

NAVY SBIR TRANSITION PROGRAM

SPOTLIGHT

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Tailoring technologies for the warfighter: Aptima's human-centered approach to successful transitions

By Amie Alscheff

Founded in 1995, Aptima, Inc. has been working to solve human performance-focused problems for the federal government for nearly 30 years. This experience includes more than 500 SBIR/ STTR Phase I and Phase II awards, with numerous technologies successfully transitioning to the DoD and other government clients.

Aptima's Confined Spaces Monitoring System (CSMS) is an SBIR technology originally developed for the Air Force that is currently being adapted to meet Navy shipyard requirements. The CSMS detects and mitigates health and safety hazards for workers performing maintenance and sustainment tasks in confined spaces. Working in confined spaces, with little room to move and few options for entrance and exit, puts workers at risk of serious injury from hazards including insufficient oxygen supply, flammable or explosive atmospheres, and exposure to toxic gases. Aptima's CSMS solution transmits data from wearable sensors to a remote display via secure wireless networking and allows for continuous real-time monitoring of entrants into confined spaces, including factors such as heart rate, motion, and targeted gases in the atmosphere around them.

Aptima is currently working with the Innovations Group at Portsmouth Naval Shipyard in Kittery, Maine, to demonstrate, tailor, and transition the technology for Navy use.

"With the Navy we started in 2020, right before COVID hit, so that was a little curveball thrown at us," recalled John Feeney, principal research engineer at Aptima, Inc. "We did manage to get



Image provided by Aptima
Testing the USAF CSMS with Air Force Maintenance Artisans.

on the shipyard during COVID, believe it or not. Wearing safety glasses, hard hats and masks at the same time was a challenge, but we were able to demonstrate the technology."

One of the challenges in taking the CSMS from Air Force to Navy is that the size and construction of a Naval vessel is much different from an aircraft, which means the physical nature of the confined spaces is not the same. The system also needs to comply with Navy-specific Occupational Health and Safety Administration (OSHA) regulations and cybersecurity requirements. Some of the Navy's requirements have changed during the development process. "Around the start of 2024, there was a major pivot on the Navy's part," said Feeney. "The system that we originally developed for the Air Force was cloud-based software as a service. When we originally proposed it in 2020, the Navy was pretty firm that they would have an on-premises Navy-run server architecture, so we spent a number of years working through that. Now they're pivoting to developing an enterprise-wide cloud-based solution that could fit not just

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Portsmouth, but any of the Naval shipyards or intermediate repair facilities. We successfully demonstrated a cloud-based alternative to the on-premises Navy-run service at Portsmouth and have already begun transitioning our efforts focused on an enterprise solution vision so it can be applied across the shipyards.”

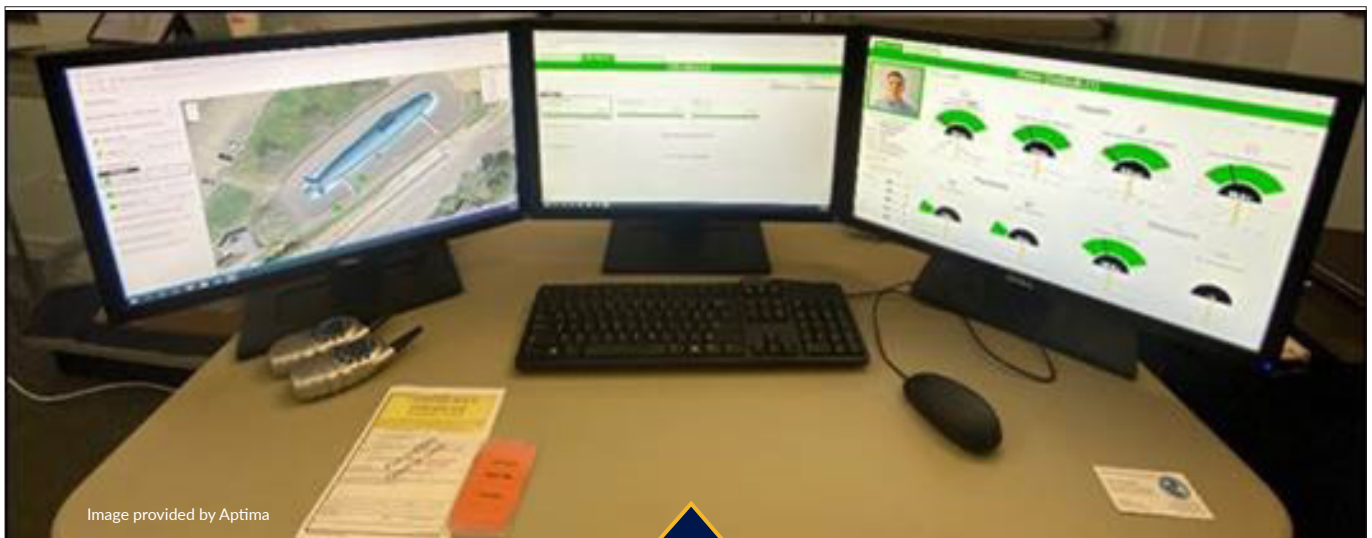
Both the Air Force and the Navy transitions have drawn from a variety of funding vehicles, according to Feeney. “For the Air Force, it was a Phase III SBIR contract. There was also a Rapid Innovation Fund award; it was an assortment of different contract vehicles and approaches. Each of these different funding vehicles supported different parts of the project for the Navy.”

Additional funding to create the Navy version of the CSMS has come through the National Center for Manufacturing Sciences (NCMS) Commercial Technologies for Maintenance Activities (CTMA) program. CTMA is a contracting vehicle that works with industry and academia to advance the development and integration of commercial technologies to aid DoD maintenance activities. “The idea behind CTMA,” said Feeney, “is ‘try it before you buy it.’ It’s a streamlined acquisition process where they can buy systems or components to try out, get evaluations, get them in the hands of users, and then decide whether

they want to press on. Ours was a little unique in that it was a system that was being tailored for the Navy and it wasn’t a commercial off the shelf product at that time. The CTMA is like a BAA. It encompasses all of the DoD maintenance enterprises. It’s the one stop shop to get maintenance contracts through, especially when you’re not a traditional government contractor.”

Over decades of experience, Aptima has refined its strategy for successfully transitioning technologies through the DoD’s SBIR/STTR programs. Counterintuitively, this means the company is going after fewer new SBIR awards.

“In the last five to 10 years,” said Feeney, “there’s been a concerted effort on Aptima’s part to get away from doing Phase Is and Phase IIs. We still do them, but now it’s targeted and with an eye for extending or enhancing platforms for use in rapidly developing new solutions. They’re not our main revenue source anymore and we’ve transitioned to the Phase III bringing in more revenue. We have a large portfolio of Phase I and Phase II work that we use to create the Phase III vehicles. There’s a term coined by AFRL called ‘SBIR stitching.’ Individual SBIR topics can be very niche and very narrow. What AFRL did was say, ‘I need a system, so I’m going to take these four different SBIR technologies and stitch



A remote attendant monitoring stations demonstration from the initial testing for Portsmouth Navy Shipyard in 2020.

them together to create that system.' That's how the Air Force created one of our first Phase III vehicles, through SBIR stitching."

Having built up a large portfolio of SBIR technologies, Aptima is now more selective about which new SBIR topics it tackles. "We have a whole review process of looking at literally all the topics that come out in any given round. We kind of rack and stack them, see who's interested in what. Then senior management will go through and review them and see if they're aligned with our core mission, which is human centered engineering. If there's not a human component, we typically don't go with it. We've become much more targeted in what we go after and how it aligns with our overall capability areas, whether that be AI, performance augmentation, training and learning, those sorts of things."

According to corporate communications specialist Chelsea Morrissey, at one time Aptima derived up to 60% of its revenue from SBIR funding. In recent years, that percentage has dipped below 25%. "Because they've gotten so much more selective in their process over the years," Morrissey explained, "we're going after fewer, but we're doing it better. We're not just throwing out a handful of darts and seeing what sticks anymore. We're much more selective now. Because of that, the work quality is better and we're able to continue on and push it into those Phase IIIs."

One current project that Aptima is excited about is MITHRIL (Measures Integration Toolkit for Heat Risk Intervention Logic), which was just selected for a Phase II award. MITHRIL is a heat stress monitoring system that will be deployed during military training to prevent heat strain and heat illness incidents. Similar to the CSMS, MITHRIL pairs wearable sensors with a secure computing platform to monitor physiological data from training participants and proactively detect anyone approaching risk of heat stroke.

Working with the Office of Naval Research (ONR)

Human and Bioengineered Systems Division, Aptima is completing the contract's built-in Phase I option while the Phase II is being finalized. Unique to the Navy's SBIR program, the Phase I option provides funding to cover the gap between Phase I and Phase II awards. "It allows you to continue work on the Phase I while the Phase II decision is being made," said Feeney. "It's a pretty smart idea because contracts could take three or four months where you're just sitting idle. They can release this other pocket of funds that keeps you working on the project and really lets you hit the ground running in Phase II. With other organizations, the way they have the Phase I and Phase II split, there could be this gap. It's a nice way the Navy helps prepare you to really succeed in Phase II."

"We're planning on going to a few different events this summer out at Camp Pendleton for the Marines and possibly at Fort Leonard Wood, to learn more about the training events that are going on and start doing some early testing of our system and to really focus on making sure that we don't build something that just works in theory, but really works in the workflow of the training events," said Isabel Erickson, a research engineer in the Performance Augmentation Systems Division at Aptima. "We're going to be developing a testing plan, but summer is a really good time to do the testing for heat stress so we don't want to waste that time. We're getting our feet wet with the testing and understanding more specific requirements. During the Phase I option, we've already been able to talk way more with our customers and our stakeholders, so that's been a big help."

For its Navy Phase II projects, Feeney said Aptima tries to take advantage of the Navy STP program.

"I think it's become more of a priority to work in programs like this, simply because it provides three key things: One, the Navy STP program gives you incredible background about the structure and organization of the Navy and the

different components and how they interact with each other. From a workforce perspective, it gives an understanding of why you should talk to this organization because they focus on training, let's say, versus some other weapon system or something like that. Working with our business development group, we're going to try to get all the materials together from the program and put them in a repository so it would be available companywide, not just for those SBIR projects that decide to go with the STP. And I was shocked

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at the number and the quality of the webinars they would have on almost a weekly basis.

“The second thing it does is it gives visibility to that project to others within the Navy that might not see it. Isabel and I were both at the Showcase event in Arlington this spring and we met people we never would have met on the project. We brought in other customers of ours in the Navy that didn't know we were working on this, and new people. That was really helpful.

“The third thing it does is provide that avenue for transition. And it might not even be transition with the Navy, it might be some other organization. In fact, I think one of the people from the Navy said we should talk to someone

in the Army about some of the technology we're working on. That's what we've been trying to do with Navy STP.”

While the DoD is Aptima's biggest customer, the company also works with other federal agencies, including NASA, DHS, and the DOT. That work typically happens through the agencies' SBIR/STTR programs as well. Driven in part by the recent hiring of Svitlana Volkova as chief computational scientist, Aptima is also making a push to expand its work with DARPA, ARPA, and IARPA, said Morrissey.

Morrissey's role at Aptima gives her an overview of the work taking place within many different divisions at the company. From her perspective, the key to building a good working relationship with the federal government is the same across agencies. “The number one thing is meeting them where they're at. Instead of us trying to assume that we know better, we work with our customers to figure out what their actual needs are, their hot buttons. Even if, in the grand scheme of things, it seems insignificant, we do our best not to overlook any tiny—even minuscule—touch points that they have because it all matters to our customers. It goes back to our human centered ideal. We're humans, they're humans. Let's talk to them like humans. Let's figure it out.”

Aptima's mission is to optimize and improve human performance in mission-critical technology-intensive settings. Focusing on the human element, Aptima creates tailored solutions for its customers across various domains, including defense, intel, aviation, law enforcement, and healthcare. The company is headquartered in Woburn, Massachusetts, with additional offices in Dayton, Ohio, Orlando, Florida, and Puerto Rico. For further information about Aptima, see www.aptima.com.

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