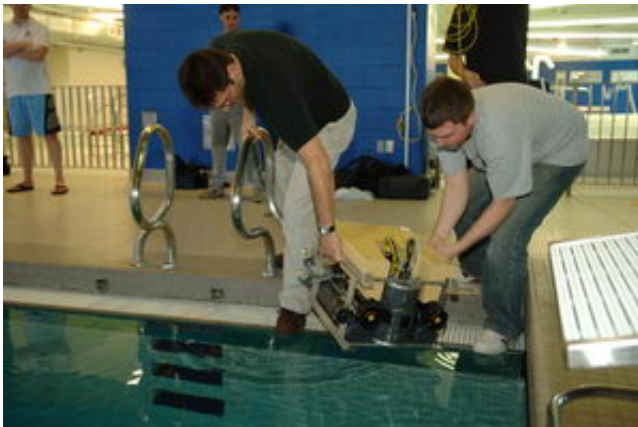


RIT students design deep-sea explorer to search for Lake Ontario shipwrecks

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It's designed to explore the depths of large bodies of water--and one recent weekend, that's exactly where it was found: searching the depths of the deep end of Judson Pool in Rochester Institute of Technology's Gordon Field House and Activities Center. (As the adage goes, every journey begins with a single step.)

A team of RIT engineering majors built the explorer, an underwater remote-operated vehicle, or ROV--and it has been described as one of the most ambitious student projects ever at RIT. This spring and summer, the device will be used to explore century-old shipwrecks resting on the bottom of Lake Ontario and the Atlantic Ocean--giving human explorers their first glimpses of some all-but-forgotten vessels

lost to the seas.

The nine-member RIT team is led by Dan Scoville, a 2005 RIT graduate who has located and explored three "virgin" (previously undiscovered) shipwrecks in Lake Ontario in the past five years. Scoville, who personally backed the ROV project financially, now has his sights set on two undisclosed Lake Ontario shipwrecks (one is an 1800s-era schooner--the names and precise locations of the vessels won't be revealed until this fall) and, working with the Undersea Research Center at the University of Connecticut, the steamship Portland, which sank off the coast of Gloucester, Mass, in 1898.

Some of the fewer than a thousand ships lost in Lake Ontario have been discovered and salvaged, while others are in water too deep to explore, Scoville says. That leaves a small number--perhaps a dozen--in the 100-to-400-foot-depth range in the area from the Niagara River to Oswego accessible to explorers such as Scoville. But they're not easily found, Scoville says. Even after they're located, they can't be salvaged because those between the shores of New York and the international line are considered state property.

"We do it because we love doing it," says Scoville, an electrical engineer with Hydroacoustics Inc. and a scuba diver for about 10 years. "When you find one, it's neat. It's a really cool experience.

Little device makes a big splash

The small, 60-pound, battery-powered ROV, designed and built over two quarters, is equipped with up to four removable video cameras, four high-intensity lamps (serving, in essence, as headlights), a navigational compass, a timer, and sensors to measure depth, pressure and temperature. Four variable-speed motors enable vertical, forward and reverse movement and turning maneuverability. RIT students custom-

built most circuit boards, wrote the software and created the graphical user interface used to control the device. All components are housed in watertight canisters (using 88 seals); a lightweight aluminum frame is rugged and modifiable.

The explorer is controlled by a joystick attached to a laptop computer that communicates with a microprocessor (the ROV's "command center") via a 680-foot-long fiber-optic cable. A human at the controls sees what the ROV "sees" through live video streaming and sensor readings.

The device is capable of diving at about two feet per second to a depth of 400 feet--about twice as deep as a skilled scuba diver can descend. A foam top helps achieve neutral buoyancy, enabling the ROV to remain level while underwater. A 100-minute battery life allows it to stay underwater longer than human divers. Future enhancements may include the addition of a mechanical arm and extended diving capability--perhaps enabling the explorer to reach Lake Ontario's maximum depth of about 800 feet.

Building the ROV cost the RIT team about \$15,000, including \$10,000 from sponsors. An equivalent commercially produced underwater ROV would cost \$20,000 to \$50,000, Scoville says. He describes the members of his team as not merely students, but skilled, practicing engineers.

"I lucked out with a really good team," he says. "We were told it couldn't be done."

Source: Rochester Institute of Technology

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