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NESDI News

Highlights & Happenings

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WHO WE ARE

The Navy Environmental Sustainability Development to Integration (NESDI) program is the Navy's environmental research and development, demonstration and validation (6.4) program, sponsored by the OPNAV N4I Installations Division and managed by the Naval Facilities Engineering Systems Command (NAVFAC) out of 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 and materials and by filling knowledge gaps to minimize operational environmental risks, constraints and costs while ensuring Navy readiness and lethality.



**The NESDI Program:
Integrating Green Technologies Into the Fleet**



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From the Program Manager's Desk



Ken Kaempffe

Welcome to the spring 2022 issue of *NESDI News: Highlights & Happenings*—part of our ongoing effort to keep you informed about 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.

In this issue, we highlight four of our eight FY22 “new start” projects that were reviewed and approved by the program’s resource sponsor (the OPNAV N4I Installations Division) and publish a year-out program schedule for your review and consideration.

Ken Kaempffe, P.E.
kenneth.c.kaempffe.civ@us.navy.mil



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FY22 “New Start” Projects Launched

The following eight efforts have been initiated as the program’s FY22 “new start” projects:

No.	Project No.	Title	Principal Investigator	Performing Agency
1.	597	Remotely Operated Oil Spill Response Equipment: Down-Selection and Demonstration at a Navy Port	Marty McMorrow	NAVFAC EXWC
2.	598	Minimizing Hazardous Waste from Expired Paints and Associated Solvents from Ships Supply	Todd Heintzelman	NAVSUP WSS
3.	599	Pathways for Addressing Opportunistic Premise Plumbing Pathogens at Navy Installations	Autumn Resto	NAVFAC EXWC
4.	600	Advanced Anodize Repair	Alexander Westbrook	NAVAIR NAWC AD Pax River
5.	601	Chronic Toxicity and Bioaccumulation Evaluation of Multiple PFAS for Benthic and Pelagic Species Relevant to Marine Ecological Risk Assessment	Nicholas Hayman	NIWC Pacific
6.	602	Closed Loop, In Situ Soil Flushing at PFAS-Impacted Source Zones	Jovan Popovic	NAVFAC EXWC
7.	603	Characterization of Antifouling Paint and Environmental Loading with Navy Dome System	Channing Bolt	NIWC Pacific
8.	604	An Integrated Navy Approach to Estimate Risk and Cleanup Goals for Radionuclides Associated with Buildings at Current and Former Navy Installations	Kenda Neil	NAVFAC EXWC

The first four projects in the table above are highlighted in this issue. The remaining four projects will be highlighted in the next issue of *NESDI News*.



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FY22 “New Start” Projects Launched *(continued)*

Alternative Oil Skimming Technologies for Afloat Oil Spill Response: Down-selection and Demonstration at a Navy Port (project no. 597)

Marty McMorrow (NAVFAC EXWC)

The goal of this effort is to determine if remotely operated oil spill response (OSR) skimming equipment and other alternative technologies can respond to on-water oil spills more effectively than existing equipment with respect to safety, cost, speed, oil recovery rate and maneuverability.

When an oil spill occurs, time is of the essence. Facility Response Teams (FRT) need remotely operated and/ or compact oil spill equipment to rapidly deploy from an oil spill response boat or port location to contain and clean up spills quickly and effectively. In particular, the

equipment may need to be able to access tight spaces and maneuver within them while maintaining their heading against currents.

Many of the candidate technologies for demonstration have been tested and evaluated under controlled conditions at the Oil Spill Response Research and Renewable Energy Test Facility, also known as Ohmsett, which is the recognized independent performance evaluation organization for the oil spill response industry. It is anticipated that two or three technologies will be selected and demonstrated at two to three Navy sites. Criteria will include effectiveness, ease of use, responsiveness of controls, maintainability and reputation of the vendor. The selected technologies will then be rigorously evaluated by experienced FRT leaders.



Sailors conduct facility response training which includes a simulated oil spill and oil spill recovery using two utility boats, a dedicated skimmer boat and oil booms to contain the spill. Alternative skimming technologies would greatly reduce the number of manhours required for spill cleanup.

(Photo Credit: Seaman Jasmine Ikuseibiala)



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FY22 “New Start” Projects Launched *(continued)*

For demonstrated technologies that meet the stated requirements, NAVFAC EXWC personnel will deliver a report and a combined guidance document /procurement package to NAVFAC’s Oil Spill Response Program (OSRP). Provided they are approved, the equipment will be added to the list of OSRP-approved equipment. EXWC will then notify the Navy On-Scene Commander Media Field Team, which will communicate the availability of the equipment to FRTs in their regions.

Minimizing Hazardous Waste from Expired Paints and Associated Solvents from Ships Supply (project no. 598)

Todd Heintzelman (NAVSUP WSS)

The objective of this study is to minimize the amount of hazardous waste produced by expired paints and associated solvents originating from ship supplies.

Navy ships place excess paint in storage after use. The paint’s shelf life often expires while in storage and therefore becomes hazardous waste. In some cases, the shelf life of expired paint can be extended, but there is conflicting guidance and understanding on how this can be achieved. The Defense Logistics Agency (DLA) often requires offsite laboratory testing of paints in order to extend the paint’s shelf life. If not tested, the paint is treated as hazardous waste, which incurs disposal and handling costs, increases the risk to human health and the environment, and runs the risk of violating existing regulations.

This project is producing an Initiation Decision Report (IDR) that provides situational understanding of the problem, current process and procedures, recommendations regarding quantities of paint to purchase, as well as techniques for effectively managing and extending the shelf life of paints.

The location for this IDR is Puget Sound Naval Shipyard & Intermediate Maintenance Facility (PSNS & IMF). This facility alone spends \$47,000 to dispose of expired paint each year.

This project team will research historical data regarding the quantity of paint ordered per year at the base and the quantity disposed of due to expired shelf life. They will then develop a paint quantity purchase guideline based on ship class that states how much material a ship is recommended to purchase in order to “right size” the amount of paint in the ship’s supply.

To prevent waste upfront, the team will research relationships between size of unit issued versus quantity used (i.e., ordering a gallon but only using a quart), and will inquire whether suppliers can package their material into smaller containers based on demand.

The team will also enable increased reuse of paint by researching shelf life regulations, process and procedures, and management practices to determine the root cause of why paint shelf life expires. Finally, the team will assess hazardous material offload options at larger Navy bases prior to ship availability at PSNS & IMF.



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FY22 “New Start” Projects Launched *(continued)*



PSNS & IMF spends \$47,000 to dispose of expired paint each year.

(Photo Credit: Mass Communication Specialist 2nd Class Eric Coffey)

There is a potential return on investment estimate of \$817,000 per year, along with a 70,000-pound decrease in expired paints. The IDR will identify feasible solutions that the Navy can implement to decrease the amount of hazardous waste produced by expired paints.

Pathways for Addressing Opportunistic Premise Plumbing Pathogens at Navy Installations (project no. 599)

Autumn Resto (NAVFAC EXWC)

This project team is studying ways to reduce or eliminate Opportunistic Premise Plumbing Pathogens (OPPP) in drinking water at U.S. Navy facilities. OPPPs are pathogens that are known to cause serious human infections (such as legionella). The Navy

medical community is seeing an increase in OPPP-related illnesses stemming from domestic water systems of Navy facilities. This may be due to the combined effects of conflicting policy requirements, water and energy conservation efforts, aging infrastructure, reduced system demands, low flows, limited disinfection residuals, and oversized combined potable and firefighting distribution systems.

The goal of this effort is to perform a deep dive into the conservation measures that may be adversely affecting the quality of drinking water. Current Navy water system operation and maintenance plans, conservation methods, distribution systems, novel and current treatment technologies and methodologies as well as conflicting Navy, federal, state and local policies are being analyzed to offer potential solutions.



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FY22 "New Start" Projects Launched *(continued)*



Navy drinking water treatment facility with potable treated water storage tanks and reverse osmosis tanks. (Photo Credit: Autumn Resto)

A review of a broad range of operational and conservation issues that impact water quality—such as toilet flush volumes, water heater temperatures and combined drinking water/ firefighting infrastructure are being made to determine the best course of action to address each and how they negatively impact drinking water quality. Investigations will be made to determine key areas where water restrictions may need to be removed or reduced, which operations need optimizing, conflicting policies that should be restructured, and areas where infrastructure can be modified and retrofitted.

Advanced Anodize Repair (project no. 600)

**Alexander Westbrook
(NAWCAD Patuxent River)**

This project seeks to promote and demonstrate two technologies as suitable replacements for hexavalent chromium-based

formulas for the repair of anodized aluminum coatings.

Trivalent chromium touch-up applicators have been on the approved products list for over 10 years. However, transitioning to these applicators has largely been avoided due to the difficulty of visually inspecting the applied coating, as it is colorless. A recent NESDI project (project no. 514: Enhanced Trivalent Chromium Pretreatment (eTCP) for Improved Coloration and Corrosion Performance of Aluminum Substrates) has shown the efficacy of a trivalent chromium coating system that incorporates a dye into the coating, producing an easily visually identified conversion coating.

The leading hexavalent chromium-free touch-up applicators will be tested for five qualities, time until failure in an accelerated salt fog environment (ASTM B117 Neutral Salt Fog), paint adhesion, conductivity, coating weight and the ease of use. The applicators will be



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|| FY22 “New Start” Projects Launched *(continued)*



This NESDI project seeks to find suitable replacements for hexavalent chromium-based formulas for the repair of anodized aluminum coatings on the F/A-18 Hornet and other U.S. Navy aircraft.

(Photo Credit: Sgt. Booker T. Thomas III)

tested and compared to hexavalent chromium-based applicators, and the best performing applicator will be tested and demonstrated at a Fleet Readiness Center (FRC).

The second repair method that will be advanced is brush aluminum anodizing. Anodizing is an electrochemical oxidation treatment commonly formed on the surface of aluminum for providing wear and/or corrosion resistance. It is a mature technology that’s been around for decades. This project will verify its effectiveness and will test for the optimum sealer. Providing that both technologies perform equal to or better than hexavalent chromium, a decision tree will be created to help FRC personnel choose the best process for their needs.

If successful, this project will remove 12.7 gallons of hexavalent chromium annually from the waste stream at FRC Southwest alone, with more anticipated from FRC Southeast. It will also eliminate thousands of associated contaminated plastic applicators. Just as important, the hazardous waste generated during the application is not carcinogenic or mutagenic, reducing the risk of serious health issues for service members.

Once the products have been successfully demonstrated in the operational environment, Local Process Specifications will be generated and distributed, ensuring that future users have a clear understanding of how to use these products and processes.

Fact sheets for the above and other NESDI projects are under review and will be posted on the program’s public website at www.navfac.navy.mil/nesdi.



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FY22 Carryover Proposal Evaluation Underway

Here is the list of the 14 carryover proposals from FY22 that are under consideration as FY23 “new start” projects:

1. 235: 3D-Printed Cone Spray Ionization Mass Spectrometry for the Rapid, Low-Cost, and In-Situ Detection and Mapping of PFAS in Soil
2. 237: Knowledge Base and Pre-Processor Tool for Modeling Groundwater at PFAS Sites Using Numerical Groundwater Models
3. 238: XCPC Solar Thermal Evaporation for PFAS-Impacted Wastewater Minimization
4. 239: Subterranean Arsenic Removal (SAR) from Well Groundwater
5. 241: Artificial Intelligence for Environmental Compliance
6. 242: Application of Supercritical Water Oxidation (SCWO) to Destroy Per- and Polyfluoroalkyl Substance (PFAS)-Impacted Waste Streams
7. 243: Technologies, Process Knowledge, & Capabilities that Increase Non-Organic Waste Diversion
8. 247: Oxsol-Free and Low-VOC Surface Ship Topside Coatings for Maintaining Environmental Regulations
9. 248: Evaluation of Regional Airfield Vegetation Regimes to Reduce Wildlife Strikes by Aircraft at Naval Airfields
10. 249: Pyrolysis GC for Rapid Soil PFAS Screening and Analysis
11. 250: Evaluation of Existing and Required Pierside Infrastructure to Accommodate Shoreside Collection and Treatment of Navy Vessel Ballast Discharges
12. 255: Ultraviolet Curable Sealant for Hazardous Waste Reduction and Rapid Cure
13. 256: Cadmium and Hexavalent Chromium Free Brush Electroplating Repair of Zinc-Nickel Corrosion Preventative Coatings
14. 257: Sub-Surface Fate and Transport of Petroleum Based Contaminants in Naval Facilities

In the upcoming months, the Technology Development Working Group (TDWG) will evaluate these carryover proposals and forward those recommended to be “new start” projects to OPNAV N4I Installations Division subject matter experts for their review and approval.



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FY23 Needs Solicitation to be Launched This Summer

Our formal needs collection process for FY23 will run from 1 June until 1 August 2022. The NESDI program defines a “need” as a requirement to eliminate or reduce an environmental constraint that:

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

When submitting a need, we encourage you to provide as much information as you can about your issue. 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 an operational challenge? Is the problem unique to your facility or is it applicable across the Navy?

To submit your need by 1 August 2022, go to the NESDI website at <https://epl.navfac.navy.mil/nesdi> then select the “Needs” button.

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. If you submitted a need in a previous year and it is still a valid need, please resubmit it via our website and provide any updated information you may have.

For more information, download our Reference Guide: Submitting and Evaluating Needs by visiting the NESDI website at <https://epl.navfac.navy.mil/nesdi/Needs.aspx> then clicking on the “Needs” banner and then clicking on the “reference guide” hyperlink.

Schedule for FY22 In-Progress Reviews Announced

The program is will hold three In-Progress Reviews (IPR) over the course of FY22 following the schedule below. Principal Investigators and TDWG members are encouraged to adjust their calendars accordingly.

What	When	Investigators Presenting
First “West Coast” IPR	26–28 April 2022	NAVFAC EXWC
“East Coast” IPR Patuxent River & elsewhere	3–4 May 2022	FRC Southeast, NAWC-AD
Second “West Coast” IPR	7–8 June 2022	NIWC Pacific & elsewhere



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Program Schedule

An entire program schedule for the next year is provided below.

No.	What	When
1.	Conduct First "West Coast" In-Progress Review	26 – 28 April 2022
2.	Conduct "East Coast" In-Progress Review	3 – 4 May 2022
3.	Announce FY23 Needs Solicitation	1 June 2022
4.	Conduct Second "West Coast" In-Progress Review	7 – 8 June 2022
5.	Close FY23 Needs Solicitation	1 August 2022
6.	Screen FY23 Needs	22 – 26 August 2022
7.	Evaluate & Rank Needs	12 – 16 September 2022
8.	Obtain Sponsor Review & Approval of Needs	19 September – 21 October 2022
9.	Conduct Programmatic Review with NAVFAC Headquarters and OPNAV N4I Installations Division timeframe	November 2022 – January 2023
10.	Quarterly Status Reports Due	5 July 2022 3 October 2022 2 January 2023 3 April 2023



Check out our website (<https://epl.navfac.navy.mil/nesdi/Schedule.aspx>) for the latest version of our program schedule.

Getting on Our Mailing List

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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.

Kaempffe, Ken (Chair)

NAVFAC

805-982-4893

kenneth.c.kaempffe.civ@us.navy.mil

Jordan, Kristin

NAVSEA

202-781-2883

kristin.a.jordan.civ@us.navy.mil

Bixler, Christy

CNIC

202-685-9313

christy.d.bixler.civ@us.navy.mil

McCaffrey, Bruce

Consultant

773-376-6200

brucemccaffrey@sbcglobal.net

Earley, Pat

NIWC

619-553-2768

patrick.j.earley.civ@us.navy.mil

Rasmussen, Eric

NAVAIR

732-323-7481

eric.w.rasmussen6.civ@us.navy.mil

Harre, Karla

NAVFAC

805-982-2636

karla.j.harre.civ@us.navy.mil

Webb, Tom

NAVFAC

805-982-2574

thomas.h.webb.civ@us.navy.mil

Henning, Jeff

NAVSUP

717-605-2861

jeffrey.a.henning.civ@us.navy.mil

Webber, Cindy

NAVAIR

760-939-2060

cynthia.k.webber.civ@us.navy.mil

Hertel, Bill

NAVSEA

301-227-5259

william.m.hertel4.civ@us.navy.mil

Youngers, Luzmarie

NAVAIR

904-790-6382

luzmarie.youngers.civ@us.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 summer 2022 issue, we will provide you with updates on the launching of our “new start” projects and progress we’ve made on the evaluation of FY22 carryover proposals.