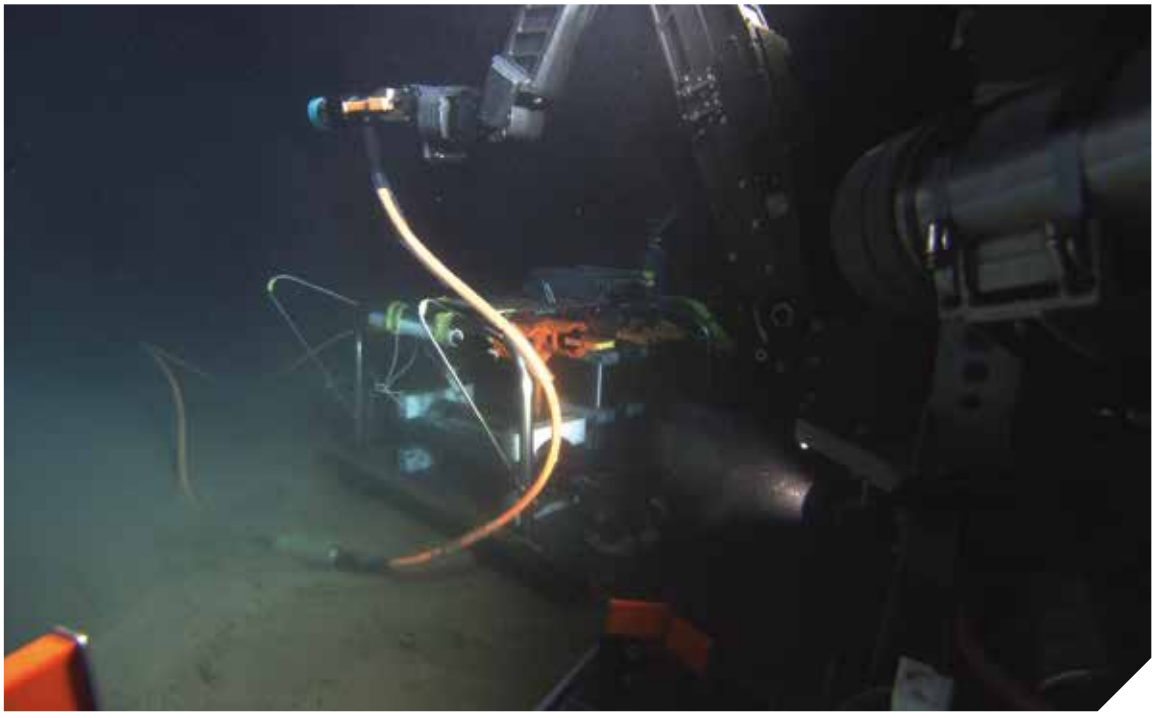
Diving deep toward the ocean floor with Axis.

University of Hawaii ALOHA Cabled Observatory sends Axis PTZ network cameras three miles down under the Pacific Ocean to obtain continuous footage of deep sea marine environment.



Organization:
University of Hawaii ALOHA Cabled Observatory

Location:
Honolulu, Hawaii, USA

Industry segment:
Education

Application:
Remote monitoring

Mission

In 2002, scientists at the University of Hawaii (UH) School of Ocean and Earth Science and Technology were given access to a retired telecommunications cable three miles below the surface of the Pacific Ocean. The cable offered a unique opportunity to establish an unmanned underwater observatory that can continuously record and transmit data. Along with sensors measuring currents, temperature and more, the university wanted to capture video 24/7. Since the area is only accessible by remotely operated underwater vehicles (ROVs), the lab team needed technology that could function reliably under heavy environmental stress.

Solution

With analog technology being far too vulnerable to water pressure damage, the researchers deployed two Axis network cameras housed in pressure-resistant glass domes.

The pan/tilt/zoom (PTZ) cameras also offered intelligent features such as automatic guard tour and H.264 compression that helped UH explore the depths most efficiently. At the surface, the university is able to record and manage video easily with the user-friendly AXIS Camera Station video management system (VMS).

Result

The Axis cameras, mounted on tripods equipped with LED lights, give researchers an uninterrupted view of life on the ocean floor. Biologists captured footage of unknown creatures, and they can observe behaviors that previously went unseen. The university also streams the video live on its website and shares the footage with schoolchildren at various events to inspire an appreciation for ocean life.

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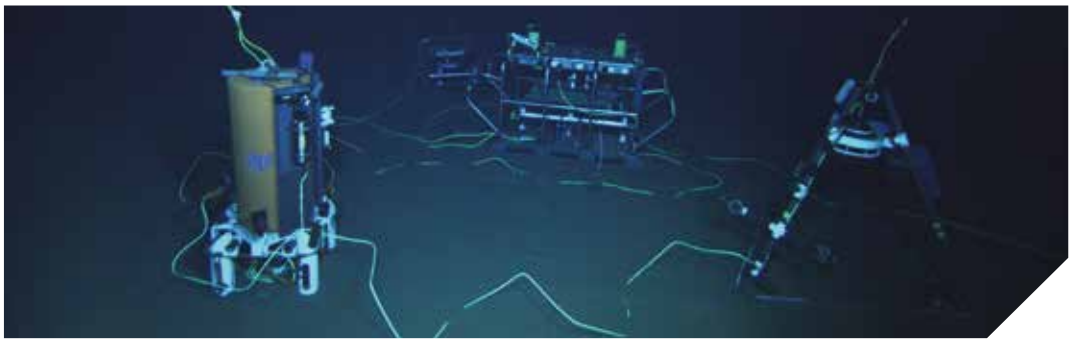


Seeing beneath the waves

The world's oceans hide many secrets deep underwater and far from the shore. In 2002, AT&T donated a retired telecommunications cable to scientists at the University of Hawaii (UH) School of Ocean and Earth Science and Technology that was previously laid three miles below the surface of the Pacific Ocean. The cable supplies continuous power for research instruments and transmits data around the clock. Over the next decade, the university developed a remote underwater research station called the ALOHA Cabled Observatory (ACO).

In addition to sensors gathering data about water pressure, salinity, ocean currents and temperatures, the ACO wanted cameras that could provide uninterrupted footage from an environment still shrouded in mystery.

"The long term observation of the changes in the world's oceans is considered one of the keys to understanding the changes to our planet. A submarine or boat passing through the area can take measurements, but what happens the other 99.99% of the time?" said Brian Chee, UH School of Ocean and Earth Science and Technology.

Taking network video to new depths

The Observatory is managed by a remotely operated underwater vehicle (ROV), which costs tens of thousands of dollars to rent. Because of the expense, the lab needed camera technology that would require as little maintenance as possible. They determined analog cameras were far too susceptible to damage under heavy water pressure.

"Unfortunately, when you're dealing with 500 atmospheres, cables do change and deform over time," Chee noted. "Because of the way analog cables mix power and signal, those changes can dramatically affect the quality of the image."

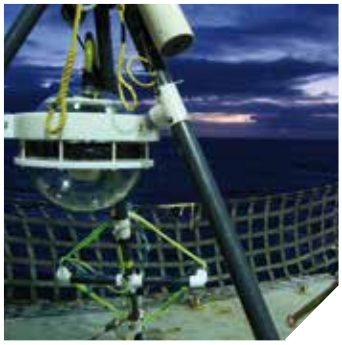
In contrast, a network-based camera produces a digital signal that would be much less affected by the changes. "There's no tuning process involved," Chee added.

The ACO selected Axis network cameras based on their reputation for quality and reliability. They first sent down an AXIS 214 PTZ Network Camera, followed by an AXIS Q6035 PTZ Network Camera two years later. The cameras are encased in pressure-resistant glass domes and secured to a tripod frame with LED lights illuminating the area.

A scientist at the surface records the video with AXIS Camera Station. Even though he did not have experience with VMS technology, a scientist was able to learn how to use the AXIS Camera Station software quickly and operate the cameras with ease. Additionally, the observatory uses AXIS Q6035's intelligent features to improve the efficiency of their research, such as the PTZ functionality to manually adjust viewing angles and pre-set guard tours to observe specific areas automatically. With H.264 compression, the ACO can capture HDTV-quality 1080p resolution without overriding the other data coming through the pipe.

With the current setup in place, the camera station underwater is adjusted entirely remotely without needing to bring the system up to make individual adjustments.

"We only have 100 megabytes per second coming up that underwater cable, and we've got a lot of data we can't afford to lose," Chee said. "With H.264, I can change the amount of bandwidth the video stream will take. That feature alone made it worthwhile using the AXIS Q6035."



"Because of the effects of water pressure, damage to the cable connecting our cameras to the observatory can dramatically affect the quality of the image. With a network-based system, it's all digital and it is less susceptible to those types of changes. The Axis cameras have been ultra-reliable. We've actually had more problems with the lights than we have had with the cameras."

Brian Chee, UH School of Ocean and Earth Science and Technology.

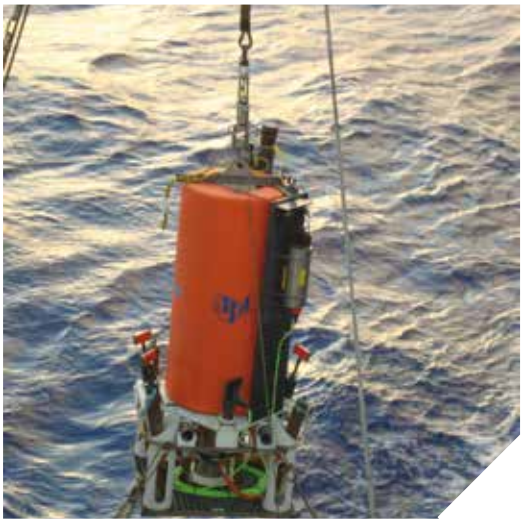
Discovering the ocean's beauty in the classroom

The Axis cameras open up a 24-hour window to the ocean floor. The ALOHA Cabled Observatory is already leading to new discoveries, including recording unidentified creatures and documenting behaviors that largely go unseen.

"Biologists are absolutely clamoring for camera time," Chee acknowledged.

In addition to scientific work, the video is live-streamed for the public on the ACO website. Members of the project also share the video with schoolchildren at functions like the Coast Guard's SeaPerch project, Maker Faire, and individual unique visits to schools. SeaPerch is a robotics program that sets up students with resource-filled kits that allow them to learn how to assemble their own Remotely Operated Vehicles (ROV) through engineering and science lessons in the classroom. With this outreach, the observatory hopes to inspire wonder about life under water.

"Nothing gets schoolchildren excited more than being able to take a peek three miles under water and see what kind of things are down there," Chee said.



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About Axis Communications

Axis offers intelligent security solutions that enable a smarter, safer world. As the global market leader in network video, Axis is driving the industry by continually launching innovative network products based on an open platform - delivering high value to customers through a global partner network. Axis has long-term relationships with partners and provides them with knowledge and ground-breaking network products in existing and new markets.

Axis has more than 2,000 dedicated employees in more than 40 countries around the world, supported by a network of over 75,000 partners across 179 countries. Founded in 1984, Axis is a Sweden-based company listed on NASDAQ Stockholm under the ticker AXIS.

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