

# Providing More Efficient Pathways to Advanced Materials Development and Commercialization



**NAUTILUS  
DEFENSE**

Nautilus Defense designs and builds advanced material-integrated systems. Leveraging its novel functional yarn technologies, Nautilus constructs textile, composite, and additively manufactured systems with integrated electrical, electronic, and electromagnetic capabilities. These yarns present a dynamic toolset for transforming materials into integrated systems without compromising their mechanical performance or survivability. With a focus on rapid experimental development, the Nautilus team is continuously maturing and expanding upon its material-integrated systems technology portfolio.

Focused on the development, transition, and commercialization of enduring and impactful solutions, Nautilus is actively developing systems for its Army, Navy, and Air Force customers. Capabilities under development include deployable textile-integrated sensor arrays for improved situational awareness, composite-integrated data and power networks for endurance-optimized electric vertical takeoff and landing (eVTOL) vehicle airframes, electromechanically optimized tethers for deployable remote sensors, and integrated data and power networks for additively manufactured parts.

These material-integrated systems support the Department of Defense's Multi-Domain Operations concept by providing mission-critical capabilities without an increased logistics footprint. Nautilus is also pursuing opportunities to leverage its technologies and expertise in the development and construction of solutions for commercial markets which employ fiber-based and fiber-reinforced materials today.

## MEANINGFUL INTERACTIONS THAT CREATE BUSINESS RESULTS

However, creating brilliant technology that can help change the world is only half the battle. Getting those innovations in front of the people who need them, in an efficient and effective manner, is an equally critical part of the equation.

401 Tech Bridge was created to connect manufacturers, small businesses, research and development entities, trade organizations, and government and defense agencies to collaborate in the development of new advanced materials, technologies, and products. Jim Owens, Principal at Nautilus Defense, attended 401 Tech Bridge's first prize challenge event in December of 2019 and quickly understood the benefits of the connections the organization enables.

During the event, Owens was able to meet with several existing contacts and establish a new connection that led to a potential partnership. According to Owens, the ability to have conversations and educate industry stakeholders on current projects in an informal, low-pressure environment creates opportunities to interact with customers and potential collaborators that are often not possible within a structured meeting environment.

The in-person events and connections created by 401 Tech Bridge also generate huge efficiencies for smaller teams that typically wear a lot of hats. The organizations that 401 Tech Bridge brings together come from a tight ecosystem—essentially a “who’s who” of those working in the advanced materials space—with shared interests. This facilitates highly relevant and powerful interactions that can help create a qualified sales funnel as well as efficiencies in opportunity management, which are critical for many small businesses.

“401 Tech Bridge is helping to build a community focused on solving problems and creating new solutions in the advanced materials industry, and we will all grow together from that,” said Owens. “That has the potential to create exponential returns for the DoD, small businesses, research partners, and the state of Rhode Island as a whole.”



**Jim Owens**  
Principal  
Nautilus Defense

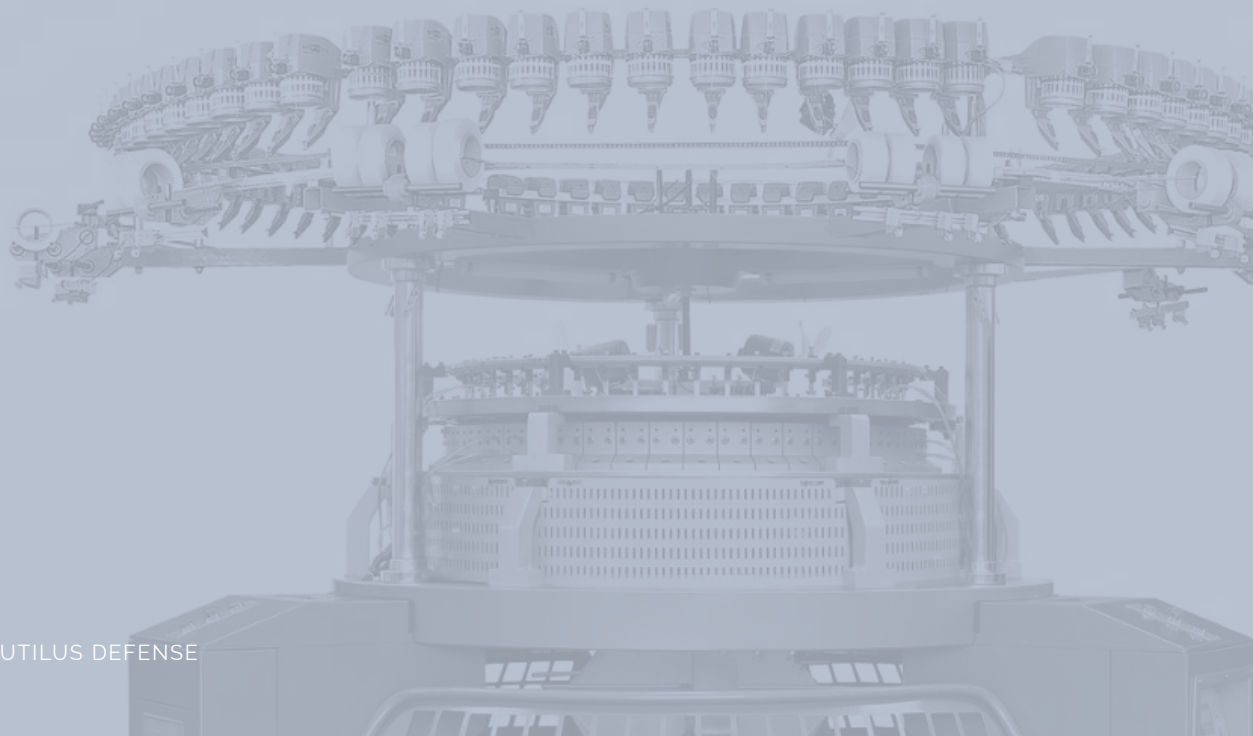
*“401 Tech Bridge is helping to build a community focused on solving problems and creating new solutions in the advanced materials industry, and we will all grow together from that.”*

One of the major barriers for smaller organizations that are developing groundbreaking new products for the DoD and larger commercial markets is the sheer number of people they often must vet to find the right contacts. 401 Tech Bridge helps make those key connections a lot faster. For example, bringing parties together that have the capability to design, build, and test, creates tremendous efficiencies in the product development process, ultimately helping to accelerate the development cycle and the commercialization of new products that are critically important to defense and other innovative business applications.

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Furthermore, 401 Tech Bridge provides an opportunity for innovators to get technology and capabilities directly in front of customers that many small businesses might otherwise not have access to. For example, in DoD applications, there are typically multiple proposal submissions involved to kick-start a product development initiative. 401 Tech Bridge provides an opportunity for innovators to have a natural conversation and show prospects their technologies and capabilities. The opportunity to showcase an actual prototype and explain how it works is more powerful than sharing a slide deck.

"It is a different experience when you are in front of someone and can physically show them how your solution can solve their specific problems; the interaction is entirely different," added Owens. "401 Tech Bridge is a valuable resource in creating these interactions."



## ADVANCING BUSINESS POSSIBILITIES

Nautilus Defense was named one of the winners of 401 Tech Bridge's Materials Innovation Challenge in December 2020. The 401 Tech Bridge Materials Innovation Challenge was formed to address a lack of internal R&D labs among the small organizations that make up the bulk of the Rhode Island region's advanced materials businesses. 401 Tech Bridge collaborated with these small businesses, including Nautilus Defense, to identify the expertise and tools they needed to further the readiness of their new solutions.

401 Tech Bridge is providing \$35,000 per awarded project to the University of Rhode Island (URI) College of Engineering to support collaboration with URI's Dynamic Photomechanics Laboratory and the Multiscale & Multiphysics Mechanics of Materials Research Laboratory on modeling, research, testing, and validation projects. This funding will enable Nautilus to work with the URI laboratories to perform electromechanical testing of novel textile-integrated systems, which will help to further strengthen the company's offerings to the defense and commercial markets.

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"I am really excited about what 401 Tech Bridge is today, and even more so what it can be as it grows and matures," concluded Owens.



## **ABOUT 401 TECH BRIDGE**

401 Tech Bridge accelerates the journey from concept to prototype to commercial scale while creating business opportunities. It facilitates collaboration across industry, government and academia and leverages the resources and expertise of its vibrant advanced materials and technology ecosystem, which spans industries and activities ranging from infrastructure development and naval research to oceanographic and offshore wind enterprises. 401 Tech Bridge offers meeting, training, lab and equipment space for industry, government, and academic partners to collaboratively problem-solve, develop concepts, build, and test prototypes, and present solutions. It also connects companies into research divisions at the University of Rhode Island and other universities and institutions across the region, offering facilities for research, prototyping, testing and validation of concepts alongside faculty researchers and students.

The 401 Tech Bridge is a business unit of The University of Rhode Island Research Foundation and serves as a partner intermediary organization for the Naval Undersea Warfare Center Division Newport, supporting the Naval X Northeast Tech Bridge. It receives support from the U.S. Economic Development Administration, the National Institute of Standards and Technology's Manufacturing Extension Partnership (NIST MEP), Rhode Island Commerce, The Rhode Island Foundation, and the Van Beuren Charitable Foundation.