



**WINTER 2021**

# NESDI News

## Highlights & Happenings

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### 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 Systems 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 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 winter 2021 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 late January 2021, I delivered the annual programmatic review brief to personnel from NAVFAC Headquarters and our resource sponsor OPNAV N45. Overall feedback was positive. During the review, it was emphasized that the NESDI program would benefit from the development of additional program-level performance metrics. Currently our only program-level performance metric is financial execution. Over the coming months, the NESDI management team will evaluate metrics used by other RDT&E organizations and possibly apply one or two of those additional metrics to the NESDI program.

Many of our projects have been able to continue to execute in spite of restrictions due to the COVID-19 pandemic. Our Principal Investigators continue to adapt to ongoing challenges including travel

restrictions and limited access to work spaces and laboratories. Over the past several months, the NESDI program has also made substantial progress towards clearing out our backlog of late final reports; as of late February, there are only two overdue final reports.

A schedule for our FY21 IPRs is also included in this issue of *NESDI News*. Since the publication of our fall 2020 newsletter, we have moved the dates from our first “virtual” IPR of the fiscal year from 23-25 March to 27-29 April 2021. We also launched our 14 FY21 “new start” projects—four of which are highlighted in the following section.

Ken Kaempffe, ken.kaempffe@navy.mil



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## “New Start” Projects Launched

Subject matter experts (SME) from the program’s resource sponsor organization (OPNAV N45) approved the following fourteen proposals as our “new start” projects for FY21.

No.	ID	Submitter	Command	Title
1.	583	James Pilkington	NAVFAC EXWC	Low-Profile Integrated Porous Pretreatment Swale (LIPPS) for Metals Treatment in Industrial Areas
2.	584	Autumn Resto	NAVFAC EXWC	Real-Time Multi-Contaminant Detection System (RMDS)
3.	585	Brandon Swope	NIWC Pacific	High Efficiency Media for Metals Removal in NPDES Discharges
4.	586	Erick Iezzi	NRL	Chrome-free, Low-VOC and Fast-drying Single- and Two-component Primers
5.	587	Itzel Godinez	NAVFAC EXWC	Detection Methodology and Treatment Train Technology for PFAS Removal in Bilge and Oily Wastewater
6.	588	Ron Gauthier	NIWC Pacific	Effluent Copper Quantification by Flow-Through Optical Detection
7.	589	John Frew	NIWC Pacific	Rapid Pathogen Detection in Drinking and Surface Waters
8.	590	Kami Carter	NAVAIR	Dry Ice Paint Removal and Cleaning
9.	591	Joey Trotsky	NAVFAC EXWC	Locating and Quantifying Groundwater Surface Water Connections Using Distributed Temperature Sensing
10.	592	Joey Trotsky	NAVFAC EXWC	Demonstration of the Robust Caisson Structure to Reduce Blast Effects from Underwater Blow-In-Place
11.	593	Jovan Popovic	NAVFAC EXWC	Evaluating Potential Effects to Marine Biota from Small-Scale, Legacy Radioactive Objects
12.	594	Gunther Rosen	NIWC Pacific	Demonstration and Application of Amendments Targeting Comingled Organics and Metals in Sediments
13.	595	Marianne (Molly) Colvin	NIWC Pacific	Demonstration of a Signal Activated Bottom Lander Trap
14.	596	Tony Danko	NAVFAC EXWC	Integrated Analytical Approach to Transition from Active to Passive Treatments at Munitions Sites

**The first three projects listed in the above table were highlighted in the fall 2020 issue of *NESDI News*. Projects in rows 4 through 7 in the above table are highlighted on the following pages.**



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

### **Chrome-free, Low-VOC and Fast-drying Single- and Two-component Primers [project no. 586]**

**PRINCIPAL INVESTIGATOR:  
Erick Iezzi (NRL)**

The anticorrosive primers most commonly used on Navy aircraft are two-component products that contain volatile organic compounds (VOC) including toxic hexavalent chromium as the active inhibitor. Hexavalent chromium is a carcinogen and may pose a human health risk. And as a hazardous waste, there can be significant monetary costs associated with the monitoring and disposal of hexavalent chromium. In addition, these efforts are in line with an April 2009 Office of the Secretary of Defense memo restricting the use of hexavalent chromium when cost-effective alternatives with satisfactory performance become available.

Water-borne primers have come into use in recent years

due to their less toxic ingredients and shorter drying time. However, they don't provide the same corrosion protection as solvent-borne primers, and ultimately result in repeated cycles of maintenance. A low-VOC alternative primer that provides adequate corrosion protection is needed. The objective of this project is to test and evaluate rapid-cure, low-VOCs and chromate-free solvent-borne primers that meet the requirements for use on Navy aircraft platforms.

This project team is exploring the use of two alternative solvent-borne primers: a single-component formula and a two-component formula. The goal is to qualify these to the performance requirements associated with MIL-PRF-23377 (PRIMER COATINGS: EPOXY, HIGH-SOLIDS, Type I/II Class N (non-chrome)) which will allow for their use at Navy aircraft maintenance facilities.



**An Aviation Electronics Technician prepares an F/A-18E Super Hornet for priming and painting.**

(Photo Credit: Mass Communication Specialist 3rd Class Victoria Granado)



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

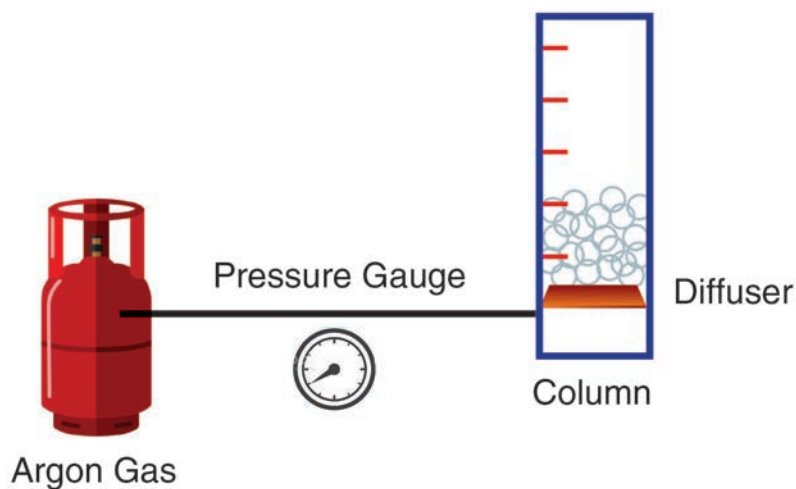
### **Detection Methodology and Treatment Train Technology for PFAS Removal in Bilge and Oily Wastewater [project no. 587]**

**PRINCIPAL INVESTIGATOR:  
Itzel Godinez (NAVFAC EXWC)**

PFASs consist of a large class of substances with unique chemical and physical properties that make them particularly persistent and mobile in the environment. In Japan, current practices dictate that bilge and oily wastewater (BOW) transferred from Navy vessels to collection barges need to be sampled for the presence of PFAS. The turnaround time to analyze BOW samples is up to 35 days. While waiting for results, barges are placed offline, which disturbs normal operations at ports. In some cases, U.S. Fleet Activities have

been forced to rent commercial barges for several times the cost of a government barge because there were no available barges to service Navy vessels coming to port. Furthermore, if the analytical results indicate the presence of PFAS chemicals, U.S. Fleet Activities must contract for the disposal and incineration of BOW and the decontamination of the barge. The latter actions can result in considerable costs to the Department of the Navy (DON). There is a critical need for prompt and cost-effective methodologies and technologies capable of detecting and treating PFAS in BOW in accordance with Navy policies.

This team plans to develop and validate a detection methodology for PFAS chemicals in BOW and to demonstrate and validate a two-part treatment technology.



**Experimental set-up for detection methodology column tests.**

(Schematic Credit: Itzel Godinez)





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

### **Effluent Copper Quantification by Flow-Through Optical Detection [project no. 588]**

#### **PRINCIPAL INVESTIGATOR: Ron Gauthier (NIWC Pacific)**

To maintain compliance with National Pollutant Discharge Elimination System (NPDES) limits, U.S. Navy shipyards must monitor the levels of copper (and other contaminants) in shipyard effluent (discharge water). The U.S. Environmental Protection Agency has set the limit at 3.1 micrograms per liter ( $\mu\text{g/L}$ ). This measurement is based on total copper concentration, which includes all forms of copper (particulate, total and dissolved). Most copper in shipyard discharges is in the form of the less bioavailable particulate phase, rather than

the bioavailable, and toxic, aqueous (dissolved) form.

To satisfy NPDES compliance, there is a need for a fast, easy-to-use tool to differentiate between forms of copper in shipyard effluent. The goal of this project is to demonstrate a methodology for rapid quantification of copper in seawater using an optical detection system. This project team will explore an innovative technology that uses fluorescence and a laser system for copper quantification. Light-reflecting copper complexes are illuminated when fluorescently activated copper ions pass through a green laser diode, producing an optical signal that corresponds to the copper concentration.



**A ship enters drydock at Puget Sound Naval Shipyard (PSNS) and Intermediate Maintenance Facility (IMF). PSNS&IMF must monitor the levels of copper and other contaminants in shipyard effluent.** (Photo Credit: Thiep Van Nguyen II)



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



Gathering water samples is typically slow, cumbersome and labor-intensive.

(Photo Credit: Lance Cpl. Jacob Bertram)

### **Rapid Pathogen Detection in Drinking and Surface Waters (project no. 589)**

#### **PRINCIPAL INVESTIGATOR: John Frew (NIWC Pacific)**

Current approaches for detecting pathogens in drinking and surface waters from military installations are slow, cumbersome, labor-intensive and prone to false positives. A portable, real-time (or near real-time) tool is required to evaluate whether drinking water supplies and/or surface and drainage waters contain biologic contaminants of concern that could be a threat to human health or the environment.

Currently, the most common method for detecting pathogens for drinking water monitoring and environmental monitoring is a culture assay conducted in the laboratory.

This type of analysis identifies a group of bacteria known as coliforms in the water. However, these drinking water analyses, approved by the EPA, are subject to false positives from field sampling errors, transportation issues and lab cross-contamination. Furthermore, both this type of testing and the more recent EPA-approved rapid assessment method for testing water detects coliforms which in some cases are harmless bacteria found in the digestive tracts of humans or animals.

The goal of this effort is to leverage existing biological detection technologies to create a portable tool that will rapidly detect and quantify targeted biological pathogens of concern in drinking and surface water.

**The remaining seven “new starts” in the table on page 3 will be highlighted in future issues of *NESDI News*.**



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## Full Proposals Requested to Address Priority Needs

In December 2020, the program received 36 pre-proposals to address priority needs identified via the program’s FY20 needs solicitation. The TDWG reviewed and ranked these pre-proposals 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. Full proposals were requested for 23 pre-proposals—proposals that did the best job of meeting the evaluation criteria and addressing the explicit requirements as stated in the targeted need. The following 23 pre-proposals were selected to advance to the full proposal stage:

No.	ID	Submitter	Title
1.	386	Erick Iezzi (NRL)	Oxsol-Free and Low-VOC Surface Ship Topside Coatings for Maintaining Environmental Regulations
2.	387	Paul Block	Evaluation of Regional Airfield Vegetation Regimes to Reduce Wildlife Strikes by Aircraft at Naval Airfields
3.	389	William (Hunter) Spence (NAVFAC EXWC)	XCPC Solar Thermal Evaporation for PFAS-Impacted Wastewater Minimization
4.	390	Louis Carnevale (NAVFAC EXWC)	Subterranean Arsenic Removal from Well Groundwater
5.	391	Hunter Klein (NAVFAC EXWC)	Artificial Intelligence for Environmental Compliance
6.	392	Kenda Neil (NAVFAC EXWC)	Integrated Approach to Estimate Risk and Cleanup Goals for Radionuclides in Environmental Media at Navy Environmental Restoration Sites
7.	393	Tom Boyd (NRL)	Pyrolysis GC for Rapid Soil PFAS Screening and Analysis
8.	394	Kendall Rowe (NAVAIR)	Cadmium and Hexavalent Chromium Free Brush Electroplating Repair of Zinc-Nickel Corrosion Preventative Coatings
9.	396	<ul style="list-style-type: none"> <li>• Channing Bolt (NIWC Pacific)</li> <li>• Ignacio Rivera (NIWC Pacific)</li> </ul>	Characterization of Antifouling Paint and Environmental Loading with Navy Dome System (CHROME DOME)
10.	399	Ramona Iery (NAVFAC EXWC)	Application of Supercritical Water Oxidation SCWO (to Destroy Per- and Polyfluoroalkyl Substance (PFAS)-Impacted Waste Streams
11.	400	Jovan Popovic (NAVFAC EXWC)	Closed Loop, In Situ Soil Flushing at PFAS-Impacted Source Zones
12.	404	Patrick Fedick (NAVAIR)	3D-Printed Cone Spray Ionization Mass Spectrometry for the Rapid, Low-Cost, and In-Situ Detection and Mapping of PFAS in Soil
13.	405	Sophia Lee (NAVFAC EXWC)	Knowledge Base and Pre-Processor Tool for Modeling Groundwater at PFAS Sites Using Numerical Groundwater Models

*(continued on the next page)*





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## Full Proposals Requested to Address Priority Needs *(continued)*

No.	ID	Submitter	Title
14.	406	Alexander Westbrook (NAVAIR)	Advanced Anodize Repair
15.	407	Stephen Chandler (NAVAIR)	Ultraviolet Curable Sealant for Hazardous Waste Reduction and Rapid Cure
16.	408	Stephen Chandler (NAVAIR)	Electromagnetic Interference Shielding Tape (EMIST)
17.	409	Nicholas Hayman (NIWC Pacific)	Chronic Toxicity and Bioaccumulation Evaluation of Multiple PFAS for Benthic and Pelagic Species Relevant to Marine Ecological Risk Assessment
18.	410	Autumn Resto (NAVFAC EXWC)	Initiation Decision Report for Addressing Opportunistic Premise Plumbing Pathogens at Navy Installations
19.	414	<ul style="list-style-type: none"> <li>• Todd Heintzelman (NAVSUP)</li> <li>• Jessica Klinkert (Puget Sound Naval Shipyard &amp; Intermediate Maintenance Facility)</li> </ul>	Minimizing Hazardous Waste from Expired Paints and Associated Solvents from Ships Supply
20.	415	William Spence (NAVFAC EXWC)	Technologies, Process Knowledge & Capabilities that Increase Non-Organic Waste Diversion
21.	417	Pei-Fang Wang (NIWC Pacific)	Sub-Surface Fate and Transport of Petroleum-Based Contaminants in Naval Facilities
22.	419	Rachel Jacobs (NAVSEA)	Evaluation of Existing and Required Pierside Infrastructure to Accommodate Shoreside Collection and Treatment of Navy Vessel Ballast Discharges
23.	421	Kyle Lawrence (NAVFAC EXWC)	Remotely Operated Oil Spill Response Equipment: Down-Selection and Demonstration at a Navy Port

**The call for full proposals runs from 18 January until 11 March 2021. (Full proposals are solicited by invitation only.) Successful proposals will result in “new start” projects beginning in FY22 and beyond.**

## Schedule Revised for FY21 Virtual In-Progress Reviews

The program is planning to hold three “virtual” IPRs over the course of FY21 following the schedule below. The dates for our first IPR have been changed from 23-25 March 2021 to 27-29 April 2021. Principal Investigators and TDWG members are encouraged to adjust their calendars accordingly.

What	When	Investigators Presenting
First “Virtual” IPR	27-29 April 2021	NAVFAC EXWC
Second “Virtual” IPR	3-7 May 2021	FRC Southeast, NAWC-AD Patuxent River & elsewhere
Third “Virtual” IPR	7-11 June 2021	NIWC Pacific & elsewhere

Updated information about our plans for our FY21 IPRs will be provided in future issues of *NESDI News*.



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## Program Schedule

Throughout the winter, the NESDI program will concentrate its efforts on reviewing pre-proposals and selecting the full proposals from Navy investigators that best address the program’s FY21 priority needs. A complete program schedule for the next year is provided below.

No.	What	When
1.	Request Full Proposals	18 January 2021
2.	Conduct OPNAV N45 Virtual Programmatic Review	26 & 27 January 2021
3.	Full Proposals DUE	11 March 2021
4.	Screen Full Proposals	29 March – 2 April 2021
5.	Conduct First FY22 Virtual In-Progress Review	27 – 29 April 2021
6.	Conduct Second FY22 Virtual In-Progress Review	3 – 7 May 2021
7.	FWG & TDWG Comments on Full Proposals DUE	17 May 2021
8.	Principal Investigator Answers to Full Proposal Screening Questions DUE	30 April 2021
9.	Announce FY22 Needs Solicitation	1 June 2021
10.	Conduct Third FY22 Virtual In-Progress Review	7–11 June 2021
11.	Complete Evaluation of Full Proposals	21 May 2021
12.	Obtain Sponsor Review & Approval of Full Proposals	31 May – 13 August 2021
13.	Announce FY22 New Starts	30 July 2021
14.	Close FY22 Needs Solicitation	2 August 2021
15.	Screen FY22 Needs	9 – 13 August 2021
16.	Evaluate & Rank Needs	13 – 17 September 2021
17.	Obtain Sponsor Review & Approval of Needs	20 September – 22 October 2021
18.	Request Pre-proposals	1 November 2021
19.	Pre-proposals DUE	16 December 2021
20.	Make Pre-proposals Assignments to FWGs	7 January 2022
21.	TDWG & FWG Comments on Pre-proposals DUE	14 January 2022
22.	Evaluate Pre-proposals	1 – 21 January 2022
23.	Quarterly Status Reports Due	5 April 2021 5 July 2021 4 October 2021 3 January 2022

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



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# NESDI News

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### GETTING ON OUR MAILING LIST

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### 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 2021 issue, we will provide you with updates on our efforts to review and approve the 23 full proposals solicited by the TDWG for “new start” projects in FY22 and beyond.