

Where We've Been:

To paraphrase Shakespeare, some unmanned systems are born great, some achieve greatness and some have greatness thrust upon them. An example of the latter is CURV, or Cable-controlled Underwater Research Vehicle.

Born for the lowly task of scooping errant torpedoes off the seabed near San Diego, CURV floated in where others had failed and managed to recover a lost hydrogen bomb off the ocean bottom near Spain in one of the largest and riskiest salvage operations in Naval history.

In so doing, it helped open military and industrial eyes to the utility of unmanned underwater systems and led to the plethora of remotely operated vehicles (ROVs) that now explore every ocean and sea across the globe.

"ROVs are everywhere and they're used for science and exploration and repairs and they've really become the workhorses of the deep ocean," says Barbara Moran, a science writer and author of a new book on CURV's exploits. "CURV is the baby, it was the first of all these things and it sort of deserves some special status."

Some of our Torpedoes are Missing

In the early 1960s, Larry Brady—who would be the operator on CURV's famous mission—was out of the Air Force and working as a contractor for a company supporting Navy tests of Poseidon and Polaris missiles in Southern California. When that work began to dry up, he heard that the Pasadena Annex of the Naval Ordnance Test Station had picked up an underwater vehicle, built by New Jersey-based Vare Industries, but nobody was having any luck getting it to work properly.

Brady told his employer, Photsonics, that he wanted to do other work and they suggested supporting this new ROV. "I was in on the ground floor," he tells *Unmanned Systems*.

He and a team of engineers and technicians began to improve the vehicle, replacing its "big, ugly camera" with a smaller one and replacing the O-rings that kept the thruster motors dry with pressure-balanced motors that kept water out. "I'm thinking that, at least in our part of the world, we pioneered that," Brady says. They also replaced the control console "built by a caveman" with something more operator friendly.

The Navy needed such a vehicle to save it some money. In addition to testing missiles, the Navy was testing MK46 torpedoes, which carried two pingers, two lead droppers, a guidance system—all the torpedo components except for the explosive heads. They would be fired, acquire a target, make a pass, exhaust their fuel, pop their lead droppers and float to the surface. That is, if things worked right. If they didn't, they would retain their lead weights and sink to the bottom.

"They were losing these things," Brady says. "The value of each torpedo was enormous."

CURV

Or: How we Stopped Worrying and Learned to Retrieve the H-Bomb

By Brett Davis

The cost to recover them was enormous, too. Here is the recovery method, as described by Brady: Torpedo recovery boats (TRBs), which had sloped decks with rollers to pull the torpedoes out of the water, would search for the signals from the downed torpedo's pingers. When located, they would place a buoy over the area. A converted barge carrying a rectangular frame, within which was a wire noose held open by a bungee cord, would then get under way. Once over the torpedo, it would put down a three-to four-point moor, "which was very labor intensive and took a long time." Then the frame would be lowered and use its noose to grab the torpedo.

"This was laborious, time consuming, they didn't always get over the torpedo ... they spent days, sometimes, on the torpedoes," he says.

In the meantime, the vehicle that was now CURV was ready for the water, carrying a sonar in addition to a TV camera. CURV showed its worth right off the bat.

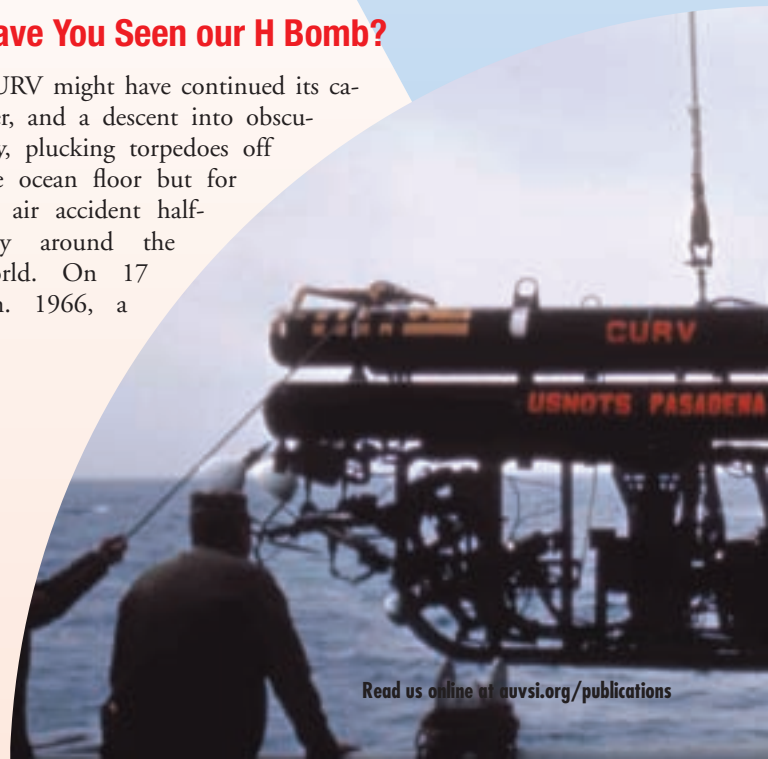
"The first recover just went great, it was gangbusters, we went right to it on the passive mode then got within the active mode, picked it up on sonar, drove into it and acquired it on TV, drove the vehicle up to it, opened the claw and ... clamped it around the midsection of the torpedo, then operated the vertical thruster and drove the whole thing to the surface," Brady says.

Everybody was pleased with CURV "except for the guys who had been riding the old rig [that recovered the torpedoes]. These guys had come to enjoy a very nice income based on their regular wages and the overtime they were drawing being out on those long, drawn-out, multi-day recovery operations.

They were the only ones who were less than pleased."

Have You Seen our H Bomb?

CURV might have continued its career, and a descent into obscurity, plucking torpedoes off the ocean floor but for an air accident halfway around the world. On 17 Jan. 1966, a



U.S. Air Force Strategic Air Command B-52G bomber collided with a KC-135 tanker while refueling, spilling its four hydrogen bombs onto the Spanish coast below. Three were found on land; one, carried by its parachute, drifted out into the Mediterranean and was lost underwater.

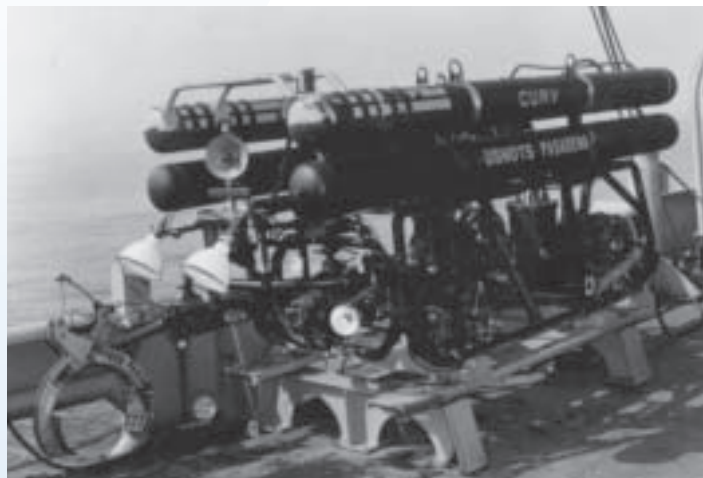
Back in Long Beach, Brady says he and his team were “reading the papers like everybody else” about what was happening. “We were brought into the scene because as the word filtered out, OK, we’ve got this darn thing in the water and we know it’s there and we’re going to find it ... someone said, there’s these guys over there in Long Beach, and they do that. We got the word: You’re going.”

At the time the bomb hit the drink, CURV was not up to the task. “It was very successful at recovering torpedoes, but it was never intended to recover hydrogen bombs,” says Moran, who recounts the bomb hunt in her book “The Day We Lost the H-Bomb,” published in April by Presidio Press. CURV’s tether was too short, requiring some cable splicing so that its ended up looking like a python after a meal. It also needed a bigger claw to handle the greater girth of the bomb.

There was also underwater competition at the accident site. Woods Hole’s famous Alvin manned submersible had a go at retrieving the bomb, attaching a cable to the bomb’s parachute, but the cable broke and they lost the bomb again. When it was CURV’s turn, Brady attached a grapnel to the bomb’s chute and intended to raise it that way. But worried Navy officials wanted an additional grapnel used. “They didn’t trust anything,” Brady says. “They didn’t trust each other.” Rear Adm. William Guest, who was in charge of the operation, also wasn’t sure.

“When we were hooking up the last hookup they brought the admiral down into the van. By this time he was worn out. The parachute is standing up in the water column, it has two or three grapnels in it. But not all of it was standing up. The bomb rolled up in the chute,” Brady says.

Moran’s book picks up the story: “Brady steered CURV back and forth around the dangling bomb, trying to give Admiral Guest a clear view of the weapon. Suddenly he noticed that a switch on the control panel had flipped. It was the circuit breaker for the starboard thruster. Brady reached up, flipped it on, and tried to run the thruster. The circuit breaker popped again. Brady panned the underwater TV camera around, looking back over CURV’s shoulder. The parachute had tangled in the starboard thruster. CURV was



CURV prepares to alert the world to the usefulness of ROVs. Photos courtesy Sandia National Laboratories.

stuck. Brady pointed at the TV and said, ‘We’re fouled.’

“Guest and his staff stared at the image on the screen. Then they stood up and walked out. Guest thanked his lucky stars that CURV was an unmanned machine, rather than a manned sub. Then he climbed the steps to the wardroom and gathered his staff. He had to make a decision.”

Not to ruin the book, but he decided to go for it and the bomb was recovered successfully, if a little inelegantly.

Brady, no fan of the floating bureaucracy that had assembled on the ocean to find the bomb, says, “If it had been left up to us, knowing what we knew, we would have gone with the grapnel, we would have made the first lift and recovered it and got it back on board. There is no doubt in my military mind.”

As it was, CURV returned to the surface wrapped in the bomb’s chute and in glory.

“We got a lot more funding as a result of that. Now the test station was on the map and the CURV system was on the map. The whole Navy knew about this asset,” Brady says, as did the civilian world.

Where is it Now?

The Navy went on to build several CURV II vehicles and CURV III (which rescued the two-man crew of the submersible Pisces in 1973, but that is another story). The original CURV was stripped of parts to build the first CURV II, then used as a test frame for sensors and other equipment.

“The last I saw it was in the boneyard out there at Point Loma [Calif.],” Brady says. “I went out some years later just looking for it and didn’t find it, so I think it’s gone.”

But not forgotten.

Brett Davis is editor of Unmanned Systems.

For More Information:

www.spawar.navy.mil/robots/undersea/curv/curv.html

www.writtenbybarbaramoran.com

CURV on deck during its fateful mission. Photo courtesy Naval Historical Center.

