2007 YEAR IN REVIEW

ACCOMPLISHMENTS OF THE NAVY ENVIRONMENTAL SUSTAINABILITY DEVELOPMENT TO INTEGRATION (NESDI) PROGRAM

A WORD FROM THE PROGRAM MANAGER

Welcome to the Fiscal Year (FY) 2007 Year in Review report for the Navy Environmental Sustainability Development to Integration (NESDI) program.

Program Title Change. The first thing you will notice in this report is that the program has undergone a title change. Beginning with the publication of this report, the new title of the program is the "Navy Environmental Sustainability Development to Integration" program (formerly the Pollution Abatement Ashore program). This much needed name change reflects the evolving goals and objectives of the program's sponsor the Chief of Naval Operations Environmental Readiness Division as well as the Naval Facilities Engineering Command's shoreside environmental 6.4 research and development (R&D) program efforts to address Navy ship-to-shore transfers, underwater range and near shore operations, and underwater unexploded ordnance issues.

The Power of Collaboration. The Technology Development Working Group (TDWG) is the program's oversight team that makes sure that we execute effectively, efficiently and collaboratively across System Commands (SYSCOM) and the Navy customers they represent. To better support the Navy's various range sustainment initiatives, Jerry Olen has joined the TDWG. Jerry represents the Space and Naval Warfare Systems Command and expands our ability to support the Navy's range communities. I will continue to add representatives to the TDWG who will further enhance our ability to identify Fleet operational requirements and support the integration of our innovative products into the hands of the Fleet.

Program Success. The success of the NESDI program is predicated on three pivotal actions – requirements collection, project execution and the Fleet integration of products. We continue to enhance the Navy's ability to collect, validate and prioritize requirements by working with and seeking out new partnerships with various Navy Functional Working Groups (FWG), listed later in this report. High priority requirements drive all our of project investments. We will maintain our efforts to execute more and more efficiently. We continue to enhance our website to help us track and document all of our efforts. We also develop the tools and training necessary so that our Principal Investigators are successful in their collaborations with our customers to ensure that our products are ultimately integrated into Fleet operations. We must integrate our products into the Fleet. So our projects are always executed and evaluated with an eye toward integration.

Starting in FY08, our Principal Investigators will utilize the Technology Integration Planning tool designed to ensure that the integration efforts for each project are addressed up front and often. We involve our end users throughout the development process so that technical and performance requirements are met and our end users have the time they need to plan for the proper integration of our products. Twice a year, we evaluate integration milestones for all our projects - before a new project is started (and funding is received) and one year after the completion of the project. This ensures that integration milestones are considered early on in the process, integration efforts are appropriately funded and addressed during the project and that integration results are validated and documented.

Finally, on behalf of the program sponsor, I'd like to thank all of the SYSCOM program participants including all of our TDWG representatives, FWG members, and Principal Investigators, engineers, scientists, and technicians that support the NESDI program. Their dedication and support is crucial to the continued success of the program.

If you would like to participate in the NESDI program, please contact me directly or your TDWG representative, listed on the inside back cover of this report.

I hope the content of this report encourages you to participate in the program in FY08 and for years to come.

Best Regards,

D. Scott Mauro, P.E.

Program Manager

Naval Facilities Engineering Command,
Environmental Shoreside 6.4 R&D (0817)

Navy Environmental Sustainability Development
to Integration Program

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NESDI
NAVY ENVIRONMENTAL SUSTAINABILITY DEVELOPMENT TO INTEGRATION

EXECUTIVE SUMMARY

Milestones achieved in the NESDI program in Fiscal Year (FY) 2007 include continued successful collaborations across the Navy to help manage the program, an expanded needs collection process, consolidation of the program's inventory of historical needs, more involvement from the range and shipyard communities, and electronic execution of the program via the program's enhanced web site.

FY07 also marked a renewed commitment to ensure that program-sponsored products and services were successfully integrated into the hands of its end users – the Fleet.

Accomplishments

Program personnel achieved the following specific objectives in FY07:

1. Continued to Make Investments Based on Fleet Requirements
2. Aligned the Program With the Navy's Strategic Priorities
3. Maintained a Collaborative Management Approach
4. Reached Out to Range & Media-Specific Working Groups
5. Made In-Roads into the Shipyard Environmental Community
6. Included a Range Representative on the TDWG
7. Focused the Program on Technology Integration
8. Moved the Program into the Electronic Age
9. Organized the Program's History of Needs
10. Institutionalized the Program into Command Environmental Programs
11. Conducted Program Reviews to Ensure Successful Project Execution
12. Leveraged Resources & Expertise of Other Technology Demonstration Programs

FY07 marked a renewed commitment to ensure that NESDI-sponsored products and services were successfully integrated into the hands of its end users – the Fleet.

The NESDI program's FY07 needs collection and evaluation processes resulted in 22 high priority needs.

High Priority Fleet Needs

The NESDI program's needs collection and evaluation processes resulted in the following 22 high priority needs:

1. Consider Use of Range Scrap for Construction of Artificial Reefs at Remote Navy Ranges
2. Determine Level of Detonation and Location of Point of Impact of Ordnance on Operational Ranges
3. Develop Checklist for Blow-In-Place Scenarios
4. Make Web Accessible Marine Mammal Scientific Publication and Density Data
5. Conduct Comparative Analysis of Marine Mammal Acoustic Models
6. Eliminate Overspray in Shipbuilding and Facilities Maintenance Operations
7. Assess the Stability of Bio-Based Products Used in Maintenance Operations
8. Develop a Safe, Lithium-ion Battery
9. Develop a Non-Ozone Depleting Substance Alternative for the Fuel Detection Process
10. Develop an Alternative to Wet-Installed Fasteners to Eliminate the Use of Hazardous Sealants

Validating a Shipboard Mobile Surface Cleaning Technology

The NESDI program is sponsoring the validation of a mobile surface cleaning technology for critical cleaning of shipboard non-skid and shoreside surfaces to remove contaminants, mitigate pollution from weather deck and stormwater runoff and reduce associated manpower and waste management burden.

11. Assess the Feasibility of Spill Prevention Detection Equipment
12. Conduct a Preliminary Assessment of Nutrient Assisted Microbial Digestion of Hydrocarbons
13. Evaluate In Situ Toxicity Testing Capability for Improved Risk Assessment
14. Recommend Improvements to Shoreside Oily Waste Treatment System to Address New Contaminants Including Synthetic Lubricants
15. Assess the Feasibility of Converting Organic Wastes into Renewable Fuels
16. Develop Improved Assessment Strategies for Vapor Intrusion
17. Achieve Greenhouse Gas Source Reductions Through Enhanced Utilization of Alternative Fuel and Renewable Energy Products
18. Assess Metals Source Identification and Load Reduction in Stormwater Runoff
19. Assess the Feasibility of Automated Health Assessment of Coral Reefs
20. Validate Technologies for Contaminant Source Tracking
21. Develop an Alternative Tank Emission Calculator
22. Consider a Portable System for Treating Munitions Constituents in Groundwater

Removing Coking from F-404 Drive Shafts

This NESDI project is using Type V Plastic Media Blasting to remove coking from F-404 drive shaft, air duct and damper to replace an arduous process that involved soaking the component parts in solvent and then scraping off the build-up.

Assessing the Environmental Effects of Abandoned Equipment in Navy Ocean Ranges

The NESDI program sponsored this project to alleviate regulatory restrictions and facilitate range operations by providing a database on the potential effects from expendable (non-munitions) equipment.

The NESDI program selected eight new projects for funding in FY08 and beyond.

FY08 Project New Starts

NESDI program management personnel selected the following eight projects for funding in FY08 and beyond:

1. Comparison of Marine Mammal Acoustic Exposure Models
2. Bio-based Metal Working Fluids
3. Aircraft Emissions Particulate Measurement Methodology
4. Application and Analysis for Multi-Lance Subsurface Dredging (MLSSD) in the Department of Defense (DoD)
5. Ballast Water Treatment System
6. Automated Health Assessment of Coral Reefs
7. Metals Removal from Stormwater Using Terpmat
8. Replacement of Naval Flight Line Halon Bottles

The Road Ahead

In FY08, the NESDI program will expand capability in the following areas:

- Expand outreach efforts to the Fleet,
- Assess future environmental risks to the navy's operational and training capability, and
- Concentrate on project completion and integration.

The execution of the NESDI program in FY07 was defined by the following significant efforts and events:

- An expanded needs collection process,
- Consolidation of the program's inventory of historical needs,
- More involvement from the range and shipyard communities,
- Electronic execution of the program via the program's enhanced web site, and
- A renewed commitment to ensure that program-sponsored products and services were successfully integrated into the hands of its end users – the Fleet.

Validating a Low Temperature Powder Coating Process

This NESDI project is validating the performance of a powder coating that can cure at lower temperatures for use on aluminum, magnesium and other temperature sensitive alloys.

The NESDI program is the Navy's environmental 6.4 research and development (R&D) demonstration and validation (dem/val) program, sponsored by the Chief of Naval Operations Environmental Readiness Division (N45) and managed by the Naval Facilities Engineering Command (NAVFAC). The program supports Fleet readiness by minimizing operational risk, constraints, and costs while ensuring shore-based environmental stewardship and regulatory compliance. The program seeks to accomplish this mission through the evaluation of cost-effective technologies, processes, materials, and knowledge enhance environmental readiness of naval shore activities and ensure they can be integrated into weapons system acquisition programs.

Validating Effective Alternative Technologies for Radome Repair

This NESDI project validated the use of epoxy resin as a viable alternative to polyester for radome repair and corn hybrid polymer media for radome paint stripping.

Primary Program Objectives

The NESDI program is focused on three primary objectives:

1. **Collect, Validate & Rank Environmental Research, Development, Test & Evaluation (RDT&E) Needs.** The NESDI program expands awareness of opportunities within the Navy shoreside community to encourage and facilitate the submittal of well-defined environmental needs and requirements.
2. **Resolve High Priority Needs.** The NESDI program seeks to ensure that program investments and the resulting RDT&E projects maintain a direct and consistent link to the defined needs.
3. **Integrate Solutions & Validate Benefits.** The NESDI program also works to maximize the number of program-derived solutions that are successfully integrated into the Fleet and future weapons system acquisitions and verify that the solutions provide the anticipated benefits.

The NESDI program's priority investments ensure that the Navy's ranges are fully available and efficiently utilized.

Priority Investment Areas

The NESDI program makes its primary investments in the following areas and Environmental Enabling Capabilities (EEC):

1. **Range Sustainment.** In the area of range sustainment (EEC-2), the NESDI program invests in innovations that address environmental impacts and restrictions at Navy ranges to ensure that Naval training ranges and munitions testing/manufacturing ranges are fully available and efficiently utilized. An example of a NESDI project in the range sustainment area is the work the program is doing to assess the environmental effects of abandoned equipment in the Navy's ocean ranges.
2. **Ship-to-shore Interface.** In the ship-to-shore interface (EEC-4) arena, the NESDI program seeks to develop innovative techniques to manage ship hazardous material/waste offload to shore facilities. An example project in this EEC area is the development and validation of an in-port ballast water treatment system.
3. **Weapon System Sustainment.** The focus of this thrust area (EEC-3) is on the organizational- and intermediate-level Fleet maintainer with the overall objectives of reducing the cost of compliance and increasing Fleet readiness. Example projects include:
    a. Validating the use of alternative technologies (including corn hybrid polymer) for the effective repair of aircraft radomes, and
    b. Validating the performance of a powder coating that can cure at lower temperatures for use on aluminum, magnesium and other temperature sensitive alloys.

Developing a Comprehensive Environmental Compliance Approach for Cathodic Protection in Caissons & Floating Dry Docks

This project is validating a cathodic protection system to achieve effective corrosion prevention while reducing environmental impacts of caisson and floating dry dock ballast discharges.

4. **Air and Port Operations.** In this area (EEC-4), the NESDI program sponsors projects pertaining to air and port operations that ensure Fleet readiness. Example projects in this EEC area include:

    a. Validating a cathodic protection system to achieve effective corrosion prevention while reducing environmental impacts of caisson and floating dry dock ballast discharges, and

    b. Assessing the feasibility of coatings and other material advancements for permanent oil booms that mitigate biofouling accumulation and enhance compliance through increased reliability, extended life and a reduced maintenance burden.

5. **Regulatory and Base Operations.** In this area (EEC-5), the NESDI program provides cost-effective methods for identifying, analyzing, and managing environmental constraints related to current and projected regulatory impacts. Example projects include:

    a. Establishing guidelines and limitations for the use of biodiesel with ground tactical vehicles and equipment, and

    b. Quantifying Navy contaminant loads by demonstrating and validating contaminant source tracking technologies and developing a technical framework that enables water program managers to attribute existing contamination loads to support their compliance programs.

Continued successful collaborations across the Navy helped to guarantee the ongoing success of the NESDI program in FY07. In particular, the NESDI program:

- Continued to Make Investments Based on Fleet Requirements
- Aligned the Program With the Navy's Strategic Priorities
- Maintained a Collaborative Management Approach
- Reached Out to Range & Media-Specific Working Groups
- Made In-Roads into the Shipyard Environmental Community
- Included a Range Representative on the TDWG
- Focused the Program on Technology Integration
- Moved the Program into the Electronic Age
- Organized the Program's History of Needs
- Institutionalized the Program into Command Environmental Programs
- Conducted Program Reviews to Ensure Successful Project Execution
- Leveraged Resources & Expertise of Other Technology Demonstration Programs

Details about these and other successes of the NESDI program in FY07 follow.

Continued to Make Investments Based on Fleet Requirements

In FY07, the NESDI program continued to base its management decisions and investments on documented Fleet operational requirements.

Through the involvement of various Navy environmental Functional-Working Groups (FWG), the NESDI program enhanced the Navy's capability to better understand and document the environmental risks associated with Fleet operations. In FY07, a total of nine Navy FWGs were involved in identifying, collecting, and ranking Fleet operational needs. FWGs are comprised of Fleet personnel or the representatives that address issues related to a specific area of Fleet operations. The following FWG support is instrumental to the continued success of the NESDI program:

The NESDI program continued to base its management decisions and investments on documented Fleet operational requirements.

Developed a Sustainable Integrated Maintenance Concept Facilities for H-60 Helicopters

This NESDI project is bringing traditional aircraft maintenance to the doorstep of the maintenance artisan under the phased Integrated Maintenance Concept (IMC). By establishing IMCs, the NESDI program is able to maintain aircraft on-site versus flying the aircraft back to off-site maintenance locations.

- Range Sustainment
  - The Range Commanders Council
  - The Range Support Group
  - The Underwater Range Sustainment Group
- Weapons System Sustainment
  - The Navy Aviation Technology Integration Program
  - The Naval Sea System Command's (NAVSEA) Pollution Prevention (P2) Working Group
- Air and Port Operations
  - NAVFAC's Clean Air Act (CAA), Clean Water Act (CWA), and Total Maximum Daily Load (TMDL) Working Groups, the Risk Assessment Working Group (RAW), and the Alternative Restoration Technology Team (ARTT).
- Base and Regulatory Compliance
  - NAVFAC's CAA, CWA, and Safe Drinking Water Act (SDWA) Working Groups, the Petroleum, Oil and Other Hazardous Substances Working Group, the RAW and the ARTT.

Aligned the Program with the Navy's Strategic Priorities

The Secretary of Defense has directed the military services to develop transformational strategies that will greatly expand U.S. options available to Command Authority across the full spectrum of warfare. The Naval Operational Concept (NOC), "Naval Power 21" (NP21) provides the transformational vision for the Navy and Marine Corps. Sea Power 21 is the Navy's transformational document, and is based on four Naval Capability Pillars (NCP): SEA SHIELD, SEA STRIKE, SEA BASING and FORCEnet and the supporting initiatives of SEA WARRIOR, SEA TRIAL and SEA ENTERPRISE.

Five Navy environmental RDT&E EECs are required to meet the objectives of Sea Power 21. The NESDI program makes investments in four of the five EEC areas.

By linking the needs collected from the Fleet community to operational requirements, the NESDI program ensures that the program's priorities stay in alignment with the Navy's strategic objectives.

The NESDI program is aligned with the Navy's strategic priorities.

Maintained a Collaborative Management Approach

The management philosophy adopted by the NESDI program manager and the program's Technology Development Working Group (TDWG) is characterized by the following statements. The NESDI program encourages:

- Collaboration among program personnel, its Principal Investigators, customers, and the Fleet,
- Engagement with other potential customers in communities outside of the traditional audience for the program,
- Leveraging of personnel and financial resources of other R&D programs,
- An open door that welcomes to the table everyone with a potential interest, and
- The free flow of information among participants.

In FY07 as in previous years, the NESDI program tapped the requisite expertise from each SYSCOM to ensure balanced participation and a more direct connection to the Fleet through each individual SYSCOM representative. The TDWG has representatives from Navy SYSCOMs including the Naval Air Systems Command (NAVAIR), the Naval Sea Systems Command (NAVSEA), NAVFAC, and the Space and Naval Warfare Systems Command (SPAWAR). The success of this approach, supported and embraced by each SYSCOM, is demonstrated by the following accomplishments:

- The TDWG collected and reviewed 67 responses to the program's FY07 needs solicitation and developed a list of 22 highly ranked needs.
- The TDWG reviewed 27 pre-proposals and 23 proposals for funding consideration. These reviews ensured that proposed projects would successfully achieve technology integration.
- The TDWG selected eight FY08 project new starts that best met the collective needs of the program. (See table on the next page.)

Proposed FY08 Project New Starts

The review and ranking of proposals received for consideration by the NESDI program in FY07 resulted in the following eight proposed new projects for initiation in FY08:

No.	Title	Investment Area	Proposed Solution
1.	Comparison of Marine Mammal Acoustic Exposure Models	Range Sustainment (EEC-2)	This project will characterize and assess selected statistical marine mammal acoustic exposure models to define similarities and differences within the models, determine how their use might affect the predicted results, and generate documentation to promote the awareness of the capabilities of the selected models.
2.	Bio-based Metal Working Fluids	Weapon System Sustainment (EEC-3)	This effort will develop and evaluate specifications for bio-based metal working fluids and will focus on bridging the gap in specifications required for evaluating the suitability of bio-based metal working fluids. New specifications must be developed to ensure that use of these products does not result in adverse affects to system components.
3.	Aircraft Emissions Particulate Measurement Methodology	Air and Port Operations (EEC-4)	This project seeks to develop a standard methodology to guide the proper usage of particulate matter measuring equipment. This methodology will address the proper capturing of a sample, the design of the sampling probe, the proper dilution of the sample, and sampling line loss of particulates among other factors.
4.	Application and Analysis for Multi-Lance Subsurface Dredging (MLSSD) in the DoD	Air and Port Operations (EEC-4)	This effort will inventory current and upcoming Navy dredge projects and develop a scoring system for appropriateness for using the MLSSD technique. Cost savings of the MLSSD method compared to traditional methods will be determined for selected sites. Feasibility metrics will include technical, environmental, regulatory and cost requirements of sediment disposal using current practices compared to the MLSSD approach to provide an estimate of applicability and cost savings to the Navy.
5.	Ballast Water Treatment System	Air and Port Operations (EEC-4)	This project will develop and evaluate a shoreside ballast tank test facility that will be used to evaluate treatment technologies, assess treatment effectiveness, follow the fate of introduced (non-indigenous) organisms under controlled conditions, and observe biofilm development, maturation, and organism shedding in ballast water tanks.

No.	Title	Investment Area	Proposed Solution
6.	Automated Health Assessment of Coral Reefs	Regulatory and Base Operations (EEC-5)	This project seeks to utilize solar-powered radiometers to measure in-situ water column sediment load, phytoplankton biomass, and natural zooxanthellae fluorescence and telemeter data ashore. This effort will consist of optimization to achieve the ability to assess and monitor the health of a coral reef, to develop a self-cleaning capability for the instrumentation sensing windows and to develop a solar power/radio frequency data transmission capability. This effort will also seek to optimize the logistics of deployment including a suitable anchoring system.
7.	Metals Removal from Stormwater Using Terpmat	Regulatory and Base Operations (EEC-5)	This effort will identify state-of-the-art and emerging Best Management Practices (BMP) and technologies for reducing pollutants in stormwater runoff from naval shore activities. New technologies that would require demonstration and validation will be identified. This effort will also demonstrate a novel technology for removing pollutants from stormwater and evaluate the suitability of using a linear pollutant removal system that utilizes natural environmental processes and material as the foundation of the treatment. This project will also evaluate different growth media and vegetation combinations to determine the optimal combination for selected pollutant parameters; the removal efficiency of selected pollutant parameters and optimal operating parameters. This project will also collect data for validation of a stormwater treatment unit designed for removing pollutants from runoff of industrial facility roofs.
8.	Replacement of Naval Flight Line Halon Bottles	Regulatory and Base Operations (EEC-5)	This project seeks to ensure that an alternative agent used with existing 150-pound flightline Halon 1211 portable hardware has been explored prior to proceeding with a more costly purchase of new delivery hardware, and characterize acid gas generation from potential new agents to ensure that personnel safety and corrosivity issues have been addressed prior to acquisition.

The NESDI program met with shipyard water program managers to discuss the ongoing challenges associated with their efforts to manage stormwater runoff.

Reached Out to Range & Media-Specific Working Groups

In FY07, the NESDI program dedicated more time and energy reaching out to a number of different FWGs that represent the various environmental subject matter experts across the Navy. Through these interactions, the program gains insights into the operation of the Navy's ranges, their outstanding challenges, and solutions the NESDI program may provide to address those challenges. These working groups include the Range Commanders Council, the Underwater Range Support Group and other working groups with related mandates.

In addition, the NESDI program continued to tap the expertise assembled in the various Media Field Teams. These subject matter experts are in touch with the challenges being faced by the various media program managers across the Navy including air, water, and other media-based programs. Over the course of FY07, more and more members of the various Media Field Teams have been involved in the NESDI program as they have helped to expand the submittal of needs from across the Fleet. A representative from the water Media Field Team also helped to clarify a particular need regarding stormwater management priorities and leverage some existing work already underway by the NESDI program. In addition, various Media Field Teams provide their informed perspectives on the approaches contained in proposals received by the NESDI program. In particular, one Media Field Team suggested an alternative more practical approach to stormwater treatment that focused on a technical approach that is characterized by low-cost, low-maintenance, low-volume, with multiple treatment stations rather than a single, large facility with a larger treatment capability.

FY07 provided a new foundation upon which to build the NESDI program's relationship with the Media Field Teams and range working groups. More and more, these and other working groups are recognizing the NESDI program as a great resource for executing the R&D projects important to their communities.

Made In-Roads into the Shipyard Environmental Community

To delve deeper into the NAVSEA community, in July 2007 the NESDI program sponsored a two-day meeting of water program managers from the following Navy shipyards:

- Portsmouth Naval Shipyard,
- Puget Sound Naval Shipyard,
- Pearl Harbor Naval Shipyard, and
- Norfolk Naval Shipyard.

The water program managers from the individual naval shipyards as well as a representative from NAVSEA Headquarters were assembled by the NESDI program to discuss the ongoing challenges associated with their efforts to manage stormwater runoff at their various facilities. As a result

Plastic Waste Shoreside Disposal & Recycling

This NESDI project will promote the cost effective and mission compliant recycling of ship plastic waste processor disks to mitigate shoreside management and landfill disposal burden.

of this workshop, personnel from the Naval Surface Warfare Center Carderock, MD are drafting an Initiation Decision Report to document these stormwater management challenges and propose research and development efforts that the NESDI program could sponsor to meet those challenges.

Included a Range Representative on the TDWG

To provide additional insights into the operation and outstanding needs of the Navy's operational and training ranges, Jerry Olen from SPAWAR Headquarters was added as a member of the TDWG. Range sustainment is the number one investment priority for the NESDI program and its resource sponsor – N45. Based on these priorities, the NESDI program manager tapped Olen to provide the help needed to identify and execute R&D projects and implement the resultant technologies that meet the needs of the managers of the Navy's operational and training ranges.

Technology integration is the ultimate focus of the NESDI program.

Focused the Program on Technology Integration

As in previous years, technology integration is the ultimate focus of the NESDI program. Technology integration means making sure that technologies and other products and services developed by the NESDI program are eventually incorporated into the day-to-day operations of the Fleet. To promote this focus on technology integration, the NESDI program has developed and promulgated the following requirements as part of its technology integration philosophy. A NESDI-sponsored project is successfully integrated once the following requirements have been met:

- The technology has been validated by the user community.
- Funding has been planned for and is in place for the integration.
- The technology has been accepted by the stakeholders.
- Customer satisfaction has been assessed and documented.
- A marketing strategy is in place.
- An implementation plan and schedule are in place.
- Sufficient support infrastructure is in place.
- A training plan has been developed and Fleet personnel have been trained on the use of the new technology.
- The use of the technology has been implemented (regardless of pathway).
- An acquisition agent has been identified and funding secured.
- Commercialization is available (if no acquisition agent exists).
- A formal change has been recognized by the SYSCOMs and the Fleet.
- The former technology has been replaced or eliminated.
- Benefit metrics have been re-assessed and validated.
- The technology has been made available through the supply/procurement system.

These requirements have been posted on the program's web site and communicated with program personnel including Principal Investigators and other personnel charged with technology integration mandates.

Although the NESDI program has established viable technology requirements, metrics, execution mechanisms and a culture that values and promotes technology integration, it will take additional efforts to assess and promote the positive impact that the integration of program-sponsored projects with have on Fleet operations. It will also take more time to accumulate the data needed to access the extent to which program-sponsored projects are penetrating and benefiting the Fleet.

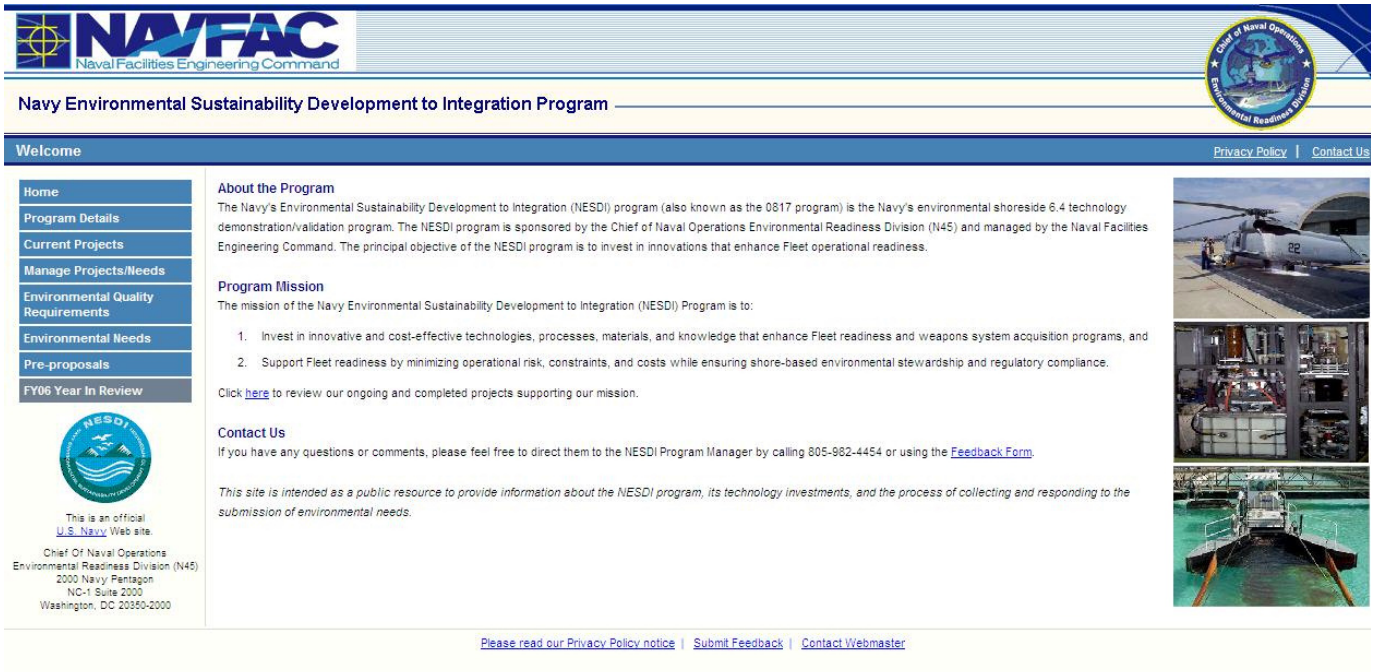
In addition to establishing a culture that promotes technology integration, the program has also:

- Constructed the Technology Integration Planning tool to guide project managers through the technology integration process,
- Required Principal Investigators to document their technology integration efforts in their semiannual briefs to the program manager, and
- Assigned technology integration experts to all NESDI projects to better ensure that integration will occur.

Moved the Program into the Electronic Age

By the end of FY07, a critical amount of the NESDI program was executed electronically via the program's web site. After unveiling the program's consolidated web site in FY06, program personnel developed the additional functions required to support the execution of the program throughout FY07. The program web site (www.nesdi.navy.mil) now provides a single, centralized repository for information pertaining to the management of the program and execution of program-sponsored projects. It's simple and efficient and provides anyone with quick "Get in, get out!" access to program resources and information.

In FY07, a critical amount of the NESDI program was executed electronically via the program's web site.



This enhanced web site promotes more efficient management of program information and more timely communication of critical deadlines and other information to key program personnel across the Navy.

In particular, the following tasks are managed via the enhanced program web site:

- The NESDI program manager developed, documented, and promulgated the annual program schedule a year in advance.
- Fleet personnel submitted their needs on the same schedule using the same template following the same process. (In addition to the submittal of needs via the program's web site, an advertisement was published in *Currents* magazine and email messages sent to alert program personnel to the needs collection process and schedule.)
- The TDWG evaluated and ranked Fleet needs.
- Personnel submitted their preliminary project proposals following the same format and adhering to the same schedule.
- The TDWG evaluated and ranked the preliminary project proposals.
- Personnel submitted their full proposals.
- The TDWG evaluated and ranked full project proposals.

As a result of the review of its historical inventory of Navy needs, over 400 needs were consolidated to a set of just under 200.

The web site allows all participating personnel to understand, well in advance, the schedule by which they can participate in the program. Posting project information on the web site also allows personnel from other R&D programs to have up-to-date insights into the NESDI program's priorities.

In addition to these tasks, the NESDI program web site is now used to archive program documentation.

Finally, in FY07, the NESDI program's website was designated as an official U.S. Navy web site. As the web site for a program of record, it was registered and approved by the DoD Network Information Center under the domain name www.nesdi.navy.mil. The website is also registered with the Navy's Functional Area Management team as an approved application within the Navy's Information Technology portfolio for logistics.

Organized the Program's History of Needs

FY07 provided an opportunity for the NESDI program manager and members of the program's TDWG to review the inventory of needs collected by the program over the past several years. In addition to executing the program's standard needs collection process in FY07, program personnel also reviewed, addressed, consolidated and otherwise updated the inventory of historical program needs. As a result of this effort, over 400 needs were consolidated to a set of just under 200. This effort allowed program personnel to better understand the relevancy of those historical

needs in today's environment and better integrate a historical perspective into the ongoing operation of the program. The NESDI program and its customers now benefit from a clearer, more concise representation of outstanding Fleet needs.

Institutionalized the Program into Command Environmental Programs

Through their TDWG representatives, SYSCOM personnel are becoming increasingly aware of the NESDI program as another capability they can draw on to effectively manage their programs. The NESDI program has developed a solid infrastructure to inform managers from across the Navy of the program's role within the Navy's environmental program. Environmental program managers are more aware than ever of how they can participate in and benefit from the NESDI program. The result is the ability of the Fleet to understand how the NESDI program operates and how to efficiently submit requirements, recommend preferred solution approaches, track project status and support the program's integration efforts. This guarantees that the innovative products developed under NESDI program sponsorship are effectively delivered to the Fleet.

Assessing the Long Term Disposition of Navy Seafloor Cables

This NESDI project is determining and quantifying seafloor cable chemical constituents that may pose adverse impacts in a marine environment.

Conducted Program Reviews to Ensure Successful Project Execution

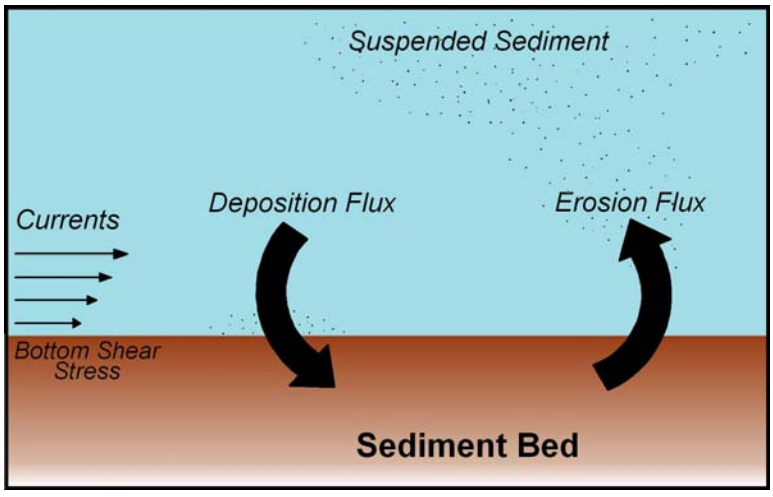
During FY07, the NESDI program conducted three interim program reviews to ensure that funded projects remained focused on the Fleet-driven need and will successfully result in a technology of value to the Fleet. In a number of instances, Principal Investigators directly involves the user community in the execution of their projects, including:

- *Sediment Transport Users Guide*. This NESDI project resulted in the publication of practical user's guide that provides Navy Remedial Project Managers (RPM) and their technical support staff practical guidance on evaluating sediment transport at contaminated sediment sites.
- *Disinfection Byproducts Users Guide*. This NESDI project resulted in the publication of The Potable Water Quality Management Guidance Document which provides Navy drinking water program managers with the direction and information for meeting compliance goals contained in the new disinfection byproducts rules.
- *Environmental Effects of Underwater Unexploded Ordnance*. This set of NESDI projects resulted in several peer reviewed publications which provide scientifically sound data available to RPMs to support informed decision making at underwater munitions response sites. These data include:
  - Dissolution rates of TNT (2,4,6-trinitrotoluene), Royal Demolition eXplosive (RDX (or 1,3,5-trinitro-1,3,5-triazine)), and High melting eXplosive (HMX (or octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)),
  - Transformation rates of TNT, RDX, HMX and some of their degradation products, and
  - Adsorption coefficients of TNT, RDX, and HMX.

  Toxicity and bioaccumulation data were also generated for fish, amphipods and bivalves.

Developed Sediment Transport Tools to Evaluate the Physical Stability & Natural Recovery Potential

This project resulted in the publication and web-posting of a Sediment Transport User's Guide that provides Remedial Project Managers with practical guidance for evaluating the transport of sediments at contaminated sites to achieve successful, cost-effective remedial decisions.



High Priority Fleet Needs

The NESDI program's needs collection and ranking process in FY07 resulted in the following 22 highly-ranked needs:

Investment Area	No.	Need
Range Sustainment (EEC-2)	1.	Consider Use of Range Scrap for Construction of Artificial Reefs at Remote Navy Ranges
	2.	Determine Level of Detonation and Location of Point of Impact of Ordnance on Operational Ranges
	3.	Develop Checklist for Blow-In-Place Scenarios
	4.	Make Web Accessible Marine Mammal Scientific Publication and Density Data
	5.	Conduct Comparative Analysis of Marine Mammal Acoustic Models
Weapon System Sustainment (EEC-3)	6.	Eliminate Overspray in Shipbuilding and Facilities Maintenance Operations
	7.	Assess the Stability of Bio-Based Products Used in Maintenance Operations
	8.	Develop a Safe, Lithium-ion Battery
	9.	Develop a Non-Ozone Depleting Substance Alternative for the Fuel Detection Process
	10.	Develop an Alternative to Wet-Installed Fasteners to Eliminate the Use of Hazardous Sealants
Air and Port Operations (EEC-4)	11.	Assess the Feasibility of Spill Prevention Detection Equipment
Ship-to-Shore Interface (EEC-4)	12.	Conduct a Preliminary Assessment of Nutrient Assisted Microbial Digestion of Hydrocarbons
Regulatory and Base Operations (EEC-5)	13.	Evaluate In Situ Toxicity Testing Capability for Improved Risk Assessment
	14.	Recommend Improvements to Shoreside Oily Waste Treatment System to Address New Contaminants Including Synthetic Lubricants
	15.	Assess the Feasibility of Converting Organic Wastes into Renewable Fuels
	16.	Develop Improved Assessment Strategies for Vapor Intrusion
	17.	Achieve Greenhouse Gas Source Reductions Through Enhanced Utilization of Alternative Fuel and Renewable Energy Products
	18.	Assess Metals Source Identification and Load Reduction in Stormwater Runoff
	19.	Assess the Feasibility of Automated Health Assessment of Coral Reefs
	20.	Validate Technologies for Contaminant Source Tracking
	21.	Develop an Alternative Tank Emission Calculator
	22.	Consider a Portable System for Treating Munitions Constituents in Groundwater

Collaborations with other environmental dem/val programs help to ensure the success of the NESDI program's own projects.

Leveraged Resources & Expertise of Other Technology Demonstration Programs

In FY07, the NESDI program continued to build on successful partnerships with other environmental 6.4 programs to leverage resources and expertise. These dem/val projects having joint service application initiated by the NESDI program are forwarded to the Strategic Environmental Research and Development Program (SERDP), the Environmental Security Technology Certification Program (ESTCP), and the Joint Group on Pollution Prevention (JG-PP). This ensures that each Service has identified the technical criteria of the solution and will be evaluated during the project. The intended result is to eliminate duplication of effort and maximize the integration of technologies across the Services.

Collaborations with these other programs help to support the ongoing success of a number of the NESDI program's own projects. For example, the following NESDI projects have leveraged ESTCP funds to expand the reach of their resultant technologies outside of the Navy community:

- Demonstrating that avian radar systems can provide natural resources managers and airport aviation safety personnel with improved tools for automatically monitoring the abundance and behavior of resident and migratory birds in and around military airfields and ranges,
- Assessing the feasibility of using biodiesel in tactical vehicles to include other vehicles across DoD, and
- Developing improved BMPs for the effective management of stormwater run-off.

Establish Guidelines & Limitations for the Use of Biodiesel with Ground Tactical Vehicles & Equipment

This NESDI project will maximize the use of biodiesel fuels in tactical vehicles and equipment.

The NESDI program assesses its progress using performance metrics in the following three areas:

1. **Project Execution.** These metrics capture the degree to which the NESDI program effectively executes individual projects.
    a. **Fleet Needs:** The number of needs collected from the Fleet each year. [In FY07, 67 needs from Fleet operational personnel and acquisition community members were collected.]
    b. **Address High Priority Needs:** The number of needs ranked as "high priority" by program personnel each year. [In FY07, the program identified 22 high priority Fleet operational needs. The FY08 project new starts address these high priority needs.]
    c. **Performance-Based Evaluation:** Each project is evaluated based on cost, schedule and performance to determine how efficiently individual projects are executed. Projects are adjusted based on regular evaluations conducted by program personnel. [The NESDI program sponsored three semi-annual program reviews in FY07 to reevaluate project cost, schedule and performance objectives.]

2. **Technology Integration.** This metric deals with the program's ability to effectively integrate technologies into Navy operations. Project buy-in is obtained from end users, approval authorities and procurement stakeholders prior to project funding. Integration objectives are reviewed and approved by the TDWG at the onset of each project (a "go/no-go" decision). No project is funded until objectives are approved. Integration objectives and accomplishments were reviewed semi-annually. Products integrated are evaluated again after one year to:
    a. Ensure that goals are met,
    b. Address unanticipated barriers, and
    c. Update associated Return on Investment (ROI)/cost avoidance numbers.

In FY07, the NESDI program collected 67 needs from Fleet operational personnel and acquisition community members.

The NESDI program prioritizes its investments in various EECs based on their potential risk to the Navy mission.

3. **Cost/Environmental/Operational Benefit.** These metrics pertain to the benefit achieved by the Navy through the integration of innovative products and services and fall into three categories:
    a. Cost avoidance,
    b. Meet current and future regulatory compliance status, and
    c. Increased Fleet readiness. In this area, the NESDI program is tracking the following indicators:
        -User ROI/cost avoidance (greater than 2.5),
        -Quantify environmental benefits,
        -Reduced emissions and/or waste generated,
        -Reduced environmental liability,
        -Informed decision-making,
        -Reduced worker exposure,
        -Reduced cost of compliance,
        -Reduced Notice of Violations,
        -Quantify operational readiness benefits,
        -Reduced operation & maintenance costs,
        -Reduced maintenance time,
        -Reduced turn around time, and
        -Program management costs (5 percent).

Developed a Shipboard Acid Waste Treatment Technology

Through this project, the NESDI program developed a pier-side heavy metal removal process that meets local sanitary sewer discharge limits. This reclamation system separates marine fouling and heavy metal sludge from ship waste water and enables the water to be reused.

The NESDI program has prioritized investments in various EECs based on their potential risk to the Navy mission. The NESDI program has aligned its investment portfolio based on priority, urgency and operational requirement. The table below highlights the approximate breakdown of program investments by EEC.

EEC	Name	FY07	FY08 (Projected)
EEC-1	Evaluate & Minimize Environmental Constraints on Platform Operation and Force Projection	0.00	0.00
EEC-2	Maximize Training & Testing Requirements Within Environmental Constraints	1.35	1.48
EEC-3	Platform Repair & Maintenance with Minimal Environmental Impact	2.03	2.41
EEC-4	Support Shore Readiness within Environmental Constraints	1.85	2.45
EEC-5	Cost-Effective Management of Environmental Regulatory Requirements	2.14	1.65

in millions of dollars

Optimizing the Anodizing Process

This NESDI project will incorporate technologies to optimize the application of anodized coatings thereby reducing labor and waste.

In FY08, the NESDI program will concentrate its resources and personnel in the following areas:

1. *Expand Outreach Efforts to the Fleet.* In FY08, the NESDI program will increase its outreach efforts to the Fleet to:
    a. Coordinate the collection of requirements especially those requirements that pertain to the ongoing successful management of the Navy's operational and training ranges.
    b. Support the integration of the program's innovative technologies into the hands of Fleet artisans.
    c. Incorporate perspectives from Fleet users into the planning and execution of individual NESDI projects to ensure a more complete integration of those projects.

Many of these objectives will be accomplished by adding a Fleet representative to the program's TDWG.

2. *Assess Future Environmental Risks to the Navy's Operational and Training Capability.* In FY08, the NESDI program will dedicate significant resources to identify and assess the potential impacts of future environmental requirements on the Navy's operational and training ranges.

3. *Concentrate on Project Completion and Integration.* In FY08, the NESDI program will:
    a. Incorporate a more regimented process to ensure that projects are completed in a timely fashion and within designated budgets.
    b. Conduct the financial analyses necessary to obtain a better sense of the return that the program is achieving on its investments.
    c. Better understand the potential and realized benefits of program-sponsored projects.
    d. Dedicate the resources required to ensure that projects are successfully integrated.
    e. Enhance the program's various planning, execution and reporting functions to guarantee a better return on program investments.

In FY08, the NESDI program will expand its outreach efforts to the Fleet.

WHAT	OCT-07	NOV-07	DEC-07	JAN-08	FEB-08
Announce Solicitation for Needs	**15 Oct**				
Review New Starts		**6 Nov**			
Make Go/No-Go Decisions				**16 Jan**	
Complete Needs Collection Process				**18 Jan**	
Evaluate Needs					**4-8 Feb**
Manage ESTCP One-Pagers					**15-28 Feb**
Request Pre-proposals					
Close Pre-proposal Collection					
Collect Comments on Pre-proposals					
Evaluate Pre-proposals					
Request Full Proposals					
Collect Full Proposals					
Comment on Full Proposals					
Evaluate Full Proposals					
Announce Program New Starts					
Semi-Annual Status Reports	**15 Oct**	**REVIEW: 5 Nov**			
Interim Project Reviews					

FY08 SCHEDULE

MAR-08	APR-08	MAY-08	JUNE-08	JULY-08	AUG-08	SEPT-08
3 Mar						
	14 Apr					
		12 May				
		19-23 May				
		27 May				
				11 July		
					5 Aug	
					11-15 Aug	
						17 Sept
	14 Apr		REVIEW at IPR	REVIEW at IPR	REVIEW at IPR	
			IPR West: 9-13 June	IPR East: 28 July - 1 Aug	Range IPR: 27 Aug	

FOR MORE INFORMATION

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An electronic copy (pdf) of this and previous Year in Review reports are available for download from the NESDI program web site at www.nesdi.navy.mil.