Trusted CI Success Story
U.S. Academic Research Fleet

Trusted CI helps U.S. Academic Research Fleet meet 21st century demands

If you think getting the Internet to work throughout your university is hard, imagine trying to manage connectivity for 18 U.S. research ships located off the east, west and gulf coasts, including Alaska and Hawai'i. That's the task of Jon Meyer, a former ship technician and an information systems manager for Scripps Institution of Oceanography, a member of the U.S. Academic Research Fleet (ARF). He's on a mission to ensure the fleet is equipped to meet the cyberinfrastructure (CI) demands of the 21st century.

"It's difficult to get connectivity in the middle of the ocean. Every ship is different and has unique CI. I'm interested in consolidating and coordinating efforts so that U.S. research vessels can normalize how they handle interconnectivity, cybersecurity, and CI. Uniformity and systemization helps the budget and benefits the researchers, so they don't have to learn a different CI environment for every ship they board. For example, we've got chemists that go ship to ship," explained Meyer.

The ARF is a National Science Foundation (NSF) research infrastructure project and major facility coordinated by the University National Oceanographic Laboratory System, formed by a consortium of universities to equalize access to ocean research. However, there were no provisions for cybersecurity and CI in the (pre-internet) 1972 charter. Since then, the NSF has established CI requirements for large facilities, but those don't easily apply to ships.

"Ships need interconnectivity for the same reasons it's important to have it for unpopulated and mountainous California fire country. Just as fire-fighters need to interact with each other, our ships need to communicate worldwide with off-ship experts and instruments," Meyer said. "Ships need reliable connectivity for coordination, safety, and essential business operations, and they need to be equipped for 21st century research, with the ability to operate drones and download sea charts to safely navigate waters. Remote collaboration for science and ship operations was especially important during the onset of COVID-19."

Ahead of 2021, Meyer needed to prepare for International Maritime Organization and evolving CMMC requirements and recognized the advantage of an ARF-wide effort. He also wanted to improve efficiency, safety, and reliability. So, in 2019 Meyer engaged Trusted CI, the NSF Cybersecurity Center of Excellence, to make enterprise-wide CI recommendations. Trusted CI staff reviewed ARF policies and procedures, toured four classes of research vessels, interviewed crew members, and met with ARF technology specialists.

Crews from ARF vessels, Robert Gordon Sproul and Roger Revelle, enjoy the sunrise in San Diego.

Among the solutions recommended: fleetwide CI and identity management solutions, restricted access to server rooms, formalized information security roles, reference network architecture (segmented networks), increased radio link availability and capacity, use of ResearchSOC, and more cybersecurity resources.

"Trusted CI communicated the importance of a consolidated ARF CI solution for meeting requirements and for helping research teams concentrate on exploration and not cybersecurity," Meyer added. "The recommendations are underway and will have a five-to-ten-year impact."

In the meantime, the fleet is making tough decisions about CI funding. As with most research, there is competition for resources. "Do you spend $200,000 for a network upgrade or does that take away from buying a $1 million ocean mapper?" explained Meyer. "The Trusted CI engagement proved there's a significant CI specialization required for research ships."