Anti-Radiation Guided Missile (AARGM), ALR-67 (v) 2 and (v) 3, Integrated Defensive Electronic Countermeasures Suite (IDECM) ALQ-214, AAR-47 (v) 2 and the AAR-47 (v) 3, AVR -2, Advanced 6" Expendable, Advanced Strategic Tactical Expendable (ASTE), ALQ-144A, Directed Infrared Countermeasures (DIRCM), EA-6B Improved Capability Program (ICAP III), LR700 and the Low Band Transmitter (LBT). This project also supports Joint Service EW systems with initial operational capability in the mid to late 2000's.

This project provides for the development of an Integrated Air Defense T&E capability to be fielded at each of the three sites comprising the Navy's Tri-Center complex: Naval Air Warfare Center Weapons Division, China Lake and Point Mugu in CA, and Naval Air Warfare Center Aircraft Division, Patuxent River, MD.

# UNCLASSIFIED

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**B. ACCOMPLISHMENTS/PLANNED PROGRAM:**

	FY 2004	FY 2005	FY 2006	FY 2007
GROUND BASED IR STIMULATOR	1,127	0	0	0

**Accomplishments/Plans:**

**FY 2004:** Completed Ground Based IR Stimulator. Completed fabrication. Integrated into the Range and performed initial operational capabilities (IOC) testing.

	FY 2004	FY 2005	FY 2006	FY 2007
ADVANCED MAN PORTABLE AIR DEFENSE SYSTEMS	30	750	750	750

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue Advanced Man Portable Air Defense Systems. Procure additional manpad seekers, install and test at the Navy open air range.

	FY 2004	FY 2005	FY 2006	FY 2007
1V2 IR ALERT/RESPONSE SYSTEM	450	0	0	0

**Accomplishments/Plans:**

**FY 2004:** Completed 1V2 IR Alert/Response System. Completed installation of hardware and software. Conducted initial operational capabilities testing at the Navy open air range.

	FY 2004	FY 2005	FY 2006	FY 2007
SIMVAL	80	100	100	100

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue SIMEVAL (Simulator Evaluation). Conduct and evaluate measurements and document

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 PROJECT NUMBER: W0602      PROJECT TITLE: ELECTRONIC WARFARE ENVIR SIMULATION (ECHO)

results to provide customers with confidence in simulator performance.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>RADAR AND WEAPON SIMULATOR</b>	486	525	525	525

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue Radar and Weapon Simulator Updates. Perform intelligence based updates to threat radar and weapon system simulators.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>MISSILE/GUN</b>	592	600	600	600

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue Missile and Gun System Simulator Updates. Perform intelligence based updates to threat missile and gun system software flyout models.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>REPROGRAMMABLE EARLY WARNING ACQUISITION RADAR</b>	500	150	0	0

**Accomplishments/Plans:**

**FY 2004 - FY 2005:** Continued Reprogrammable Early Warning (EW) Acquisition (ACQ) Radar. Continued hardware and software development of laboratory EW/ACQ Threat Radar System. In FY 2005 complete Reprogrammable Early Warning (EW) Acquisition (ACQ) Radar and complete fabrication and perform IOC testing of laboratory EW/ACQ Threat Radar System.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>ADVANCED THREAT SIMULATOR</b>	2,642	2,030	1,015	0

**Accomplishments/Plans:**

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**FY 2004 - FY 2006:** In FY 2004 initiated Advanced Threat Simulator and conducted design trade-off analysis and began hardware and software development. In FY 2005 continue Advanced Threat Simulator and continue hardware and software development. In FY 2006 complete Advanced Threat Simulator and complete development and perform IOC testing at both Air Combat Test and Evaluation Facility (ACETEF) and the Electronic Combat Systems Engineering Laboratory (ECSEL).

	FY 2004	FY 2005	FY 2006	FY 2007
<b>1VM RF ALERT/RESPONSE</b>	2,052	1,641	1,133	0

**Accomplishments/Plans:**

**FY 2004 - FY 2006:** In FY 2004 continued 1 vs M RF Alert Response and continued hardware and software development. In FY 2005 continue 1 vs M RF Alert Response and continue hardware and software development and begin installation and interface with 1V1 and 1V2 systems. In FY 2006 complete 1 vs M RF Alert Response and complete development and perform IOC testing at the Electronic Combat Range.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>VALIDATION</b>	401	400	400	400

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue Validation of Simulators. Generate Validation Reports using Simulator Evaluation (SIMEVAL) results and forward for Director Test and Evaluation (DOT&E) approval.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>ECHO TECHNICAL &amp; ENGINEERING SUPPORT</b>	1,970	2,234	2,262	2,268

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** Continue ECHO Technical & Engineering support. Provide program management, systems engineering and requirements support at all three Navy Electronic Warfare Test and Evaluation (EWT&E)

# UNCLASSIFIED

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facilities.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>ADVANCED MULTIPLE-EMITTER SIMULATOR ADVANCED MODULATION</b>	725	714	500	0

**Accomplishments/Plans:**

**FY 2004 - FY 2006:** In FY 2004 initiated Advanced Multiple-Emitter Simulator Advanced Modulation and developed design and interfaced specifications and began hardware and software development. In FY 2005 continue Advanced Multiple-Emitter Simulator Advanced Modulation and continue hardware and software development. In FY 2006, complete Advanced Multiple-Emitter Simulator Advanced Modulation and complete development, install and perform initial operational capabilities testing at the Navy laboratory facilities.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>MVM IR/RF ALERT/RESPONSE</b>	1,970	1,276	2,250	1,700

**Accomplishments/Plans:**

**FY 2004 - FY 2007:** In FY 2004, initiated Many vs Many (MvM) Infrared (IR) Radio Frequency (RF) Alert/Response. Developed design and interfaced specifications. Began prototype hardware and software development. In FY 2005 through FY 2007, continue MvM RF Alert/Response and continue hardware and software development.

	FY 2004	FY 2005	FY 2006	FY 2007
<b>AMES MMW UPGRADE</b>	0	500	500	0

**Accomplishments/Plans:**

**FY 2005 - FY 2006:** In FY 2005 initiate Advanced Multiple-Emitter Simulator Milli-Meter Wave (MMW) Upgrade project. Initiate design and procurement of hardware. In FY 2006 complete Advanced Multiple-Emitter Simulator Milli-Meter Wave (MMW) Upgrade project. Complete development, install and perform initial operational capabilities testing at the Navy laboratory facilities.

# UNCLASSIFIED

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	FY 2004	FY 2005	FY 2006	FY 2007
ADVANCED THREAT SIMULATOR (OPEN AIR)	0	0	1,087	2,500

**Accomplishments/Plans:**

**FY 2006 - FY 2007:** In FY 2006, initiate Advanced Threat Simulator project for the Electronic Combat Range. Initiate design and procurement of hardware/software development. In FY 2007, continue Advanced Threat Simulator project for the Electronic Combat Range. Continue hardware and software development.

	FY 2004	FY 2005	FY 2006	FY 2007
REACTIVE PLUME SIMULATOR	0	0	400	2,120

**Accomplishments/Plans:**

**FY 2006 - FY 2007:** In FY 2006, initiate the Reactive Plume Simulator. Initiate design. In FY 2007, continue Reactive Plume Simulator. Initiate software and hardware development.

	FY 2004	FY 2005	FY 2006	FY 2007
LONG RANGE THREAT SIMULATOR	0	0	0	883

**Accomplishments/Plans:**

**FY 2007:** Initiate Long Range Threat Simulator project for hardware in the loop lab and installed systems test facility. Initiate design of system.

**C. OTHER PROGRAM FUNDING SUMMARY:**

Related RDT&E: Not applicable.

Non-Navy Related RDT&E: Not applicable.

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**D. ACQUISITION STRATEGY:**  
Not applicable.