

NETWORKED CARRIERS

WIRELESS NETWORKING PROPELS NAVY MAINTENANCE SYSTEM

Imagine dozens of sensors posted all over a human body, monitoring various vital signs, from pulse and blood oxygenation to the stress on certain joints and tendons. The sensors feed data back to a system, creating a status snapshot of the body and its component parts that medical professionals can evaluate in order to determine what needs to be fixed.

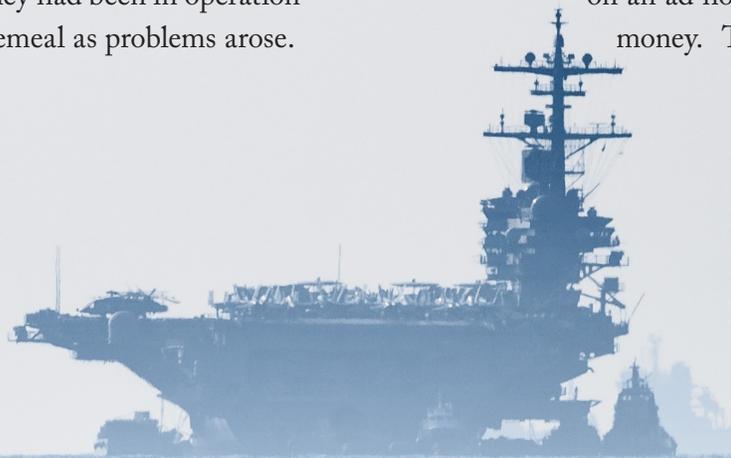
This type of monitoring system is exactly what founder Steven Chen and his team set out to build in 1997. Except instead of humans, Chen worked with 10,000-ton ships.

When Chen founded his company, 3e Technologies International (now Ultra Electronics 3eTI), the U.S. Navy was still using a time-based approach to maintenance. This meant that, in general, ships were taken for repairs based on how long they had been in operation rather than being fixed piecemeal as problems arose.

Chen, though, had other ideas.

Initially, after opening its doors in 1995, his Maryland-based company focused mainly on building sensors for hard drives. But as that market became flooded, the company, Chen said, “had to find a new direction.”

That direction came in the form of an SBIR solicitation topic issued by the Navy to update the monitoring and maintenance systems on its ships. Using its sensor-building background, 3e developed what it called a “base-monitoring” system—a series of sensors attached to various parts of the vessel, from the propulsion system to the generators, all communicating with one another over a local area network. The system would allow the Navy to transition to a condition-based maintenance approach, where it could detect faults and make repairs on an ad hoc basis, saving it time and money. The novel approach won



3eTI the company's first SBIR contract.

"We were trying to take risks rather than be comfortable. We wanted to build products, and that was the difference between us and a lot of other companies," Chen said.

A Phase II contract followed, then it went to Phase III, an important achievement for any SBIR. Eventually, 3eTI's monitoring technology was employed on six different classes of ships and in every Naval base around the globe. But the company still had more steps to take.

Around 2004, Chen and his team attended a presentation hosted by tech giant Intel. The company was pitching the idea of wireless internet on laptop computers, technology that, at the time, was slow and costly. But where others saw a far-fetched idea, Chen saw opportunity. Following the presentation and an introduction with Chen, Intel enlisted 3eTI to rewrite important security software stack for its software, which later became the secured Wi-Fi offered in the computers using the Intel Wi-Fi technology.

This meant, Chen said, that "the 3eTI technology, funded by DoD SBIR, scaled with chips from Intel."

While the partnership proved a financial boon, 3e again resisted resting on its laurels. Instead, the company took its newfound experience in the wireless sector and applied it to its existing technology. The wired ship-monitoring system was effective, but installing so many sensors added unnecessary weight to the vessels. With the Intel deal in the rearview, the next step was a logical one: cut the cords.

"The Navy looked at the wireless system and said, 'Wow, this really improved the efficiency,'" Chen said. "What we were doing became the industry standard. We saw that was the future."



In addition to untethering the sensors, transitioning to wireless also allowed 3eTI to easily add upgrades such as security cameras and smart meters to the system.

"Once you have wireless, you can hook up cameras and everything. Then you're doing control and security at the same time. It's all related," Chen said.

The move toward cybersecurity marked a larger shift in the company, which now offers security solutions for municipalities and large-scale utility providers, among others.

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Chen sold the company in 2006 as an Intel Capital portfolio company. It was bought again in 2011 by Greenford-based defense company Ultra Electronics.

Chen is now a principal with Blu Venture Investors in Virginia, a firm focused on startup funding, where he initiated a cybersecurity investment program. The venture capital company has made invest-

ments in approximately 50 businesses, with 25 in cybersecurity, several of which have received SBIR contracts or other government funding.

Chen said his experience working for a company with more than 40 SBIR contracts to date has given him an appreciation not only for the companies themselves, but also for the U.S. government SBIR program as a whole.

"I love government-funded technologies, because I understand winning an SBIR Phase I is not easy," Chen said. "If I have 10 companies that are asking for me to invest in them, if they have SBIR awards, that is a big deal because of the rigid selection processes they have to go through.

"At the end of the day, it's great that the government is doing a wonderful job helping companies commercialize." ✨



Steven Chen

3e Technologies International, Inc. (Ultra Electronics 3eTI)

Modernization Priority: Fully Networked Command, Control, and Communications
Rockville, MD • SBIR contract: N00178-99-C-3026 • Agency: Navy • Topic: N98-114, Context Dependent Prognostics and Health Assessment:
A New Paradigm for Condition-Based Maintenance