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FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: February 2007

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603758N
PROGRAM ELEMENT TITLE: NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total PE	42,610	41,146	41,196	47,209	44,301	71,646	73,744	70,424
2918 NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS	42,610	41,146	41,196	47,209	44,301	71,646	73,744	70,424

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) addresses the development of recent technology breakthroughs to meet current operational needs from a subscale proof-of-principle into a full-scale prototype for warfighter experimentation during laboratory and operational demonstrations, Fleet Battle Experiments (FBE), Limited Objective Experiments (LOEs) and Sea Trial Exercises. The key aspects of this PE are divided into four areas: (1) SwampWorks develops and demonstrates newly invented or recently discovered technologies that address emergent and enduring operational problems in an accelerated timeframe; (2) Naval Warfare Experimentation develops prototypes of recent technology breakthroughs and provides them to the warfighter for experimentation during FBEs, LOEs or Sea Trials; (3) Tech Solutions resolves operational problems submitted by the deckplate sailor via website, applies scientific applications to solve these problems, and provides the solution to the sailor for evaluation and use; and (4) Operations Analysis provides the Navy and Marine Corps the means to identify capability needs that can be addressed with science and technology solutions.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2007 President's Budget Submission	48,549	41,308	37,416	66,460
Congressional Undistributed Reductions/Rescissions	36	-162	0	0
Execution Adjustments	-5,262	0	0	0
Non-Pay Inflation Adjustments	0	0	-102	97
Program Adjustments	0	0	-726	1,377
Program Realignment	0	0	4,563	-20,782
Rate Adjustments	0	0	45	57
SBIR Assessment	-713	0	0	0
FY 2008/FY 2009 President's Budget Submission	42,610	41,146	41,196	47,209

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:

Overall metric goals are to transition the 6.3 advanced technology projects into acquisition programs of record, demonstrate successful technologies to enable new operational concepts, and enable the production of technology products such as proofs of concept and manufacturing packages. The performance of the work funded in this PE is reviewed at several levels to ensure that the investment is relevant and productive:

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At the macroscopic level, the investment is coordinated with Navy Warfare Development Command (NWDC) and Commander, Fleet Forces Command (CFFC) to address the goals and objectives identified for Sea Trials and LOEs. At the microscopic level, the work funded in this PE is reviewed periodically by the Program Manager to ensure the investment is meeting the goals defined for each project. This review includes feedback collected from the warfighter community on all Sea Trials and LOE to support the Program Manager's assessment of the value and relevance of each investment. Furthermore, the entire program is reviewed yearly by the Chief of Naval Research.

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PROJECT NUMBER: 2918

PROJECT TITLE: NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
2918 NAVY WARFIGHTING EXPERIMENTS AND DEMONSTRATIONS	42,610	41,146	41,196	47,209	44,301	71,646	73,744	70,424

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project focuses on the development of recent technology breakthroughs to meet current operational needs from a subscale proof-of-principle into a full-scale prototype for warfighter experimentation during laboratory and operational demonstrations, Fleet Battle Experiments (FBE), Limited Objective Experiments (LOEs) and Sea Trial Exercises.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
NAVAL WARFARE EXPERIMENTATION	15,166	14,771	12,750	17,246

The objective of this project is to capitalize on recent technology breakthroughs to develop prototypes quickly and provide them to the warfighter for experimentation during laboratory and operational demonstrations, Sea Trials or LOEs. Current efforts include experimentation with a Coherent Stand-In Jamming (CSIJ) for unmanned air vehicles (UAVs), Knowledge Management (KM) tools for Intel and Operations Officers, technology to advance riverine warfare operations, advanced sensors for Anti-Submarine Warfare (ASW) and technology investigation studies.

The funding level decrease from FY 2007 to FY 2008 is due to a realignment in support of Net-Centricity - Net-Enabled Command Capability. The funding level increase in FY 2009 is due to additional experimentation with technologies developed in SwampWorks' power and energy initiative.

FY 2006 Accomplishments:

- Continued investigation of operational areas that can be served with KM technologies.
- Continued concept based technology program efforts.

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- Continued to identify other promising technology breakthroughs that can be prototyped and delivered to the warfighter for experimentation.
- Completed unmanned underwater vehicle (UUV) mission modules for the Sea Trial event in the Panama Canal Exercise, a mine warfare training and readiness exercise (which included the HSV SWIFT).
- Completed experimentation on craft of opportunity, in particular the HSV-2 SWIFT and X-Craft, and supported the Littoral Combat Ship mine warfare mission module development program.
- Completed KM tools for Intel officers in C2F, C3F, C5F, C7F that are robust and that the warfighter can use during laboratory and operational demonstrations, Sea Trial exercises or LOEs.
- Completed development of KM tools for the operations officers (J3) in C2F and C5F. Planned and conducted LOEs to assess the effectiveness of these tools in reducing the time and complexity of data collection and analysis.
- Completed the development of an optical sensor for rocket detection, integrated with the Critical Area Protection System (CAPS) (previously developed in this program and deployed in Camp Fallujah and tested) and provided to the Marine Corps for experimentation.
- Completed support of the Marine Corps in LOEs with the gun detection and location units and collected data on the performance of the units in an operational scenario.
- Completed the fabrication of several units of the electromagnetic sensor to support Limited Objective Test with Fleet ASW Command.
- Initiated the development of an unmanned aerial vehicle (UAV) with jamming capability for Suppression of Enemy Air Defenses (SEAD) and IED initiatives.
- Initiated effort to experiment and demonstrate technology for riverine warfare.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete investigation of operational areas that can be served with KM technologies.
- Complete the development of an unmanned aerial vehicle (UAV) with standoff jamming capability for SEAD and IED initiatives.
- Complete experimentation with Fleet ASW Command to assess the effectiveness of the electromagnetic sensors in cueing in a real-time operational scenario.
- Initiate development and demonstration of real time situational awareness technologies.
- Initiate Ship Affordability program to examine ship designs and construction processes and develop technologies that can significantly reduce the costs to conceive, design and construct naval ships.
- Initiate effort to experiment and demonstrate technologies to improve warfighter survivability using

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electronic warfare systems.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete effort to experiment and demonstrate technologies to improve warfighter survivability using electronic warfare systems.
- Complete effort to experiment and demonstrate technology for riverine warfare.
- Complete program to develop technologies to enhance vehicle tactical situational awareness and fuse with intelligence products.
- Complete Ship Affordability program and experimentation.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Initiate experimentation efforts with technologies developed in SwampWorks power and energy initiative.

	FY 2006	FY 2007	FY 2008	FY 2009
OPERATIONS ANALYSIS	0	0	2,954	2,670

The objective of this project is to provide operational analysis through studies, analyses, gaming and experimentation to identify Navy and Marine Corps capability needs that can be addressed with Science and Technology (S&T) solutions. The effort includes core analysis of S&T programs, military utility/capability gaps analyses, war gaming and fleet experimentation analysis. Recent work includes fleet operational readiness assessments, command and control operational performance assessments, participation in Maritime Domain Awareness Simulation Exercises (SIMEX), Sea Basing concept analysis and Electro-Magnetic Railgun S&T transition wargame and targeting analysis, and development of a Combating Terrorism Process Model, and wargaming with technology transfer innovation.

Previously funded in PE 0601153N.

FY 2006 Accomplishments:

Previously funded in PE 0601153N.

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FY 2007 Plans:

Previously funded in PE 0601153N.

FY 2008 Plans:

- Continue to conduct Military Utility Analyses (MUAs) of future naval capability technologies.
- Continue to conduct capability gaps analyses to identify areas that can be addressed with products from the science and technology portfolio.
- Continue to conduct war games focused on technical issues for S&T transitions to acquisition and the fleet.

FY 2009 Plans:

- Continue all efforts of FY 2008 noted above.

	FY 2006	FY 2007	FY 2008	FY 2009
TECH SOLUTIONS	8,100	7,447	7,500	9,486

The objective of this program is to provide deckplate sailors and Marines in the field with technical solutions to common operational problems. The sailors and Marines provide their operational issues via the web.

The funding increase in FY 2009 is due to the initiation and ramping up of a series of new science and technology programs focused on anti-terrorism and force protection as identified by Science Advisors and the Fleet/Force.

FY 2006 Accomplishments:

- Continued to obtain operational problems from the sailors via the web and developed, demonstrated and delivered technical solutions.
- Initiated development of a portal for explosive detection that utilizes infrared detection.
- Initiated development of a marker for search and rescue that does not interfere with radio frequency

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communications called a Search and Rescue Low Probability of Interference Marker.

- Obtained feedback from extremity protection and dust palliatives that have been deployed and made enhancements as appropriate.

FY 2007 Plans:

- Continue development and deliver to the fleet a prototype for all efforts not noted as completed in FY 2006.
- Complete development of ballistic goggles that provide eye protection for ground troops and are adaptive to changing light conditions.
- Complete development and testing of ballistic net protection system.
- Initiate development of projects that provide solutions to problems identified by Science Advisors, as well as the Fleet/Force.

FY 2008 Plans:

- Continue development and deliver to the Fleet/Force a prototype for all efforts not noted as completed in FY 2007.
- Initiate development of projects that provide solutions to problems identified by Science Advisors, as well as the Fleet/Force.

FY 2009 Plans:

- Continue development and deliver to the Fleet/Force a prototype for all efforts not noted as completed in FY 2008.
- Initiate development of projects that provide solutions to problems identified by Science Advisors, as well as the Fleet/Force.

	FY 2006	FY 2007	FY 2008	FY 2009
SWAMPWORKS	19,344	18,928	17,992	17,807

SwampWorks seeks to develop and demonstrate technologies that address emergent and enduring operational problems in an accelerated timeframe. Some of these technologies may end up in the hands of the warfighter for experimentation, or may culminate in a significant exercise that demonstrates capability then transitions

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into the Acquisition Program of Record (POR). Examples of recent successes are the half-length torpedo which led to the development of the SwampWorks Broadband Sonar and transitioned to the Mk 48 Advanced Capability (ADCAP) program and the Aircraft Carrier Situational Awareness System (ACSAS), which will be incorporated into a POR. Current efforts are the development and demonstration of jet noise mitigation technologies, blast resistant structures, a high resolution sonar for the new lightweight torpedo, the Combat Science and Technology Vehicle (CSTV), and ship affordability, energy storage and reduced energy consumption technologies and technology investigation studies.

FY 2006 Accomplishments:

- Continued to identify enduring and emergent operational barriers identified by naval leadership and responded with relevant technology developments and demonstrations.
- Continued to test and evaluate technology for F18 noise abatement.
- Completed characterization of performance of the celestial navigation device in relevant scenarios that simulated operational conditions.
- Completed the development of the advanced sonar for the Mk54 torpedo and characterized its performance in a submarine exercise.
- Completed the installation of the Aircraft Carrier Situational Awareness System (ACSAS) (provides 360-degree sensing, detection and tracking for Aircraft Carriers when transiting in ports and restricted waterways when high-powered radars must be turned off) on the USS Theodore Roosevelt.
- Initiated the development of new technologies that are responsive to Taskforce Antisubmarine Warfare (TF ASW), a recently developed Concept of Operation.
- Initiated an investigation and development of technologies that reduce energy consumption losses during recent operations.
- Initiated ship affordability program.
- Initiated development of vehicle technologies to address survivability, fuel economies and blast mitigation.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete test and demonstration of technology for F18 noise abatement.
- Complete ship affordability technology development.
- Initiate studies of climate effects on operations and identify potential mitigating technologies.

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- Initiate novel heavy fuel propulsion system development.
- Initiate development of new methods applying breakthrough cognitive technologies, in behavioral, computational, and mathematical sciences to relevant Naval systems.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete development of technologies that reduce energy consumption losses during recent operations.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Complete novel heavy fuel propulsion system development.
- Complete development of new technologies that are responsive to Taskforce Antisubmarine Warfare (TF ASW).
- Complete development of vehicle technologies to address survivability, fuel economies and blast mitigation.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.