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MONTEREY, Calif. (February 3, 2022) — The Naval Postgraduate School Foundation recently selected four new defense research projects led by Naval Postgraduate School faculty to receive a total of \$405,000 in research funding and additionally provided \$220,000 to enhance research facilities for hypersonics and marine acoustics at NPS.

"The funding for the 2022 research projects targets NPS priorities and accelerates the adoption of new capabilities into the Naval Services and the broader Department of Defense. More importantly, these projects will be a catalyst for engaging industry partners and DOD sponsors to scale solutions that matter at the speed of relevance," said Karen Hargrove, NPS Foundation Trustee and chair of the Foundation's Funding Committee. "Research areas that are most critical today, such as hypersonics, integration of autonomous systems, cyber and space communications, have impacts across our entire military. The solutions to operational challenges need to be available across the joint force for us to achieve a competitive advantage."

The projects selected for 2022 seedling funding align with the [Naval Warfare Studies Institute's](#) Research Task Forces Hybrid Force 2045 and Project Overmatch, the Navy's multi-command plan for a connected force for future battles.

Using a competitive, venture capital funding model to determine funding support, the NPS Foundation provided the following investments in 2022 projects:

- \$200,000 to support upgrading the current Mach 4 wind tunnel in the NPS Gas Dynamics Laboratory into one capable of producing uniform Mach numbers greater than 5.0 for runtimes longer than 20 minutes. With hypersonics sitting atop the short list of Department of Defense research priorities, the Naval Postgraduate School is uniquely equipped to contribute to this research. With this investment, the current configuration of the gas dynamics laboratory can facilitate long-runtime, high-Mach number flows. Dr. Garth Hobson is the NPS faculty lead for this project.

- \$175,000 to support research for inverting the command and control (C2) pyramid for large-scale unmanned aerial system (UAS) experimentation and education. In support of U.S. Navy and Marine Corps strategies to employ unmanned systems as force multipliers, this research addresses the currently burdensome manpower and equipment requirements to provide C2 to unmanned systems. It will result in a one-of-a-kind experimental testbed at NPS for multi-vehicle operations as well as realize capabilities for a single warfighter with an appropriate interface to direct a team of unmanned systems. The research team consists of NPS faculty members Dr. Sean Kragelund, Dr. Isaac Kaminer and Aurelio Monarrez.
- \$100,000 to support research of turbulent wake detection to determine the viability of non-acoustic wake detection of submerged objects using surface temperature and turbulence. The research addresses the issues of sound damping through advances in technology as well as shadow zones, which are ocean regions that are unobservable using acoustic methods. The funding enables direct technical support to student theses and the publication of findings. The research team includes NPS faculty members Dr. Justin Brown and Dr. Timour Radko as well as seven meteorology and oceanography masters students.
- \$80,000 to support research of a low-cost design for extending the endurance, range and capability of the Sonobuoy-Tube Launched Unmanned Aerial Vehicle (SL-UAV). The funding supports research, development and field experimentation of a new solar wing that will optimize a UAV's mission effectiveness, reduce operating costs, and enhance payload capabilities to accommodate sensors that support anti-submarine warfare missions. The research team includes NPS faculty members Dr. Sherif Michael and Dr. James Calusdian along with five electrical engineering masters students.
- \$50,000 to support research of a pseudorandom number generator that will result in a state-of-the-art decimation-based PRNG for use in future military systems and improve the security of a host of military and civilian technologies. The research will also increase Department of Navy and DOD expertise and knowledge in tactical cryptography. The research team includes NPS faculty members Cmdr. Thor Martinsen, Dr. Pante Stanica, Dr. Douglas Fouts and Dr. Britta Hale.
- \$20,000 to support the inspection and restoration of undersea cables required for operating undersea acoustic sensors for the Naval Cable Acoustic Observatory. The funding enables the connection of new tetrahedral acoustic sensors for meteorology and oceanography research in support of the U.S. Navy's Task Force Ocean and the Monterey Bay Ocean Consortium. Researchers will leverage the 5G tower at the Sea Land Air Military Research (SLAMR) lab to extract collected data. The team includes NPS faculty members Dr. Doug Horner, Dr. Kevin Smith and John Joseph.

In addition to aligning with NWSI's Research Task Forces, projects such as the wind tunnel upgrade for hypersonics research also support the new DOD Technology Vision and the science and technology strategies across the joint force.

“The increasing interest in hypersonic weapons and flight vehicles combined with the undesirable phenomenon of unstart that occurs in supersonic inlets is the effort we aim to understand and ultimately control,” said Dr. Garth Hobson, the project lead for the wind tunnel upgrade. He added that “The upgrade to our Super Sonic Wind Tunnel system with the electrical heater will allow for testing at true hypersonic speeds of Mach 5+.”

“The Navy's Science and Technology Strategy envisions a future where warfighters seamlessly employ large numbers of distributed Intelligent Autonomous Systems to gain a decisive advantage on the battlefield,” said Dr. Sean Kragelund, the lead researcher of the unmanned systems project.

“NPS conducts operationally relevant research and field experimentation with ScanEagle, an unmanned aerial system used by Naval Special Warfare and the Marine Corps,” added Kragelund. “Funding from the NPS Foundation will support development, flight test and validation of a framework for controlling multiple ScanEagles from a single interface. This will allow us to leverage several aircraft recently provided by U.S. Special Operations Command for multi-vehicle operation.”

The NPS Foundation's Defense Innovation Fund supports early-stage research and development projects at NPS that focus on accelerating the adoption of new capabilities into the Department of Defense. The fund moves projects from concept to capability by providing the initial investment to develop projects to the point where they can compete for federal spending. The Seed program uses a venture capital model to select research projects that address operational challenges that are often identified well before the military requirement is articulated. If the initial research shows sufficient progress and potential, those projects become “seedlings” and receive additional funding. The investment in early stage research creates opportunities for the Naval Postgraduate School to develop capabilities well before the military services uncover a vulnerability or opportunity.

By funding early-stage projects, ideas from some of our nation's brightest are transformed into scalable and world-changing solutions for defense, technology, energy, climate and more. Supporters can [donate to the Defense Innovation Fund](#) and make a major impact on America's global advantage.

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About Naval Postgraduate School Foundation & Alumni Association

The Naval Postgraduate School Foundation is a 501(c)(3) nonprofit providing support and advocacy to the Naval Postgraduate School, our Nation's premier defense education and research institution. NPSF is at the intersect of engagement with students, alumni, faculty, the broader DOD, and industry in addressing challenges and identifying opportunities that advance the capabilities of the Department of Defense, Department of Homeland Security,

and our allies. By funding defense innovation research, student and alumni programs, and NPS initiatives, NPSF lays the foundation for NPS to develop the leaders, technologies, and ideas our Nation needs to keep our service members safer abroad and us all safer at home.

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