ROVs: A Look Back, A Look Ahead — *Robert Wernli*

Robert Wernli is a mechanical engineer and president of First Centurion Enterprises. He has 35 years' experience in the development of undersea vehicles and work systems. In addition to his work as an independent consultant, he has begun a second career as a writer and has published several fiction and nonfiction books.

This is the silver anniversary of the first remotely operated vehicle (ROV) conference, ROV '83, held in San Diego, California, 25 years ago. So it seems a perfect time to reflect on the past, examine the present and peer into the future of ROVs.

For ROV '83, we crafted the theme "A Technology Whose Time Has Come." And come it had. From the days of immaturity, when everything leaked in the wrong places; through adolescence, where temperamental systems made you want to pull your hair out; and eventually to a period of acceptance, where oil companies began to listen and divers began to worry.

My goal as chairman of ROV '83 was to provide a forum that encouraged the participants to shape the future of ROVs.

They met the challenge, taking the technology—at that time heavily located in San Diego—and moving it into the Gulf of Mexico and then on to Europe and the North Sea. ROVs have been an essential tool in the offshore industry ever since.

ROV '83 was a showcase for early vehicles: Hydro Products' (San Diego) RCV 225 and RCV 150; AMETEK Straza's (San Diego) Scorpio ROV; Perry Oceanographics' (Riviera Beach, Florida) RECON IV; and the Benthos (North Falmouth, Massachusetts) RPV 430. Towed vehicles conducted searches, while autonomous underwater vehicles (AUVs) were academic or government projects. U.S. Navy vehicles, such as the Deep Drone and Cable-Controlled Underwater Recovery Vehicle (CURV) III, were working in 4,000 to 7,000-foot depth ranges. Observation-class vehicles were just beginning to pop their heads above the water.

By the 10th conference, ROV '92, the *Titanic* had been found, CURV III and the advanced tethered vehicle made it to a depth of 20,000 feet and back and Japan had discussed the development of an ROV capable of diving to 11,000 meters.

ROVs were commonplace offshore and growing in the military. Kevlar cables, fiber optics, lasers, 3D color cameras and charge-coupled device technology were everywhere. Maturity had arrived.

Those of us involved during those volatile years now know that with maturity comes wisdom. We've learned the value of time. Efficiency is critical. We plan ahead, practice and use our hard-earned knowledge to not repeat the mistakes of our youth. And, with such wisdom overseeing the technology, ROVs have achieved a similar level of maturity: They can go anywhere, do it efficiently and cost-effectively and through practice and planning—using computer-based vehicle simulators—do it right the first time, in most cases.

At ROV '83, one paper predicted a "Tele-Operated Man Substitute," and the author felt he might be tarred and feathered as a "crackpot" visionary. However, his vision wasn't far off target.

Similar systems have been developed, and the technology is there to produce them if desired. But such anthropomorphic diver replicas weren't necessary, as the oil companies, along with others, joined in, and the hardware installed in the deep ocean was designed for remote intervention.

Massive subsea intervention ROVs, such as Schilling Robotics' (Davis, California) UHD™ and Perry Slingsby Systems' (Jupiter, Florida) TRITON® XLX, now work around the clock using sophisticated manipulator systems and tools. And the Kiel 6000 ROV, manufactured for the University of Kiel, Germany, by Schilling, has even been certified by Germanischer Lloyd (Hamburg, Germany) as meeting requirements for safety and environmental impact. ROVs have gone green!

According to forecasts by Douglas-Westwood Ltd. (Canterbury, England), increasing ROV day rates will push the annual ROV operating costs worldwide from $827 million in 2006 to $1.45 billion in 2011.

This is in a market where offshore capital expenditures are expected to peak at $120 billion in 2010. More wells, deeper water and offshore drilling rig day rates of more than $500,000 will increase the need for new work-class ROVs to 120 per annum. Those are projections that will make many ROV manufacturers smile.

So how do I end this with an appropriate vision of the future? The Japan Agency for Marine-Earth Science and Technology's Kaiko left its calling card on the bottom of the Mariana Trench in 1995, establishing a record that can be tied but never broken.

Woods Hole Oceanographic Institution's hybrid ROV Nereus, which can operate in a tethered or autonomous mode, hopes to also make the trip within the next year.

Small observation-class ROVs, from VideoRays to SeaBotix's (San Diego) Little Benthic Vehicle, will continue to flood the market, creating the potential for an ROV on every yacht.

Work-class ROVs, too many to even bother counting today, will flourish as the price of oil, now more than $125 a barrel, continues to rise. AUV/ROV hybrids, being developed for remote intervention, will carve out their own niche.

With such a great outlook on the horizon, where will we take ROV technology in the future? As we've shown during the past 25 years, given a vision and the funding, we'll take it anywhere we want.

The ROV conferences continue today as the Underwater Intervention series held in New Orleans, Louisiana. I would like to extend a special thanks to those volunteers who have ensured the success of these conferences over the last quarter century. Happy silver anniversary! ■