

WINTER 2017

NESDI NEWS

Highlights & Happenings



INSIDE THIS ISSUE:

FY17 Pre-Proposal Solicitation Results	3
New Projects Launched	4
2017 IPRs Scheduled	11



Welcome!

This quarterly update provides you with the latest information about 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.

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 and Environmental Readiness Division (OPNAV N45) and managed by the Naval Facilities Engineering Command (NAVFAC) from the Engineering and Expeditionary Warfare Center (EXWC) in Port Hueneme, CA. The mission of the program is to provide solutions by demonstrating, validating, and integrating innovative technologies, processes, materials, and by filling knowledge gaps to minimize operational environmental risks, constraints, and costs while ensuring Fleet readiness.



The NESDI Program: Integrating Green Technologies Into the Fleet



From the Program Manager's Desk

Welcome to the winter 2017 issue of *NESDI News: Highlights & Happenings*—part of our ongoing effort to keep you informed about the NESDI program.



Ken Kaempffe
Program Manager

In January, the Technology Development Working Group (TDWG) and I screened and ranked pre-proposals that were received to address the priority needs collected via our FY17

needs solicitation process. More information about the results of our pre-proposal review is included in the following section.

We have also been busy building agendas and execution plans for our two FY17 In-Progress Reviews (IPR)—the first to be held at the Fleet Readiness Center in Jacksonville, Florida on 28-30 March 2017 and a second IPR will be held at the Naval Postgraduate School in Monterey, California on 9-11 May 2017. Details about these IPRs are included in the “2017 IPRs Scheduled” section of this issue of *NESDI News*.

Ken Kaempffe
ken.kaempffe@navy.mil

FY17 Pre-Proposal Solicitation Results

We collected a total of 43 pre-proposals to address the priority needs that resulted from our FY16 needs solicitation process. The next significant milestone on the NESDI program schedule is the review of full proposals. Once all pre-proposals were collected, NESDI program management reviewed and ranked them using established criteria, including how the proposed effort addresses the need, how executable the project is, if the proposed effort is ready for demonstration and validation and how feasible it will be to integrate the solution into ongoing fleet operations. This was followed by a final evaluation that determines which pre-proposals will proceed to full proposal development. These results were provided to anyone who submitted a pre-proposal shortly after the evaluation period ended on 13 January 2017.

Full proposals were requested for those pre-proposals that do the best job of meeting the evaluation criteria and addressing the explicit requirements stated in the targeted need. Of the pre-proposals that were received, full proposals were requested for the following 15 pre-proposals:

1. Business Processes and Requirements Enabling Technology Integration (pre-proposal 298 from Bill Venable, NAVFAC)
2. Demonstrating the Effectiveness of Novel Treatment Technologies for the Removal of Poly- and Perfluoroalkyl Substances from Groundwater (pre-proposal 327 from John Kornuc, NAVFAC)
3. Low-Volatile Organic Compound Primers for Ground Support Equipment Application (pre-proposal 288 from Michael Brindza, NAVAIR)
4. Elimination of Hexavalent Chromium from Magnesium Conversion Coating Processes at Fleet Readiness Centers (pre-proposal 308 from Alan Grieve, NAVAIR)
5. Non-chromate Deoxidizer for Resistance Spot Weld Cleaning (pre-proposal 313 from Carolyn Mercer and Mackenzie Sims, NAVAIR)
6. Industrial Waste Management and Minimization of AFFF Concentrate and Wastewater Initiation Decision Report (pre-proposal 293 from Daniel Edwards, NAVFAC)
7. Weapon Systems Support Navy Enterprise-wide Hazardous Material Standardization and Minimization of General Use Consumables (pre-proposal 295 from Linda Christensen and Renata Laing, NAVSUP)
8. In-situ Automatic Stormwater Sampling Device for Use at Tidally-Impacted Sampling Locations (pre-proposal 319 from Ernie Arias, SPAWAR)
9. Source Metal Particle Removal for Stormwater Compliance (pre-proposal 314 from James Howell, NAVSEA)
10. Initiation Decision Report of Laser Coating Removal on Naval Aircraft Components (pre-proposal 297 from Joseph Santa Maria and Steven Starnes, NAVAIR)
11. Implementation of Biotic Ligand Model-Based Water Quality Standards for Copper at Navy Sites (pre-proposal 328 from Gunther Rosen, SPAWAR)
12. Biochar for Dry Dock Effluent (pre-proposals 311 & 322 from Patrick Morrow (NAVSEA) and Lewis Hsu (SPAWAR))
13. Background Analysis and Tracer Study to Identify Metal Contaminant Source Contributions to Stormwater Runoff (pre-proposal 306 from Jim Leather, SPAWAR)
14. Development and Demonstration of a Portable, Temporary Barrier to Aid in Cargo and Equipment Inspections to Prevent Brown Treesnake Dispersal (pre-proposal 301 from Jean Pan, NAVFAC)
15. Addressing Temporal Variability in Industrial Buildings During Vapor Intrusion Assessments (pre-proposal 309 from Trish Venable and Travis Borrillo, NAVFAC)

The call for full proposals runs from 19 January until 15 March of this year. (Full proposals are solicited by invitation only.) Successful proposals will result in new projects beginning in FY18 and beyond.



New Projects Launched

The NESDI program launched the following 15 new initiatives in fiscal year (FY) 2016 to address some of the most pressing environmental operational challenges facing the Navy:



1. Stable Carbon Isotopes for Tracing In Situ RDX Remediation (project no. 537)



5. Utility Vault Water Treatment (project no. 541)



2. Development of Advanced Primer and Superhydrophobic Topcoat for Corrosion Resistance and Leachate Impedance (project no. 538)



6. Naval Air Systems Command Solutions for Engine Washing (project no. 542)



3. Forward Looking Infrared (FLIR) for Advanced Discharge Characterization (project no. 539)



7. Preventative Management of Contaminated Silt (project no. 543)



4. Smart Electronic Tools for Navy Environmental Compliance Monitoring and Reporting (project no. 540)



8. Stable-Isotope Labeled Tracers, an Innovative Way to Validate Natural Attenuation of RDX in Groundwater (project no. 544)

New Projects Launched (continued)



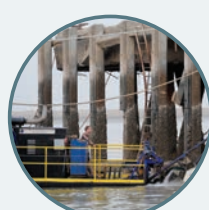
9. In Situ Treatment of 1,4-Dioxane Using Enhanced Biodegradation (project no. 545)



13. Demonstration of Optimized non-NMP (n-Methyl-2-pyrrolidone) Solvents for Immersion Chemical Depainting (project no. 549)



10. National Pollutant Discharge Elimination System (NPDES) Copper Effluent Control System (project no. 546)



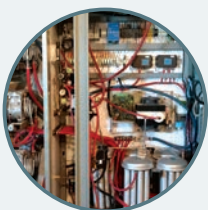
14. A Comprehensive Analysis and Strategy for Contaminated Sediment Management (project no. 550)



11. Demonstration of Improved Toxicity Methodology to Link Stormwater Discharges to Receiving Water Impacts at Navy Sites (project no. 547)



15. Impact of Sediment Resuspension by Propeller Wash and Shore Sediment Dynamics on Remediation Options (project no. 551)



12. Sewer Gas Elimination Technology (project no. 548)

In this issue of *NESDI News*, we introduce you to four of these projects.



New Projects Launched (continued)

Development of Advanced Primer and Superhydrophobic Topcoat for Corrosion Resistance and Leachate Impedance (project no. 538)

Galvanized metal is commonly used at Navy installations. This metal is also one of the main sources for zinc in stormwater discharges, and one of the primary reasons for potential regulatory compliance issues. Both the Navy and the Electronic Harbor Security Systems (EHSS) program have a stake in protecting these galvanized structures and reducing zinc in stormwater runoff.

The EHSS has responsibility for over 60 sites worldwide with galvanized metal structures that are regularly subject to heavy salt spray, which results in rapid corrosion. This can cause both zinc leaching and discharge, increased structural

repair requirements due to corrosion, damage to security equipment, and potential downtime.

This project is a partnership between EHSS, the Naval Air Warfare Center (NAWC) Patuxent River, Maryland and the Space and Naval Warfare Systems Center Pacific (SSC Pacific) in San Diego, California. The team, headed by Brandon Swope of SSC Pacific, and Alan Grieve of NAWC Patuxent River, will investigate two potential solutions to this problem—superhydrophobic coatings and inorganic zinc-free primers.

Volumetric superhydrophobic coatings are water-repellant coatings first developed by the oil industry. These coatings have undergone extensive testing for their anti-



Galvanized metal is one of the major sources for zinc runoff in stormwater.

(Photo Credit: Chuck Katz)

corrosion properties and showed no leaching whatsoever, making them far superior to other coatings currently or previously in use. Superhydrophobic coatings are also considered a “green” technology because they’re not biocidal and virtually eliminate zinc leaching.

Metal-rich coatings have proven to be highly effective in preventing corrosion in aggressive corrosion environments. Most of these products contain a zinc pigment, which can leach out into the environment. This type of pollution in estuaries and bays can affect marine life. Zinc-free alternative coatings have been developed by personnel from the Naval Air Systems Command. These inorganic coatings have produced good results in accelerated testing and may provide an alternative to zinc-based corrosion prevention schemes while limiting heavy metal discharge.

Laboratory testing of the two products will be conducted at NAWC Patuxent River and SSC Pacific. After a suitable formula has been identified, field-deployed test panels will then be sent to various EHSS testing sites (based on operational availability) where high levels of corrosion occur, and assessed for corrosion in these environments over time. Additionally, scaffolding material will be coated and field-deployed in an industrial shipyard setting.

End users at EHSS will be involved with the demonstration of the product and, if successful, will adopt the technology worldwide. Additionally, Navy facilities with permitting issues related to zinc leachate will be engaged during the project with the end goal of including the product in future contractor requirements to apply new coatings during the maintenance of galvanized structures.

Naval Air Systems Command Solutions for Engine Washing (project no. 542)

NAVAIR maintenance operations require engine washing as a routine part of scheduled maintenance. Current engine

washing procedures require the use of a gas path cleaner, which requires thorough rinsing. Occasionally the rinsing process is insufficient, and dried residual cleaning solution remains in and on the engine. This attracts dirt and contaminants, and can lead to bearing pitting/corrosion, and water migration into the oil—all of which require subsequent maintenance.

The equipment and processes used at Fleet Readiness Centers (FRC), Naval Air Stations, and other maintenance facilities lead to excessive amounts of water usage and insufficient cleaning. In addition, these systems use



This NESDI project is demonstrating a new engine washing procedure for use across NAVAIR. Shown here is an H-53 helicopter engine wash demonstration with the EcoPower small wash unit and effluent collecting kit in place.

(Photo Credit: David Marriott)

New Projects Launched (continued)

osmosis water purifiers in combination with mixed bed deionizers. Workers—particularly outside the U.S.—often do not have access to water of sufficient quality, instead using locally available potable water which rarely meets requirements. Without deionized water, engine washing quality can be compromised. Inefficient engine washing operations potentially lead to hazardous waste generation and greater hazardous air pollutant emissions due to excess fuel burning and excess fuel consumption.

The EcoPower system produces better results, in less time, with greater efficiency, without the associated hazardous waste disposal issues.

This project team, led by Keiko Sapp of FRC East in Cherry Point, North Carolina and Kami Downey of FRC Southeast in Jacksonville, Florida, plans to demonstrate EcoPower™—a cleaning technology that uses heated, deionized, atomized water along with custom manifolds for specific aircraft/engine types to clean the engine. EcoPower is used extensively worldwide in the commercial aviation industry.

This technology works by delivering high-pressure water through a manifold in a droplet size tailored to the engine type. The system deionizes the input water, so any fresh water source is acceptable. At the end of the cleaning process, the effluent is captured, recycled and cleaned of metal contaminants in a nearly closed-loop system. Recycled water can be analyzed and monitored for contamination buildup to determine when it should be disposed.

Detergent is not required for this system, thus eliminating the challenges associated with detergent buildup, as well as purchasing costs and handling/storage concerns. Additionally, the proposed technology takes about 40 to 60 minutes per aircraft to complete, as opposed to roughly 4–8 hours per aircraft for the current procedure.

In short, the EcoPower system produces better results, in less time, with greater efficiency, without the associated hazardous waste disposal issues and no need for a deionized water supply. The initial phase of this project involves customizing the system for various aircraft platforms including the V-22 Osprey tiltrotor aircraft, H-53 Sea Stallion helicopter, AV-8 Harrier vertical/short takeoff and landing jet aircraft, P-8 Poseidon military patrol aircraft and C-130 Hercules military transport aircraft.

This phase will be followed by demonstration, performance testing (including an estimation of the hazardous material and hazardous waste handling costs), industrial validation and integration into existing operations.

After successful execution at land-based activities, additional demonstrations will be conducted in a shipboard environment. Assuming the demonstrations are successful, the appropriate technical maintenance manuals including the Cleaning and Corrosion Control Manual (NAVAIR 01-1A-509) and the Maintenance Instructions (Organizational and Intermediate Level) Support Equipment Cleaning, Preservation, and Corrosion Control Manual (NAVAIR 17-1-125) will be revised.

In Situ Treatment of 1,4-Dioxane Using Enhanced Biodegradation (project no. 545)

The Department of Defense has over 100 sites with measureable concentrations of 1,4-dioxane in groundwater, and many of these sites have high enough concentrations to require treatment. Although a number of potential remedies have been examined, all tend to be either prohibitively expensive or ineffective, and the Navy does not have a cost-effective solution that can be implemented immediately.

The objective of this project is to demonstrate a new, cost-effective treatment method for reducing or removing concentrations of 1,4-dioxane from groundwater at Navy sites.

Enhanced in situ aerobic bioremediation is the process of stimulating indigenous, oxygen-dependent microorganisms to degrade contaminants in groundwater and in the aquifer matrix. Bacteria with the capacity to biodegrade 1,4-dioxane are augmented with auxiliary substrates to induce the required enzymes and support co-metabolic degradation.

Propane is injected into the saturated zone to increase the biological activity of the indigenous microorganisms.

Preliminary studies have revealed propane biosparging to be effective for bioremediation of 1,4-dioxane. Biosparging technology uses indigenous microorganisms to biodegrade organic constituents. In this process, propane is injected into the saturated zone to increase the biological activity of the indigenous microorganisms. If necessary, oxygen and nutrients are also injected to make for ideal conditions for biodegradation.



Real-time multi-level monitoring of remedial amendment injection.

(Photo Credit: GSI Environmental, Inc.)

This project team, headed by Anthony Danko of NAVFAC EXWC, plans to leverage the results of treatability studies conducted at Rice University on a separate project. The most promising bacteria strains identified in these studies will be fermented and characterized by their suitability for production scale-up.

The project will then move into the pilot test phase. The design of the pilot test will be tailored to meet the characteristics of the selected test site. The general structure of the pilot test will involve the injection of an amendment solution consisting of a tracer plus a co-metabolic substrate

into a well or wells. At a nearby well(s), an amendment solution consisting of a tracer, co-metabolic substrate and a bioaugmentation culture will be injected. Consequently, this design will provide data to compare biostimulation with bioaugmentation. Post-injection monitoring will occur periodically through a series of groundwater extractions from test well(s). The success of the demonstration will be tied to decreasing concentrations of 1,4-dioxane, and the transformation capacity and rates which will help determine the feasibility of designing a full-scale in situ biostimulation system.

New Projects Launched (continued)

A Comprehensive Analysis and Strategy for Contaminated Sediment Management (project no. 550)

Contaminated sediment management is broadly estimated to be a one billion dollar problem for the Navy. The actual cost of managing these sites could be even higher, as costs often grow as a site progresses from feasibility study to Record of Decision (ROD) to remedy design, to implementation. A systematic review of how and why these costs grow is needed.

This project was formed to prepare an Initiation Decision Report (IDR) to guide investments in the sediment remediation area.

At most remediation sites, the understanding and tools for determining the nature and extent of the contamination, the limitations of existing characterization tools and the shortcomings of current remediation and performance monitoring technologies are still evolving, as is understanding of regulatory/stakeholder expectations. Therefore, decision making often occurs at every stage based on incomplete information.

The IDR will provide technical insights into—and analysis of—the sediment marketplace, identifying information gaps



Dredging is one major contributor to the Navy's contaminated sediment management challenges.

(Photo Credit: Mass Communication Specialist 1st Class Peter D. Lawlor)

and limiting factors, such as Navy or regulatory policies. The report will indicate where sediment research, development, test and evaluation investments should be made to fill these gaps, and which technologies are ready for demonstration/validation today.

Decision making often occurs at every stage based on incomplete information.

The project team, headed by Joey Trotsky of NAVFAC EXWC, will gather broad input from Remedial Project Managers in the Navy as well as non-Navy

stakeholders (including the EPA, Army Corps of Engineers, individual states and others). Recent remedial investigations, feasibility studies and RODs will be examined to identify end user-driven research needs for possible future NESDI investments.

The IDR will be disseminated through multiple technology mechanisms. Discussion of IDR results will also be presented to NAVFAC's Contaminated Sediment Workgroup and Alternative Restoration Technology Team. The report may also be incorporated into additional training seminars.



2017 IPRs Scheduled

Each year, the NESDI program holds In-Progress Reviews (IPR) to check in on the progress made by the program's Principal Investigators and make sure that their efforts will achieve the intended results. These annual reviews bring together end users, resource sponsor representatives and researchers, shrinking the gap between the research and required integration efforts. Each year, dozens of participants attend or dial in to hear briefings about ongoing projects and to provide valuable feedback to the program's Principal Investigators.

The schedule for the program's 2017 In-Progress Reviews (IPR) is set. So mark your calendars accordingly.

What	When	Where
East Coast IPR	28-30 March 2017	Fleet Readiness Center Southeast Jacksonville, FL
West Coast IPR	9-11 May 2017	Naval Postgraduate School Monterey, CA

East coast IPR attendees will participate in a tour of aircraft maintenance activities at FRC Southeast. A historical tour and interactions with NPS faculty and students is included in the agenda for the west coast IPR.

MARCH 2017						
SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	East Coast IPR			30	31

MAY 2017						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	West Coast IPR			12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

As always, space for our IPRs is limited. To request a seat or for more information including a draft agenda and dial-in information, contact Cindy Webber at cynthia.webber@navy.mil or 760-939-2060.



Program Schedule

For the next couple of weeks, the program will concentrate its efforts on the evaluation of full proposals to address the priority needs that were collected, screened, evaluated and ranked as part of the program's FY16 needs solicitation process. A program schedule for the entire year is provided below.

No.	What	When
1.	Full Proposals DUE	15 March 2017
2.	Conduct East Coast In-Progress Review	28-30 March 2017 (Fleet Readiness Center Southeast, Jacksonville, FL)
3.	TDWG & FWG Comments on Full Proposals DUE	31 March 2017
4.	Screen Full Proposals	3-7 April 2017
5.	Principal Investigator Answers to Full Proposal Screening Questions DUE	5 May 2017
6.	Conduct West Coast In-Progress Review	9-11 May 2017 (Naval Postgraduate School, Monterey, CA)
7.	Announce FY18 Needs Solicitation	1 June 2017
8.	Evaluate Full Proposals	by 8 June 2017
9.	Obtain Sponsor Review & Approval of Full Proposals DUE	29 June 2017
10.	Announce FY18 New Starts	31 July 2017
11.	Close FY18 Needs Solicitation	2 August 2017
12.	Screen Needs	7-11 August 2017
13.	Evaluate & Rank Needs	11-15 September 2017
14.	Obtain Sponsor Review & Approval of Needs	18 September - 6 October 2017
15.	Request Pre-proposals	12 October 2017
16.	Conduct OPNAV N45 Programmatic Review	October 2017
17.	Pre-proposals DUE	15 November 2017
18.	Make Pre-proposals Assignments to FWGs	1 December 2017
19.	TDWG & FWG Comments on Pre-proposals DUE	20 December 2017
20.	Evaluate Pre-proposals	8-12 January 2018
21.	Request Full Proposals	18 January 2018
22.	Quarterly Status Reports Due	3 April 2017 3 July 2017 2 October 2017 8 January 2018

Check out our web site (www.nesdi.navy.mil) for the latest version of our program schedule.



Getting on Our Mailing List

If you're not already on our mailing list and want to subscribe to *NESDI News*, please send your email address to Lorraine Wass at ljwass@outlook.com.

Contact Your TDWG Member

For more information about the operation of the NESDI program, contact Ken Kaempffe, the NESDI program manager, or members of the TDWG.

No.	Name	Command	Phone	Email
1.	Kaempffe, Ken (Chair)	NAVFAC	805-982-4893	ken.kaempffe@navy.mil
2.	Bixler, Christy	NAVFAC/ CNIC	202-685-9313	christy.bixler@navy.mil
3.	Earley, Pat	SPAWAR	619-553-2768	patrick.earley@navy.mil
4.	Harre, Karla	NAVFAC	805-982-2636	karla.harre@navy.mil
5.	Hertel, Bill	NAVSEA	301-227-5259	william.hertel@navy.mil
6.	Kopack, David	NAVSEA	202-781-3247	david.kopack@navy.mil
7.	McCaffrey, Bruce	Consultant	773-376-6200	brucemccaffrey@sbcglobal.net
8.	Mukherjee, Sandi	NAVSUP	717-605-6854	sandi.mukherjee@navy.mil
9.	Rasmussen, Eric	NAVAIR	732-323-7481	eric.rasmussen@navy.mil
10.	Sugiyama, Barbara	NAVFAC	805-982-1668	barbara.sugiyama@navy.mil
11.	Webber, Cindy	NAVAIR	760-939-2060	cynthia.webber@navy.mil
12.	Youngers, Luzmarie	NAVAIR	904-790-6382	luzmarie.youngers@navy.mil



In the Next Issue of *NESDI News*

There is a lot more information coming your way in the next issue of *NESDI News: Highlights & Happenings*. In our spring 2017 issue, we will provide you with updates on our efforts to evaluate and rank the full proposals received by our March deadline.

Until then, look for an article about our 15 FY16 “new start” projects in the upcoming winter 2016-17 issue of *Currents*, the Navy’s energy and environmental magazine. You can read our article “NESDI Program Launches New Initiatives” and other articles about NESDI-sponsored research online and subscribe to *Currents* at <http://greenfleet.dodlive.mil/currents-magazine>.