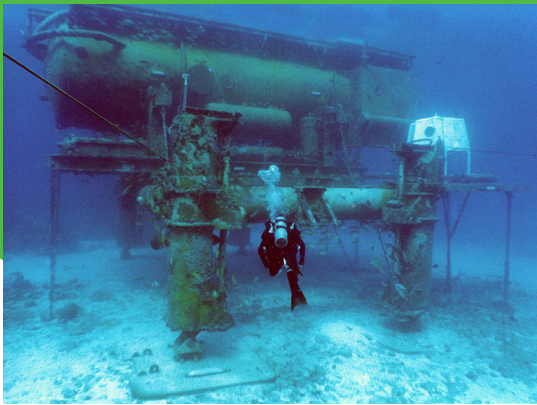


Cambium Enables Video Streaming from the Ocean Floor



"When reliability is critical and one of your endpoints is a 30-foot (9-meter) buoy on the open sea, you need to have a very reliable system or you could find yourself on that buoy at any time of day and in any weather conditions. The PTP 600 was the only solution that could provide a high-performance, carrier-grade connection in this environment. With the excess throughput, we can begin to explore new opportunities that the bandwidth enables."

~ Dominic Landucci, National Undersea Research Center

SITUATION

The National Oceanic and Atmospheric Administration's (NOAA's) undersea laboratory, Aquarius, needed reliable connectivity with the National Undersea Research Center's (NURC's) land-based research facility in Key Largo. Prior to Cambium's involvement, video from the undersea laboratory, was fed on a hard wire up to the top of a 30-foot (9-meter) buoy on the ocean's surface. From the buoy, a conventional point-to-point broadband wireless system connected to the NURC office in Key Largo, where the video was fed directly onto the web. The connection's throughput could range anywhere from 2 to 4 Mbps depending on the swell of the ocean.

As the project grew, higher-resolution video had become available, and the wireless link had become too slow to stream live video. The communication was choppy and incomplete and periodically crashed the video servers. The video streaming required at least 7 Mbps of throughput for proper performance, but the existing wireless device was unable to provide the performance or high availability needed.

SOLUTION

Florida-based service provider Rapid Solutions provided NOAA with the Cambium PTP 600 radio to meet the technical requirements of the deployment: in excess of 7 Mbps of bandwidth; the ability to connect reliably over open water; carrier-grade reliability -- 99.999%; and the ability to link from one moving endpoint (a buoy on the high seas) to a stationary endpoint. Other wireless solutions were tested but none matched Cambium's ability to maintain the connection between NOAA's buoy and the land-side office in Key Largo.

Rapid Systems has been offering the most advanced Internet experience in the State of Florida and surrounding areas since 1994. Its state-of-the-art network, facilities and technical resources are second to none, giving customers all the advantages of a pure ATM network over an IP infrastructure. Their engineers tenaciously monitor, maintain and upgrade the network to provide their customers the most advanced technologies, services, support, hardware and software available.

CUSTOMER PROFILE

NOAA
Key Largo, Florida

- Aquarius Habitat Undersea Laboratory
- 60 Feet Below the Sea
- 9 Miles off the Coast
- High Bandwidth Need

Cambium Product

- PTP 600

Result

- High quality video streaming
- Average throughput is 31.5 Mbps
- Enabled new applications
- Connectivity maintained in severe weather



Geographical Considerations

NOAA's Aquarius Habitat, a 400-square-foot (122 square-meter) undersea laboratory, is located nine miles (14.5 km) offshore in the Florida Keys at a depth of 62 feet (19 meters) where it sits on the ocean floor. In addition to serving as a home base for aquatic research, it also serves as a laboratory for experiments that require the simulation of an outer-space environment. Video communications must be streamed from the Aquarius Habitat to the NURC's land-side office in Key Largo, where the experiments are then streamed live on the University of North Carolina at Wilmington's (UNCW) website. In addition, the Habitat is monitored by a watch desk at the base station.

Deployment detail and Interoperability

Rapid Systems and NURC deployed a Cambium Point-to-Point Wireless Ethernet Bridge – 600 Series solution with integrated antennas between NURC's land-side base station in Key Largo and the 30-foot (9-meter) buoy out at sea – 62 feet (19 meters) above the Aquarius Habitat. The installation was conducted during heavy seas, and the radios were deployed quickly. Even with the continuous rough motion of the sea, the link came up immediately.

From a 24-port Cisco switch located at the base station, the PTP 600 Series unit provides an Ethernet connection to a 12-port Cisco switch on the off-shore buoy. From the top of the buoy, a CATV wire connects the 12-port switch to another 24-port Cisco switch in the Habitat where two video servers are connected – one for the Watchdesk and the other for streaming to the website. In addition, IP

phones are used between the Watchdesk and the Habitat.

Additional Applications and Results

In addition to the Cambium PTP 600 providing what was required in bandwidth, the excess bandwidth now available has enabled new applications to be deployed: a new video conference link between NASA's International Space Station and the Habitat is now operational. Live video of certain key missions, such as NEMO7, could not otherwise have been transmitted without the PTP 600. The VoIP transmission between the base station and the Habitat – previously poor quality and choppy – was also greatly improved. The broadband wireless link has maintained carrier-grade (99.999%) availability through rough 6-foot (2-meter) swells as well as Hurricane Jeanne off the Florida coast. During the hurricane, the PTP 600 Series link not only maintained the connection without dropping a packet, but its durable antennas remained intact as well.

The Cambium Advantage

The Cambium PTP solution delivered 10 to 15 times the throughput of the existing system. It was the only system that could connect and maintain carrier-grade reliability over the open sea. In addition, the rugged, compact enclosure was unaffected by weather extremes.