## FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2006 Exhibit R-2

BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N

PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

COST: (Dollars in Thousands)

Project Number & Title	FY 2005 Actual	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	23,437	23,560	23,668	24,540	25,331	25,885	26,477
0602 ELE	CTRONIC W	ARFARE ENVIF	CONMENT SIMULA	ATION (ECHO)			
	11,129	11,350	11,550	12,036	12,376	12,593	12,872
0672 EFF	'ECTIVENES	S OF NAVY EL	ECTRONIC WAR	FARE SYSEMS (	(ENEWS)		
	12,308	12,210	12,118	12,504	12,955	13,292	13,605

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 environments to test Tri-Service 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 0672 Project, Effectiveness of Navy EW Systems (ENEWS), is a Department of Navy (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, Washington, DC.

The 0602 Project, Electronic Warfare Environment Simulation, directly supports the T&E resource requirements for all Naval Air EW development programs to include multi-spectral situational awareness and countermeasures.

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

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BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N

PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

## B. PROGRAM CHANGE SUMMARY:

	FY 2005	FY 2006	FY 2007
FY 2006 President's Budget Submission	23,287	23,918	24,457
Congressional Undistributed Reductions/Rescissions	-17	-358	0
Execution Adjustments	300	0	0
FY 2005 SBIR	-136	0	0
Program Adjustments	3	0	-962
Rate Adjustments	0	0	173
FY 2007 President's Budget Submission	23,437	23,560	23,668

#### PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

## C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

## D. ACQUISITION STRATEGY:

Not applicable.

## E. PERFORMANCE METRICS:

Performance metrics are discussed within each project (R2a).

FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2006

Exhibit R-2a

BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT NUMBER: 0602 PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

COST: (Dollars in Thousands)

Project FY 2005 FY 2006 FY 2007 FY 2008 FY 2009 FY 2010 FY 2011 Number Actual Estimate Estimate Estimate Estimate Estimate

& Title

0602 ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

11,129 11,350 11,550 12,036 12,376 12,593 12,872

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 (IDECM) Suite 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), Joint Strike Fighter, EA-18G, 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.

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BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT NUMBER: 0602 PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

#### B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
ELECTRO-OPTICAL/INFRA-RED (EO/IR) THREAT CAPABILITIES	2,883	3,914	5,127

## Accomplishments/Plans:

FY 2005 - FY 2007: Provide the test community with the modern threat systems necessary for test and evaluation of airborne EO/IR passive alert systems and airborne EO/IR active response systems. Develop spectral, power, and temporal systems to test and evaluate Missile Warning Systems (MWS) and measure the end-game effectiveness of IR expendables and DIRCM systems by simulating high speed IR missile engagements against airborne targets. Develop an IR missile seeker capability similar in concept to the Missile-on-a-Mountain (MOM) facility to measure end-game miss distance and acquire Measure-of-Effectiveness (MOE) data against airborne countermeasures. Develop and integrate an instrumented IR target array for targeting applications. Procure, characterize, instrument, and integrate foreign hardware. Combine the capability of two existing IR seeker vans to enable testing of up to 12 seekers simultaneously to expedite data collection against tier 1 IR Surface to Air Missiles (SAM's).

	FY 2005	FY 2006	FY 2007
RADIO FREQUENCY (RF) THREAT CAPABILITIES	5,935	5,311	4,242

#### Accomplishments/Plans:

FY 2005 - FY 2007: Provide the test community with the modern threat systems necessary for test and evaluation of airborne RF alert, Situation Awareness, Targeting systems and airborne RF response systems. Modify the existing Point Mugu Advanced Multiple Emitter Simulators (Micro-AMES) by adding a low band module and a new phase/amplitude chassis. Provide 180 degrees minimum coverage over an extended frequency range to stimulate all receiver channels with simultaneous azimuth and elevation stimulus. Build two Mobile systems to provide a high density RF background environment superimposed over the existing high fidelity threat systems. Upgrade the existing I-23 threat system to provide new high fidelity threat complex waveforms and gray systems. Procure an advanced technology J-Band multiple threat target engagement radar system. The system will simulate six different threats in the lab configuration and a single threat at the range. Instrument and

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PROJECT NUMBER: 0602 PROJECT TITLE: ELECTRONIC WARFARE ENVIRONMENT SIMULATION (ECHO)

integrate an actual foreign missile seeker into the I-23 weapon system simulation. Upgrade the I-23 tracking algorithms, radar/missile control modes.

	FY 2005	FY 2006	FY 2007
REQUIREMENTS AND VALIDATION	2,311	2,125	2,181

## Accomplishments/Plans:

FY 2005 - FY 2007: Validate and track intelligence updates of the Threat Systems necessary for the operation and continuous improvement of Navy laboratories and ranges which provide engineering support, testing and analysis to the developers, integrators, testers and users of systems and technologies that counter or penetrate air defenses. Provide Program Management and Systems Engineering support for the development of simulators and the acquisition of Foreign Material to accurately reflect current and future Threat scenarios.

## C. OTHER PROGRAM FUNDING SUMMARY:

-Not applicable

## D. ACQUISITION STRATEGY:

-Not applicable

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BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT NUMBER: 0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSEMS (ENEWS)

Project FY 2005 FY 2006 FY 2007 FY 2008 FY 2009 FY 2010 FY 2011 Number Actual Estimate Estimate Estimate Estimate Estimate

& Title

0672 EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSEMS (ENEWS)

12,308 12,210 12,118 12,504 12,955 13,292 13,605

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, Operational Test and Evaluation Force, Special Operations, and other EW Research, Development, Test and Evaluation 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 is another ENEWS modeling tool that was developed to support T&E. The display 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 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 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, 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/SLO-32 Surface Electronic Warfare Improvement Program (SEWIP), R17.0X (NULKA), Rapid Anti-ship Integrated Defense System, all MK245 Giant tests, advanced Infrared (IR) decoys, decoy placement, ship IR signature and Radar Cross Section measurement of DDG-51, LPD-17, DD-21 and PC class ships, High Power Microwave program, and other ship self-defense initiatives, including test and evaluation of Future Naval Capability process. In

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BUDGET ACTIVITY: 06

PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

PROJECT NUMBER: 0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSEMS (ENEWS)

addition, ENEWS assets are regularly employed to test the effectiveness of North Atlantic Treaty Organization ships' EW systems in joint allied exercises.

## B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2005	FY 2006	FY 2007
SIMULATOR HARDWARE UPGRADES	724	69	77

Provides simulator upgrades to ENEWS flyable and shore based IR and Radio Frequency (RF) simulators.

## FY 2005 Accomplishments:

- -Completed FOXTROT 1 standard instrument pod (SIP) flight certification on NP-3D aircraft.
- -Completed AN/ALQ-170 Multi-Threat Simulator Upgrade (MTSU). There was 1 simulation: generic sim 14.

## FY 2006 Plans:

- -Complete intelligence upgrades to MEIR 3 and SUMMIT.
- -Initiate intelligence upgrades to MEIR 3, MIKE 3, SUMMIT, FOXTROT 1 SIP, and VICTOR 1 SIP.

## FY 2007 Plans:

-Continue all efforts of FY 2006 less those noted as completed above.

	FY 2005	FY 2006	FY 2007
SIMULATOR SOFTWARE UPGRADES	700	60	68

Provides software upgrades to existing ENEWS flyable and shore based simulations required due to either hardware upgrade of the computer or new intelligence information. FY 2005 - FY 2006 Focus is on upgrades to existing simulators.

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## FY 2005 Accomplishments:

- Completed software upgrades to the MTSU. There were 2 simulations: sims 11 and 17.

- Initiated software upgrades to the FOXTROT 1 SIP. There was 1 simulation: sim 2.

#### FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.

- Initiate intelligence upgrades to MEIR 3 and VICTOR 1 SIP. There will be 2 simulations: visible band and sim 4.

## FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.

	FY 2005	FY 2006	FY 2007
SIMULATOR CHARACTERIZATION	123	26	29

Provides characterization of IR and RF simulators as part of the periodic checks on simulator performance and to collect performance data to be used in validation reports.

## FY 2005 Accomplishments:

- Initiated and completed characterization of INDIA II, NOVEMBER II, III and IV, and there were 75 tests per simulator.
- Initiated and completed characterization of MIKE 2 and 3. There were 4 system level tests per simulator.

## FY 2006 Plans:

- Initiate and complete characterization of INDIA I.

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PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

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#### FY 2007 Plans:

- Initiate and complete characterization of INDIA III.

	FY 2005	FY 2006	FY 2007
SIMULATOR MAINTENANCE	1,000	1,096	1,071

Provides required simulator maintenance to ensure that the hardware simulators are available for customer testing. Preventative maintenance, troubleshooting, and repairs are performed as required.

## FY 2005 Accomplishments:

- Continued annual maintenance on 21 simulators. There were 15 RF and 6 IR simulators to support 15 flight/shore based tests per year.

## FY 2006 Plans:

- Continue all efforts of FY 2005.

## FY 2007 Plans:

- Continue all efforts of FY 2006.

	FY 2005	FY 2006	FY 2007
SIMULATOR CONTROL PANELS	205	253	244

Supports the development and maintenance of all simulator control panels.

## FY 2005 Accomplishments:

- Completed INDIA I simulator control panel. There were 4 assemblies.

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## FY 2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2006 Exhibit R-2a

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- Initiated FOXTROT I SIP and INDIA I simulator control panels with 10 assemblies.

- Initiated INDIA II simulator control panel. There were 4 assemblies.

#### FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate INDIA III simulator control panel.

#### FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete INDIA II simulator control panel.

	FY 2005	FY 2006	FY 2007
LABORATORY FACILITIES	1,000	1,026	1,027

Provides maintenance and upgrades to the indoor laboratory and outdoor land based facilities required to perform testing of surface electronic warfare systems.

## FY 2005 Accomplishments:

- Initiated and completed upgrades to MEIR 2, MIKE 2, QUESTION, FOXTROT I and VICTOR I shore based support equipment. There were 5 IR systems.

#### FY 2006 Plans:

- Initiate and complete upgrades to the mobile IR simulator van, adding 400 cycle power and 27 volt DC to support 5 simulators.

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PROGRAM ELEMENT: 0604256N PROGRAM ELEMENT TITLE: THREAT SIMULATOR DEVELOPMENT

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#### FY 2007 Plans:

- Initiate and complete upgrades to shore based test facilities required to conduct test of SEWIP and NULKA Programs.

	FY 2005	FY 2006	FY 2007
SIMULATION THREAT REPOSITORY	10	40	43

Provides management, access, and configuration control of the classified document and simulations library.

## FY 2005 Accomplishments:

- Initiated the transition of NRL Code 5750 and 5770 environmental, threat, and platform simulations to the Subversion Software Configuration Management Program. Subversion software upgraded as new releases became available. There are 100 updates annually.

## FY 2006 Plans:

- Continue all efforts of FY 2005.

## FY 2007 Plans:

- Continue all efforts of FY 2006.

	FY 2005	FY 2006	FY 2007
SIMULATION INSTRUMENTATION	233	482	566

Provides development and maintenance of flight support instrumentation such as oscilloscopes, global positioning systems, videocassette systems, and monitors.

## FY 2005 Accomplishments:

- Continued upgrades and maintenance of flight support systems as necessary to support the IR/RF ENEWS

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simulators. There are 15 RF & 6 IR simulators.

## FY 2006 Plans:

- Continue all efforts of FY 2005.

#### FY 2007 Plans:

- Continue all efforts of FY 2006.

	FY 2005	FY 2006	FY 2007
SIMULATION VALIDATION	430	677	606

Provides for the validation of hardware and software simulators and digital models. Develops reports that contain detailed descriptions of the threat simulators or digital models and the threat missile seekers.

## FY 2005 Accomplishments:

- Initiated and completed the INDIA I digital model validation report. Provided report to the Simulator Validation Working Group (SVWG).
- Initiated work on the INDIA II digital model validation report.
- Initiated work on the MIKE 2, MEIR 2, QUESTION, FOXTROT I SIP, and NOVEMBER II hardware validation reports.

## FY 2006 Plans:

- Continue all efforts of FY 2005.
- Complete MIKE 2, MEIR 2, QUESTION and NOVEMBER II hardware validation reports. Provide reports to SVWG.
- Initiate INDIA III digital model validation report.
- Initiate and complete INDIA II and QUEBEC hardware validation reports. There will be 2 reports to SVWG.
- Initiate TANGO and MIKE 3 hardware validation reports.

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#### FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.

- Complete Mike 3 and FOXTROT I SIP hardware validation report. Provide reports to SVWG.

- Initiate INDIA I and NOVEMBER III and IV hardware validation reports.

	FY 2005	FY 2006	FY 2007
ELECTRONIC ATTACK/ELECTRONIC SUPPORT SIMULATIONS	545	567	571

Provides improvements and intelligence upgrades to ASCM Digital Models to include fly-out models, NULKA and other off-board decoys including chaff models. Also, supports the maintenance of the Threat Database to provide threat intelligence for the development of Test and Evaluation digital scenarios.

#### FY 2005 Accomplishments:

- Initiated improvements and intelligence upgrades to ALPHA I, INDIA I, II, III, LIMA, NOVEMBER III, QUEBEC, TANGO, and TANGO II. In all, a total of 9 digital models.

## FY 2006 Plans:

- Continue all efforts of FY 2005.

#### FY 2007 Plans:

- Continue all efforts of FY 2006.

	FY 2005	FY 2006	FY 2007
PROGRAM MANAGEMENT	338	330	416

Provides technical management functions in support of the ENEWS project; engineering and technical support required for the overall efforts of ASCM Simulator and Digital Models development to meet DT/OT testing requirements, development of detailed test resource requirements, and provide an interface between N-912, N-

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PROJECT NUMBER: 0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSEMS (ENEWS)

433, Office of Naval Research, and other ENEWS oversight activities. Also, provides technical leadership to the Navy Surface Anti-Ship Cruise Missile Threat SVWG.

## FY 2005 Accomplishments:

- Continued management of the SVWG.
- Initiated and completed update of FY 2005 Program Management Plan.
- Initiated and completed FY 2005 quarterly reports, earned value management analysis, and progress trend analysis.

#### FY 2006 Plans:

- Continue all efforts of FY 2005 less those noted as completed above.
- Initiate and complete update of FY 2006 Program Management Plan.
- Initiate and complete FY 2006 quarterly reports, earned value management analysis, and progress trend analysis.

## FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Initiate and complete update of FY 2007 Program Management Plan.
- Initiate and complete FY 2007 quarterly reports, earned value management analysis, and progress trend analysis.

	FY 2005	FY 2006	FY 2007
CLASSIFIED PROGRAM	7,000	7,584	7,400

Details about this program are classified.

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PROJECT NUMBER: 0672 PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSEMS (ENEWS)

7549

## FY 2005 Accomplishments:

- Details are of a higher classification.

## FY 2006 Plans:

- Details are of a higher classification.

## FY 2007 Plans:

- Details are of a higher classification.

## C. OTHER PROGRAM FUNDING SUMMARY:

- Not applicable

## D. ACQUISITION STRATEGY:

- Not applicable

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