

SUMMER 2011

# NESDI NEWS

*Highlights & Happenings*



## *Welcome*

This quarterly update provides a glimpse into program operations, significant accomplishments, and future focus areas for the Navy Environmental Sustainability Development to Integration (NESDI) program.

We hope you will find these insights useful and that they encourage you to participate (or increase your involvement) in the program over the coming months.



The NESDI Program: Integrating  
Green Technologies Into the Fleet



## From the Program Manager's Desk



### **Welcome to the Summer 2011 issue of *NESDI News: Highlights & Happenings*—another milestone for the program and part of our ongoing effort to keep you informed.**

As you may know, we hold two In-Progress Reviews (IPR) each year—one on the west coast and a second on the east coast. We have just completed our IPRs for this year and they were both very successful. I want to thank everyone who helped us prepare for those reviews and our Principal Investigators who did a great job of presenting the progress of their individual projects. I also noticed a dramatic increase in participation from the targeted customers for our various projects. Our projects only have value if our customers endorse their development and support the integration of those products into the daily operations of the fleet. So I want to thank all of our customers for taking the time to participate in our IPRs this year.

Recently, we have made great strides in trying to quantify the benefits of our various projects using our on-line Technology Integration Cost Analysis (TICA) tool. TICA output will be instrumental in helping us communicate the value of our program investments to our resource sponsor and future customers.

### **Who We Are**

The NESDI program is the Navy's environmental research and development demonstration and validation (6.4) program, sponsored by the Chief of Naval Operations Energy Environmental Readiness Division (N45) and managed by the Naval Facilities Engineering Command.

The mission of the program is to provide solutions by demonstrating, validating and integrating innovative technologies, processes, materials, and filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Fleet readiness.

The next significant milestone on the NESDI program schedule is the opening of our needs solicitation process for Fiscal Year 2012. Although you can submit a need at any time, our formal needs collection process runs from the beginning of July through the end of August each year. (See our Program Schedule on page 7 of this issue of *NESDI News* for more insights.)

For the NESDI program, a “need” defines a requirement to eliminate or reduce an environmental constraint that:

1. Addresses a Fleet operational challenge
2. Identifies an existing gap in knowledge, technology, and/or capability
3. Is associated with an environmental constraint or regulatory driver

Needs are the fundamental basis of the NESDI program as all of our technology investments are based on recommended solutions to the need.

When submitting a need, I encourage you to provide as much information as you can about your problem. What is the problem? How big is it? What's the basis of the problem? Is it due to a current or impending regulatory requirement that now makes your job more difficult? Is it a technology gap? Is it a fleet operational challenge? Is the problem unique to your facility or is it applicable across the Navy? For more information about submitting a need, read the “Using Our Web Site” section on page 7 of this issue of *NESDI News* and visit our web site at [www.nesdi.navy.mil](http://www.nesdi.navy.mil) or contact your Technology Development Working Group (TDWG) representative.

Leslie Karr, P.E.  
NESDI Program Manager



## Assessing the Extent, Diversity & Impact of Laser System Use

The NESDI program recently published a technical report titled, *Laser System Usage in the Marine Environment: Applications and Environmental Considerations*, which provides a comprehensive picture of the extent and diversity of lasers system usage within the Navy. The report also outlines a scientifically defensible assessment pathway which can be used to evaluate potential laser impacts on the marine biological community.

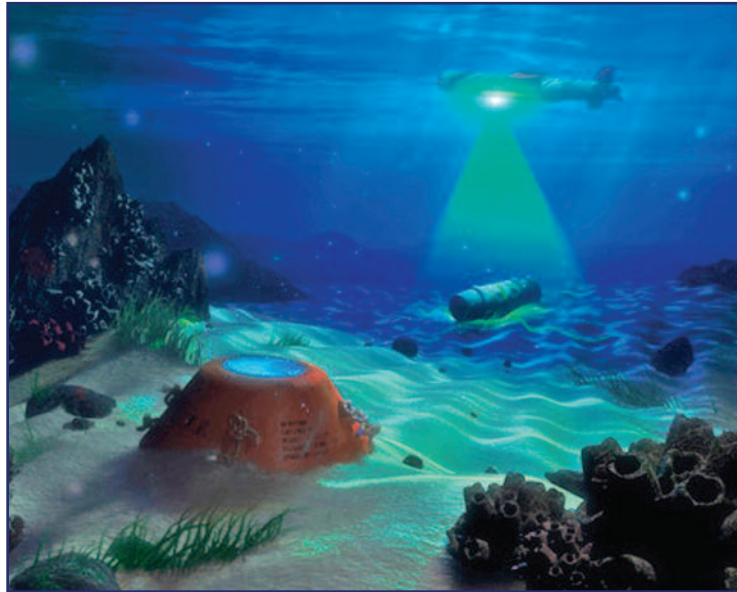
The Navy currently uses, and is continuing to develop, laser technology for use in the marine environment. Numerous laser systems are used for various communication, surveillance, and mine detection applications.

In an effort to quantify and qualify laser usage in the marine environment, the NESDI program sponsored a one-year initial study to determine the extent of underwater laser usage and to outline a means to assess its environmental impact.

The project team's first step was to define which laser systems are being used, in what types of environments, and to what extent. This was accomplished by querying personnel within different functional groups including regulatory and environmental planning offices, mine detection programs, and other research and development entities.

Based on the laser systems identified in the first task, a list of biological communities that may be impacted was defined. Those primary biological groups included marine mammals, sea turtles, planktonic and benthic communities.

Next, an assessment pathway was developed to evaluate potential risks within each community. Literature was reviewed for species/group-specific information related to laser exposure, potential damage thresholds and expected impacts. The information was then synthesized to assess impact potential from the various laser systems to each biological group.



This study assessed the extent and diversity of the laser-based systems being used in an underwater environment which may have an effect on the biological community and marine life.

Finally, the information gathered was summarized into a technical report that is available on-line at the Joint Services Pollution Prevention and Sustainability Technical Library and on N45's Environmental Planning Library.

As new technologies are transferred to the fleet through the acquisitions process it is necessary to identify and mitigate environmental, safety, and occupational health (ESOH) risks associated with the emerging systems.

ESOH risks need to be addressed in compliance documentation related to Programmatic Environment, Safety and Occupational Health Evaluations in the acquisition process, and National Environmental Policy Act compliance, which includes preparing Environmental Impact Statements (EIS) for proposed Navy actions. For example, current and future training exercises identified in draft EISs for the southern California and Hawaii range complexes utilize

an Airborne Laser Mine Detection System which employs a form of laser technology known as Light Detection and Ranging (LiDAR). Currently, EISs use general information to assess the risk of LiDAR in the marine environment. For future EIS documents, scientifically defensible technical data are needed to develop Navy-wide environmental policies for laser activity in marine environments.

The culmination of this work will provide Navy environmental planning offices with the tools necessary to technically defend the use of lasers in the marine environment. The project will provide consistent citable data and strengthen overall documentation preparation, which will, in turn, help to safeguard the process of new and emerging technology transfer to the fleet as it pertains to communication and surveillance capabilities and integration into operational systems.

**For more information about this project, contact Brandon Swope at [brandon.swope@navy.mil](mailto:brandon.swope@navy.mil). Brandon is profiled in this issue of NESDI News.**

**The NESDI program is always looking for demonstration sites for our ongoing projects and sites where we can implement our finished products. Contact the NESDI Program Manager or your TDWG representative if you think your installation might benefit from one of the NESDI program's demonstrated technologies.**



## Regulatory Corner

### Minimizing Use of Hexavalent Chromium

**Environmental drivers, including regulations, directives and Presidential Executive Orders, provide the primary force behind the NESDI program. In this section we highlight changes to the regulatory landscape that may have an impact on the environmental research and development community.**

DoD is issuing a final rule amending the Defense Federal Acquisition Regulation Supplement (DFARS)—Case 2009-D004 (dated 05-May-2011)—to implement requirements for minimizing the use of materials containing hexavalent chromium in items acquired by DoD.

Hexavalent chromium is a chemical that has been used in numerous DoD weapons systems and platforms due to its corrosion protection properties. However, hexavalent chromium is a known carcinogen. The DoD rule prohibits the delivery of items containing more than 0.1 percent by weight hexavalent chromium in any homogeneous material under DoD contracts unless there is no acceptable alternative to the use of hexavalent chromium.

On 8 April 2009, a Deputy Undersecretary of Defense (DUSD) memo entitled “Minimizing the Use of Hexavalent Chromium,” specifies

that if hexavalent chromium is to be used on a new system or for operations and support of existing systems, then the Program Executive Office (PEO) or equivalent level, in coordination with the military department’s Corrosion Control and Prevention Executive are the authority level required to certify that there are no acceptable alternatives to hexavalent chromium.

This DFARS case and the DUSD memo create a driver to exhaustively try to identify substitutes for hexavalent chrome paints, plating, and any other hexavalent chrome applications, and in the event that suitable substitutes are not found, PEOs or their equivalent will be required to document the effort sufficiently to satisfy the process for certifying that no substitutes are currently available.

*For more information about this final rule, visit <http://www.gpo.gov/fdsys/pkg/FR-2011-05-05/html/2011-10882.htm>.*

#### **Advanced Anodizing Using Process Control Technology (project #330).**

The NESDI program evaluated the use of a non-hexavalent chrome post sealer on component parts (like the one shown here) as a potential replacement to existing dichromate sealers.



**Look in this section of NESDI News to see where the results of NESDI-sponsored research are appearing in print and on-line publications and at major conferences.**

The NESDI program has already taken steps to minimize the use of hexavalent chromium in the operation and maintain of naval aircraft. The program is sponsoring a few projects where the primary objective is to reduce the use of hexavalent chrome including:

- **Advanced Non-Chromate Primers & Coatings (project #458).**  
This project is looking for a non-chromate coating system that will receive approval for use by the Naval Air Systems Command (NAVAIR).
- **Navy Demonstration of Cadmium and Hexavalent Chromium Free Electrical Connectors (project #451).**  
This NESDI project will perform field testing of new protective finishes that do not contain cadmium or hexavalent chromium for use on military electrical connectors.
- **Nanocrystalline Cobalt Phosphorous (nCoP) Electroplating as a Hard Chrome Alternative (project #348).**  
This NESDI project will validate nCoP alloy electroplating as a drop-in replacement for hard chromium plating. The project will evaluate both Line-of-Sight as well as Non-Line-of-Sight applications and identify Navy requirements in support of acquisition systems integration.

*The Naval Facilities Engineering Service Center provides a free weekly Federal Regulatory Summary that DoD personnel or contractors supporting DoD may receive by e-mail. To subscribe or unsubscribe, contact [NFESRegulatorySupportDesk@navy.mil](mailto:NFESRegulatorySupportDesk@navy.mil) or 805-982-2640.*

The NESDI program is also sponsoring some projects where the hexavalent chrome reduction is either an indirect or secondary objective including:

- **Cadmium Tank Electroplating Alternative (project #450).**  
As a secondary objective, this NESDI project is demonstrating trivalent chrome post treatment as an alternative to conventional hexavalent post treatments on the alkaline Zinc-Nickel deposit.
- **Low Temperature Powder Coating (project #349).**  
This NESDI project is demonstrating the use of a low temperature powder coating that could be used on aluminum substrates.
- **Advanced Anodizing Using Process Control Technology (project #330).**  
The secondary objective of this NESDI project is to evaluate the use of a non-hexavalent chrome post sealer as a potential replacement for existing dichromate sealers.

**Some completed NESDI projects have also addressed hexavalent chrome reduction including:**

- **Cold Galvanized Coating Systems for Repair Applications (project #389).**  
This project studied field repair of cadmium where chrome primer was used.
- **High-Velocity Oxygen Fuel (HVOF) Thermal Spray as an Alternative to Chromium (projects #377 and #318).**  
These projects studied HVOF thermal spray as a replacement for hard chromium plating.

At the Environment, Energy Security and Sustainability Symposium & Exhibition (E2S2) held in New Orleans, LA in May of this year, two of our Principal Investigators delivered briefs on their NESDI projects. During Kathleen (Kappy) Paulson's briefing on **"Computational Fluid Dynamics (CFD) Modeling and Verification to Reduce Airflow Rates in an Aircraft Paint Hanger,"** she discussed the results of the NESDI project (project #370) that she and Ray Lucy executed to develop and field verify a CFD model confirming that reduced airflow rates are sufficient to control paint overspray with no significant deterioration of health protection.

Also at E2S2, Dave Chavez discussed the results of his NESDI project— Biodiesel for Ground Tactical Vehicles and Equipment (project #412)— during his presentation entitled **"Biodiesel Paving the Way for the Department of Defense's (DoD) Renewable Future."**

On 22 May 2011, Jim Breay, Industrial Hygienist from the Naval Medical Center in San Diego, CA presented the results of **NESDI project #370** at the Armed Forces Public Health Conference in Hampton, VA. Jim's presentation concentrated on the work that was performed at the Southwest Regional Maintenance Center. Kappy Paulson was also on hand to field questions from the audience.

*More information about these projects including a downloadable fact sheet, visit the NESDI web site at [www.nesdi.navy.mil](http://www.nesdi.navy.mil).*



## Names & Faces: **NESDI Profiles**

**In each issue of *NESDI News*, we will meet someone who represents a great commitment to the NESDI program.**

This time around, we profile Brandon Swope — the Principal Investigator for our study entitled *Laser System Usage in the Marine Environment: Applications and Environmental Considerations* (NESDI project #439) as well as NESDI project #463— *Environmental Effects of Military Expendable Material*.



### **Brandon Swope**

#### **Organization**

Space and Naval Warfare  
Systems Center—Pacific

#### **Education**

- M.S., Marine Science, University of San Diego
- B.S., Biology, Salisbury University
- B.S., Environmental Science, University of Maryland Eastern Shore



#### **Experience**

Brandon has a diverse educational background with nine years of field and laboratory experience. His field experience includes natural resources surveys with an emphasis on the relationship between the physical environment and biological community. His laboratory experience has focused on trace metals analysis using Inductively Coupled Mass Spectrometry with research interests focused on the development of new analytical techniques.

#### **Role**

Brandon has supported the NESDI program as a Principal Investigator on an effort to quantify and qualify laser usage in the marine environment and outline a means to assess its environmental impact (NESDI project #439 highlighted in this issue of *NESDI News*) and a second ongoing effort to assess the environmental effects of Military Expendable Material (NESDI project #462). He also provides technical expertise on a wide variety of NESDI projects led by other Space and Naval Warfare Systems Center—Pacific personnel.

#### **Connections**

His diverse research interests have led to collaborative ties across a variety of government and academic laboratories supporting range, shipyard and regional projects.

#### **Perspective**

*"I believe that the NESDI program is a great venue to transition new and innovative technologies in support of challenging environmental issues the Navy faces, while also providing a great opportunity to leverage with other DoD research and development programs."*

**For more information about either of these projects or his role in the NESDI program, you can contact Brandon at 619-553-2761 and [brandon.swope@navy.mil](mailto:brandon.swope@navy.mil).**

**In this section of NESDI News, we provide insights into our annual program schedule.**

## PROGRAM SCHEDULE

For the next few months, we will focus on collecting needs from our customers (items 1 and 2 in the table below). Check our web site for the latest version of our program schedule.

NO.	WHAT	WHEN
1.	<b>Announce FY12 Needs Solicitation</b>	<b>5 July 2011</b>
2.	<b>Close FY12 Needs Solicitation</b>	<b>29 August 2011</b>
3.	Screen Needs	6-9 September 2011
4.	Evaluate & Rank Needs	26-30 September 2011
5.	Obtain Sponsor Review & Approval of Needs	3-14 October 2011
6.	Request Pre-proposals	17 October 2011
7.	Close Pre-proposal Collection	18 November 2011
8.	Collect TDWG Comments on Pre-proposals	29 November 2011
9.	Evaluate Pre-proposals	29 November – 1 December 2011
10.	Request Full Proposals	12 December 2011
11.	Collect Full Proposals	20 February 2012
12.	Collect Functional Working Group Comments on Full Proposals	9 March 2012
13.	Collect TDWG Comments on Full Proposals	21 March 2012
14.	Screen Full Proposals	26-30 March 2012
15.	Evaluate Full Proposals	18-22 June 2012
16.	Obtain Sponsor Review & Approval of Full Proposals	9-23 July 2012
17.	Conduct In-Progress Reviews	West: 7-11 May 2012 East: 18-22 June 2012 Stormwater: Jan-12 (TBD)
18.	Announce New Starts	30 July 2012
19.	Quarterly Status Reports Due (all Fridays)	14 October 2011 13 January 2012 13 April 2012 13 July 2012
20.	Conduct N45 Programmatic Review	First Review: 6 October 2011 Second Review: TBD

## USING OUR WEB SITE

**To submit your need, visit the “Environmental Needs” section on the NESDI web site. Then click on the “Submit A Need Now” button. This will take you to the “NESDI Environmental Needs Submission Form.”**

Use this on-line form to tell us everything you can about your need. Then use “Spell Check” to correct any typos and click on the “Submit Need” button to complete the process.

Once you submit your need, technical experts assembled by NESDI program management will assess, validate, and rank it. You will be notified about the ultimate status of your need once this ranking process is complete.

**For more information, download our Reference Guide: Submitting and Evaluating Needs by visiting the NESDI web site at [www.nesdi.mil](http://www.nesdi.mil) then clicking on the “Environmental Needs” button. Direct any questions about the use of our web site to Eric Rasmussen, our webmaster, at 732-323-7481 and [eric.rasmussen@navy.mil](mailto:eric.rasmussen@navy.mil).**



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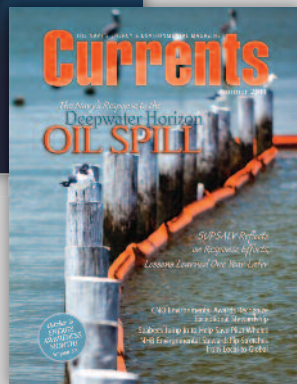
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## CONTACT US

For more information about the operation of the NESDI program, contact Leslie Karr, the program manager, or members of the TDWG—the program's management team.

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## IN THE NEXT OF NESDI NEWS

There is a lot more information coming your way in the next issue of *NESDI News: Highlights & Happenings*. In our Fall-11 issue we will:

1. Announce FY12 new start projects.
2. Summarize the results of our FY12 needs collection.
3. Tell you how to submit proposals to address our needs.
4. Highlight another one of our Principal Investigators, Ruben Prado, and his work to find environmentally-friendly sealers that prevent corrosion.

Until then, look for our article in the summer-11 issue of *Currents*—the Navy's energy and environmental magazine—about the publication of our most recent Year in Review report—the Case for Success. Read *Currents* on-line and subscribe to the magazine at <http://greenfleet.dodlive.mil/currents-magazine>.