

# Operationalizing AI for National Security at the Naval Postgraduate School

The Naval Postgraduate School is advancing artificial intelligence to meet the needs of the Naval and Joint Forces through a coordinated effort that combines education, research and problem solving.

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# The AI Task Force at NPS

The NPS AI Task Force is building a unified effort to accelerate the Navy and Marine Corps' ability to understand, adopt, and operationalize artificial intelligence. This framework establishes NPS as the Naval AI Accelerator integrating education, experimentation, and operational collaboration to deliver AI solutions that strengthen warfighting advantage.

The AI Task Force focuses on five lines of effort:

- Build an AI-Ready Naval Workforce
- Provide Secure and Scalable AI Infrastructure
- Accelerate Applied AI Research and Prototyping for Mission Impact
- Drive Collaborative AI Efforts Across Naval Stakeholders
- Support Combatant Command and Naval Service Priorities



By connecting research, education and operational application, the AI Task Force ensures that NPS delivers AI solutions that are relevant, secure, and ready to enhance naval warfighting effectiveness.



# The NVIDIA AI Tech Center

Through a Cooperative Research and Development Agreement with NVIDIA, NPS established an AI Tech Center in 2025 to support applied, warfighter-driven artificial intelligence experimentation and education. The effort integrates NVIDIA platforms and expertise into NPS research and curriculum, enabling work across artificial intelligence, autonomy, modeling and simulation, and advanced analytics. Capabilities include NVIDIA DGX systems, GPU-accelerated simulation and digital engineering infrastructure, and edge AI devices, enabling applied AI experimentation in operationally relevant, secure environments. A combined gift from Dell Technologies and Sterling Computers provided advanced simulation and digital engineering infrastructure supporting operations across unclassified, controlled unclassified information, and classified environments.

In early 2026, NVIDIA will deliver a DGX GB300 system to NPS, NVIDIA's newest generation AI computing platform and a first-of-its-kind capability for the Naval and Joint Force. Built on Blackwell architecture, the system will significantly expand AI compute capacity, enabling large-scale experimentation and model training across domains.

# The NPS Foundation Role

The Naval Postgraduate School Foundation plays a central role in advancing AI at NPS by providing the resources and mechanisms that make partnerships like the NPS-NVIDIA collaboration successful. The Foundation has committed up to \$2 million to support AI initiatives at NPS including the hiring of mentors, research technicians, and a dedicated program portfolio manager, as well as direct funding for infrastructure, hardware, software and lab resources that sustain education, research and prototype development.

The Foundation operates through multiple authorizations that enable different forms of support for NPS and the Department of the Navy. As an independent 501(c)(3) nonprofit, it can accept and manage private contributions to strengthen NPS and its mission. Under a Partnership Intermediary Agreement (PIA) with NPS, it hosts events, activities and challenges that connect students, faculty, and industry innovators to drive discovery and collaboration. And through a Memorandum of Agreement (MOA) with the Department of the Navy, the Foundation serves as a partner in the Naval Innovation Center at NPS, providing funding, in-kind resources, and ongoing technology support.

# Digital Trident AI Challenge

The Digital Trident AI Challenge is designed to increase mission impact by leveraging cutting-edge NVIDIA technologies and tools available at the Naval Postgraduate School. With support from industry partners, seven NPS student-faculty teams are developing AI solutions to address national security challenges. These projects were selected from 38 submissions to receive a total of \$825,000 in funding and additional in-kind support provided by the Naval Postgraduate School Foundation. The Digital Trident AI Challenge is an ongoing initiative and will continue to support future teams and projects.

**By empowering Naval Postgraduate School students and faculty to push the boundaries of AI, we strengthen the ability to deliver decision advantage and operational effectiveness to our warfighters.**  
– Kaitie Penry, Director of Emerging Tech & Innovation



## ONGOING PROJECTS SELECTED THROUGH THE DIGITAL TRIDENT AI CHALLENGE INCLUDE:

### **BOMA NIX: AI-Enhanced Passive Sensing and Interoperable C2 for Maritime Operations** (PI: Prof. Kevin Smith)

- Develops interoperable sensing and C2 architectures for multinational maritime missions.
- Advances NATO and DOD maritime integration through physical AI experimentation.

### **AI-Driven Seeker Autonomy and Omniverse-Integrated Digital Twin for Low-Cost Missile Development**

(PI: Maj. Dillon Pierce)

- Accelerates design and testing of autonomous weapons systems using digital twin modeling.
- Supports affordable, scalable missile architectures aligned with operational needs.

### **Towards Ultra Long Endurance Flight Around the World** (PI: Prof. Mark Karpenko)

- Improves endurance, adaptability, and autonomy of UAVs for operations in remote or denied areas.
- Enables new mission planning and platform development for long-range, persistent flight.

### **Terahertz Imaging Camera for Upper Atmosphere Surveillance** (PI: Prof. Fabio Durante Pereira Alves)

- Validates compact THz imaging sensors for potential space-based surveillance missions.
- Defines pathways for onboard AI processing and future edge-enabled ISR applications.

### **Operational Application of AI for Automatic High Energy Laser (HEL) Beam Control** (PI: Prof. Brij Agrawal)

- Develops AI-enhanced targeting systems to improve accuracy and responsiveness of HEL platforms.
- Strengthens Navy capability to defend against drone swarms and other fast-emerging threats.

### **Small Scale AI for Aviation Maintenance** (PI: Harrison Schramm)

- Designs AI-powered maintenance tools that operate without cloud or network dependency.
- Enhances real-time fault detection and repair to increase mission readiness in austere conditions.

### **Operationalizing AI with Microgrid Digital Twins for Energy Security** (PI: Prof. Doug Van Bossuyt)

- Creates digital twins to simulate and manage energy infrastructure across naval installations.
- Improves mission assurance and operational resilience in contested and distributed environments.



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# AI CAPABILITIES AT THE NAVAL POSTGRADUATE SCHOOL

## NPS AI FACTORY

### NVIDIA DGX AI Supercomputer



*A rack-scale “AI factory” system built on the Grace Blackwell Ultra platform, engineered for large-scale AI training and high-throughput inference (including reasoning and long-context workloads).*

**NVIDIA’s DGX GB300 provides the Department of Navy & Joint Force access to a level of AI compute power not available anywhere else in the DoW,** enabling military teams to train and operate large, domain-specific models that can support maritime operations, expeditionary warfare and special operations missions, including AI-enabled planning, ISR fusion, autonomous behaviors, and operational decision support.

### Impact

- Accelerates research and prototyping for interdisciplinary teams and mission-focused sprints.
- Enables next-generation simulation and digital twins (wargaming, autonomy, multi-domain modeling) with high-throughput AI pipelines.
- Facilitates secure, scalable model development, fine-tuning, and inference experimentation aligned to Fleet needs.
- Empowers NPS and its industry partners to mature advanced AI concepts at scale.

### Example Use Cases

- Large-scale foundation model training on operational and defense-specific datasets
- Fine-tuning and adaptation of LLMs for naval planning, intelligence, and operations
- Reinforcement learning training for autonomous surface, subsurface, and aerial platforms
- Multi-agent AI training for fleet tactics, swarming, and adversarial competition
- AI-assisted wargaming training using self-play and red & blue force learning loops



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## NVIDIA Omniverse and the NVIDIA Deep Learning Institute



*A platform that enables the integration of OpenUSD, NVIDIA RTX™ rendering technologies and generative physical AI into existing software tools and simulation workflows.*

The NVIDIA Omniverse and the Deep Learning Institute provide NPS, the Department of Navy and the Joint Force with an AI-ready workforce through hands-on and mission-relevant education, training and experimentation that aligns with operational needs.

### Impact

- Enables secure, high-fidelity modeling, simulation, and real-time AI experimentation, to include digital twins and shared virtual environments.
- Accelerates AI-driven decision-making across training, planning, and system development.

## MITRE ASPEN Model

### *Advanced Simulation for Planning & Enhanced Navigation*

*A high-fidelity digital twin environment for simulating — using the NVIDIA Isaac Sim framework for robotics — with unmanned underwater vehicle (UUV) navigation, obstacle avoidance and real-time decision-making under uncertain conditions like currents, low visibility and acoustic interference.*

MITRE's ASPEN model provides NPS, the Department of Navy and the Joint Force with a high-fidelity digital twin simulation environment that supports maritime mission planning and navigation tasks in complex and uncertain environments.

### Impact

- Enables modeling and evaluation of autonomous systems.
- Incorporates real-time vehicle position and orientation data for hardware-in-the loop model training and mission prediction.



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