case **study**

Electronic Data Systems

"For these very complex, live transmissions, we needed a manufacturer with broadcast quality encoding. We looked at competitive products, but TANDBERG Television provided an excellent product line that enabled us to use IP encapsulation to transport MPEG-2 video over IP networks."

Michael Magers
Implementation Project Manager
Electronic Data Systems

the**company**

Electronic Data Systems (EDS) is the world's largest independent information technology services company. EDS provides strategy, implementation, business transformation and operational solutions for clients managing the business and technology complexities of the digital economy. EDS brings together the world's best technologies to address critical client business imperatives. It helps clients eliminate boundaries, collaborate in new ways, establish their customers' trust and continuously seek improvement. EDS, with its management-consulting subsidiary, A.T. Kearney, serves the world's leading companies and governments in 60 countries.

the**situation**

Famed oceanographer Dr. Robert Ballard has worked with EDS for the past 15 years, refining his vision of telepresence. For his expedition in the summer of 2003 to the Black Sea and eastern Mediterranean, Ballard, president of the Institute for Exploration (IFE) at Mystic Aquarium in Mystic, Connecticut and an Explorer-in-Residence at National Geographic, wanted to bring deep-sea exploration live and in real-time to scientists, students, and the public via satellite and Internet technologies. This was part of the IFE's "Immersion Project," which asserts that scientists can join a mission "virtually" and conduct scientific research from ashore. A remotely operated vehicle developed by engineers from Woods Hole Oceanographic Institute and the IFE was deployed several hundred feet below sea level to capture audio and video footage from the Black Sea and send it, in real-time, from the U.S. Navy research vessel Knorr to scientists at the University of Rhode Island's Graduate School of Oceanography. The live satellite feed was also routed to the Mystic Aquarium where visitors joined in a live talk with Ballard and his team in real-time. Live video was also sent back via Internet2 to camps and children's groups throughout the U.S.
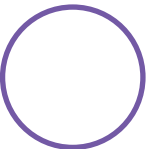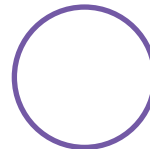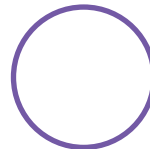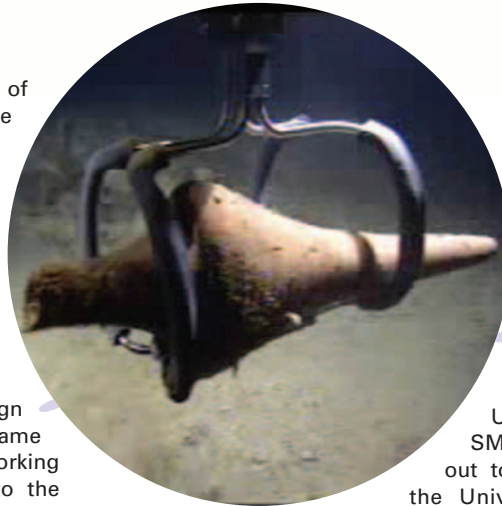
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the**challenge**

While Dr. Ballard had been working on his concept of telepresence for years within the scientific community, the technology necessary had not been ready for a fully unmanned, underwater remote operation. Sending video from several hundred feet below sea level in real-time to many sites via two-way IP satellite traffic required a very flexible and strong video distribution system. A second, initial consideration required equipment that could send broadcast quality video to National Geographic headquarters in Washington, D.C. for re-purposing into three one-hour specials.

As the focus of the expedition shifted during the design phase, the design of the video distribution system became a work in progress. Several different disciplines, all working together, from the underwater Remote Vehicle crew to the video production and encoding and satellite segments had to be in agreement about the purpose and function of the system. Plus, the overall coordination of experts from various regions of the globe presented its own logistical challenges.

the**solution**

EDS, working with its subcontractor MCI IDB Systems Group, transformed a cargo container into a mobile, shippable satellite encoding and uplink van. The van was mounted on the deck of the ship and had a portable satellite uplink platform mounted on its roof. IFE built two additional vans for the control of all camera feeds' input and output.

Two SDI "show feeds" generated aboard the Knorr were sent to two TANDBERG E5710 video encoders, compressed using MPEG-2 technology, and multiplexed into a single stream for transmission using a TANDBERG MX5620 multiplexer. The output of the multiplexer was sent to a TANDBERG TT6120 MediaLink and output as IP traffic, which became a two-way IP feed over satellite for transmission to the University of Rhode Island.

All of the TANDBERG Television equipment was installed in racks within the satellite encoding and uplink van on the ship. The satellite signals were received by an MCI earth station in Andover, Maine, and sent via a

private DS3 link to EDS in Plano, Texas. There they were redirected over Southern Methodist University's network to SMU's Internet2 POP and out to the remote campus of the University of Rhode Island in Narragansett, where the school's Graduate School of Oceanography is located. There, the IP-encapsulated signals were converted back into ASI streams through a TANDBERG TT6120 MediaLink and decompressed with two TANDBERG TT1260 receiver /decoders. Scientists at the school communicated via H.323-based intercom back and forth to direct the expedition.

" Our past experience with TANDBERG Television through IDB Systems proved that they'd provide the support needed for this project. Transmission of IP video over satellite to sites across the U.S. posed considerable unknowns. We needed a company with a history of solid support and high-end broadcast quality output under the toughest conditions. For those reasons, we chose TANDBERG Television"

Mike Magers
Implementation Project Manager
Electronic Data Systems

why
TANDBERG Television?

IDB Systems Group has had a long and successful relationship with TANDBERG Television and knew first-hand the support they'd receive from the company. A remote underwater expedition being transmitted for the first time as IP video over satellite to multiple sites required consistent support for any unforeseen transmission challenges. Initially, the video was also to be re-purposed for National Geographic specials, so the footage had to be broadcast quality. TANDBERG Television's compression and processing equipment provided EDS with the ability to use IP encapsulation to transport MPEG-2 video over IP networks.