

Intelligent Ships Symposium 2025

Philadelphia, Pennsylvania, USA
26 - 28 August 2025

ISBN: 979-8-3313-1627-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2025) by American Society of Naval Engineers
All rights reserved.

Printed with permission by Curran Associates, Inc. (2026)

For permission requests, please contact American Society of Naval Engineers
at the address below.

American Society of Naval Engineers
1452 Duke Street
Alexandria, Virginia 22314
USA

Phone: (703) 836-6727
Fax: (703) 836-7491

asnehq@navalengineers.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

WEDNESDAY, AUGUST 27

7:00 - 4:35 pm Registration Open (Grand Ballroom Foyer)

9:00 - 9:30 am ISS Welcome & Opening Remarks (Grand Ballroom)

- CAPT Dale Lumme, USN (Ret.), Chief Executive Officer, ASNE
- Allison DeRocco, ISS Committee Senior Advisor, NSWC Philadelphia Division
- Tania Teissonniere, ISS Planning Committee Chair, NSWC Philadelphia Division

9:35 - 10:25 am Technical Session 1a Track 1: Marine Engineering (Grand Ballroom)

Moderator: Jessica Niwore, NSWCPD CHENG's Office Code 00E

- *"Investigating Low Pressure, Very Low Global Warming Potential (GWP) Refrigerants for Navy Chillers"...*1
 - Matthew V. Frank, P.E. Thermal Management Specialist, NSWCPD Code 325; Dr. Mark S. Spector, ONR Code 331
- *"Investigating Carbon Dioxide as an Alternative for Navy Modular Refrigeration Systems"...*14
 - Matthew V. Frank, P.E. Thermal Management Specialist, NSWCPD Code 325; Dr. Mark S. Spector, ONR Code 331

9:35 - 10:25 am Technical Session 1b Track 1: Marine Engineering (Liberty Room I)

Moderator: Christina Holt, NSWCPD Code 314 Technical Manual Readiness

- *"Navy Common Actuator (NCA)"...*29
 - Matthew Fohner, Mechanical Engineer, NSWCPD, Code 414 Combat Support Systems; Mark Cybulski, Senior Mechanical Engineer, NSWCPD, Code 414 Combat Support Systems
- *"Dilating Disk Valve (MIL-DTL-32632) - Introducing a new high efficiency control valve which saves money, size and weight supporting mission readiness"...*30
 - Joshua Guedesse, Director of Defense Products, Curtiss-Wright

10:25 - 10:40 am Morning Break (Grand Ballroom Foyer)

10:45 - 11:45 am Keynote Address 1 (Grand Ballroom)

- Peter Reddy, Deputy Assistant Secretary of the Navy for Research, Development, Test & Engineering

11:45 - 12:45 pm Lunch (Outside Grand Ballroom)

12:45 - 2:15 pm Discussion Panel 1:

"The Essential Role of Emerging Technologies and Innovation in Naval Engineering" (Grand Ballroom)

Moderator: Patrick Violante, NAVSEA Additive Manufacturing Project Manager

- Jake Rohrig, Discipline Chief, Collins Aerospace
- Seanna Senior, Senior Vice President of Product, Govini
- Scott Storms, NAVSEA Additive Manufacturing Deputy Program Manager (NSWCPD)
- Mathew VanRavenhorst, Navy Expeditionary Sustainment and Repair (NESAR)
- Dr. John Amy, Senior Technologist for Naval Power Architectures Technologies, NSWCPD

2:15 - 2:30 pm Afternoon Break (Grand Ballroom Foyer)

2:30 - 3:30 pm Technical Session 2a Track 2: Advanced Materials for Marine Systems (Grand Ballroom)

Moderator: Dr. Kaitlyn Sitch, NSWCPD Code 322 Electric Power R&D

- *"Investigations in Alternating Current (AC) Operation of Superconductors for Future Naval Systems"...*41
 - Joseph R. Nalbach, Mechanical Engineer, Naval Superconducting Technologies Applied Research (N-STAR)
- *"Stiffness and Damping Coefficients for Hyperelastic Bearings"...*48
 - Gregory S. Dobbs, Senior Mechanical Engineer, NSWCPD, Code 427, Main Propulsion Shafting Systems
- *"Type II High Temperature Superconductor (HTS) Compact Energy Cell (CEC) Building Blocks for Energy Systems"...*62
 - CDR Michael J. Mielnik, USN (Ret.), P.E., PMP, NDI Engineering Company; Charlie Baume, NDI Engineering Company; Jack Corcoran, NDI Engineering Company

2:30 - 3:30 pm Technical Session 2b Track 3: Fleet Readiness & Sustainment (Condition-Based Maintenance) (Liberty Room I)

Moderator: Tom Fien, NSWCPD Code 532 Remote Monitoring & Condition Based Maintenance

- *"Vibration Monitoring for Condition Based Maintenance on U.S. Navy Ships"...*72
 - Dr. Patrick Lewis, Director of Technology Transition, Hepburn and Sons LLC; Dr. R Byron Beddingfield, Senior Technology Manager, Hepburn and Sons LLC; CDR Walter Hokett, USNR (Ret.), Director of Business Development, Agilis Measurement Systems
- *"Air Compressor Study for CBM+"...*82
 - Neil Eklund, Noblis (Contractor, Code 324 Machinery Silencing R&D), Noblis; Adam Wechsler, Data Scientist, NSWCPD Code 321 Automation & Controls R&D, Noblis; Colin Dingley, Mechanical Engineer, NSWCPD Code 324 Machinery Silencing R&D, Noblis; Khai Van, Mechanical Engineer, NSWCPD Code 322 Electric Power R&D, Noblis
- *"NAVSEA 05T NESAR Distance Support Kit (DSK)"...*90
 - Phillip Borrelli, Distance Support Project Manager, Command Strategies LLC (SEA 05T NESAR); Omar Ramos, Visualization Project Manager, Command Strategies LLC (SEA 05T NESAR)

2:30 - 3:30 pm STEM Event (Liberty Room II)

WEDNESDAY, AUGUST 27

3:30 - 4:30 pm Technical Session 3 Track 4: Machinery Automation (Grand Ballroom)

Moderator: Michael Michejda, NSWCPD Code 323 Machinery Technology R&D

- *“Using AI to Accelerate Identification, Evaluation, and Corrective action associated with Corrosion”...99*
 - Dale Hirschman, Programs and Policy Manager, MI Technical Solutions
- *“Fast Shipboard Electric Network Simulation: Applications of Behavioral Modeling”...103*
 - Ethan T. Alquist, Mechanical Engineering Graduate Student at Massachusetts Institute of Technology (MIT)
- *“Controller Hardware in the Loop Test Laboratory – for testing automated engineering operations and cybersecurity applications”...114*
 - Dr. Theodore Mordfin, Technical Fellow, Leidos / Gibbs & Cox; Matthew Fontaine, Intelligent Fault Management Lead, Weather Gage Technologies; Manuel Camilo, Electrical Dept Asst Manager, Leidos / Gibbs & Cox

4:30 - 6:30 pm No-Host Networking Reception (Lounge 1643 - In Hotel)

THURSDAY, AUGUST 28

7:00 - 2:45 pm Registration Open (Grand Ballroom Foyer)

9:00 - 9:10 am ISS Welcome (Grand Ballroom)

- CAPT Dale Lumme, USN (Ret.), Chief Executive Officer, ASNE

9:10 - 10:45 am Discussion Panel 2:

“The Naval Workforce of the Future” (Grand Ballroom)

Moderator: Joe Amadoro, NSWCPD Code 00E Warfighting Readiness Director

- Dr. Angela D. Lewis, SES, NSWC Crane Technical Director
- Sean Brennan, SES, NAWCAD Lakehurst Executive Director
- Josh Sturgill, Maritime Industrial Base Workforce Development Lead
- Peter McCauley, Technical Warrant Holder for Machinery Integration at NAVSEA 05Z

10:45 - 11:00 am Morning Break (Grand Ballroom Foyer)

11:00 - 12:00 pm Technical Session 4a Track 5: Power Systems, Storage & Distribution (Grand Ballroom)

Moderator: Ewane Etinge, NSWCPD Code 322 Electric Power R&D

- *“Next Gen Power Conversion for Navy / Marine Propulsion and Integrated Power Systems - Hybrid Modular Multilevel Converter (HMMC)”...123*
 - Dr. Joe Zhou, GE Vernova Power Conversion & Storage
- *“MIL-STD-1399 Section 300 Part 3: The Navy’s New Low Voltage Direct Current Power Interface Standard”...135*
 - Steven Swindler, P.E., Cardinal Engineering; Humberto Lopez, NAVSEA 05Z32 Technical Warrant Holder; Dr. John Heinzel, NAVSEA 05 Integrated Power Systems Technical Advisor, Naval Systems Engineering and Logistics Directorate
- *“Metaheuristic Optimization for Automatic Arrangement of Power Electronics Components in a Shipboard Electrical Distribution System”...140*
 - Dr. Julie Chalfant, Research Scientist, MIT Sea Grant; Sebastien Lohier, Computer Science Graduate Student, Massachusetts Institute of Technology (MIT)

11:00 - 12:00 pm Technical Session 4b Track 6: Fleet Readiness & Sustainment (Digital Twin) (Liberty Room I)

Moderator: Elyse Merkel, NSWCPD Code 225 In-Service Ships & Cross Platform Engineering

- *“Digital Twin-Based Tactical Energy Management Controller for Intelligent Ship System Control”...151*
 - Dr. Andrew Wunderlich, Engineering Manager, Digital Twins & Controls, Integer Technologies LLC & University of South Carolina
- *“Internet of Digital Twins: A Genetic IOT Platform for Mission Readiness Management”...157*
 - Kent Colling, Founder & CEO, BluEyeQ LLC
- *“Enhanced Maintenance Capabilities for Electronic Circuitry (Digital Twin)”...167*
 - Harry Kennedy, Technical Specialist, Electronic System Design, Altair

12:00 - 1:00 pm Lunch (Outside Grand Ballroom)

1:00 - 2:00 pm Keynote Address 2 (Grand Ballroom)

- CAPT Reid Nagao, USNR, Acting Director, NAVSEA Warfighting Readiness 00R

THURSDAY, AUGUST 28

2:00 - 3:00 pm Technical Session 5a Track 7: Unmanned Technology (Grand Ballroom)

Moderator: Thiago Szymanski, NSWCPD Code 322 Electric Power R&D

- "Object Detection and Automated Data Annotation Based on Low Level Features in Multiple Image Domains"...168
 - Dr. Yi Wang, Professor of Mechanical Engineering, University of South Carolina; Luke Bagan, Mechanical Engineering PhD Student, University of South Carolina; Tristan Kyzer, Perception Engineering Manager, Integer Technologies LLC
- "Use of Autonomy Digital Ecosystems in Development of xUSV Controls"...169
 - Mike Lear, Lockheed Martin Associate Fellow; Mr. Andrew Young, PE, IWSS Strategic Products & Initiatives, Small Combatants & Ship Systems
- "An Approach to Optimizing the Convergence of Autonomous Fault Isolation in Ship Platform Distributed Systems"...175
 - Dr. Stephen Konyk Jr., Villanova University

2:00 - 3:00 pm Technical Session 5b Track 8: Digital Transformation (Liberty Room I)

Moderator: Mark Cybulski, NSWCPD Code 414 Combat Support Systems

- "21st Century Networks: Powering and Energizing the Next Generation Warship"...183
 - Nick Smith, Executive System Technology, GE Vernova Power Conversion & Storage
- "Transforming the Digital Playing Field: Integration of Digital Technologies for the Fleet's Tool Kit"...184
 - Dr. Renee Oats, NSWC Port Hueneme; Jason Bickford, NSWC Port Hueneme
- "The Effects of Incorporating Physics-Based Knowledge on Training Model to Predict Condenser Fouling"...193
 - Dr. Ethan Wescoat, Mechanical Engineer, NSWCPD, Remote Monitoring and Condition Based Maintenance Systems (Code 532)

3:00 - 3:15 pm Afternoon Break (Grand Ballroom Foyer)

3:15 - 4:15 pm Technical Session 6 Track 9: Integrated Monitoring & Communication Systems (Grand Ballroom)

Moderator: Jacob Kephart, NSWCPD Code 325 Energy Conversion R&D

- "Portable Wi-Fi Sensors"...194
 - Dale Hirschman, Programs and Policy Manager, MI Technical Solutions
- "Wireless Optical Communication"...198
 - Dale Hirschman, Programs and Policy Manager, MI Technical Solutions
- "Architecture-Driven Model-Based Development of High-Assurance Embedded Software and Display Systems"...202
 - Travis Maslow, Senior Application Engineer, Ansys, Inc.

4:15 - 4:30 pm ISS Closing Remarks (Grand Ballroom Foyer)

- Nick Scarpato, 2027 ISS Planning Committee Chair, NSWC Philadelphia Division

NAG

M A R I N E ★

DESIGNED & MANUFACTURED IN THE U.S.A.
BY RUGGED SCIENCE

MIL-SPEC COMPUTERS



- Up to a 24-Core Intel® CPUs with up to 10-years of Lifecycle Support
- ARM-based CPU Options up to 128-core
- NVIDIA GPU Support for GPGPU & AI/ML Applications
- Fan-less (optional) & Solid-State
- Operating Temps of -20°C to 70°C • Customizable I/O
- Software-Agnostic



HIGH PERFORMANCE SERVERS



- 2U/3U 20" Rackmount Options
- Up to 256 x86 or ARM-64 cores
- Up to 6TB of DDR5 memory
- Up to seven PCIe GEN5 slots
- Operating Temperature: 0°C - 60°C
- I/O options: high speed ethernet, GP-GPU, MIL-1553, and more

For over 25 years, NAG Marine has successfully served the fluid automation and rugged electronic needs of our DoD & commercial maritime customers. We have built an outstanding reputation as a trusted provider of reliable products backed by our manufacturing partners and teams of experts in quality, service, and support.

www.nagmarine.com