

# Liquid Robotics Case Study

## Tracking Crabs in Real-Time to Improve Fishery Management

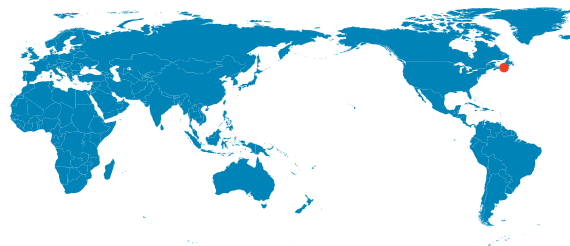
*One of the most striking aspects of the Wave Glider project is the intricacy of all the connections. Hopefully we will have developed some lasting changes as to how to scientists and managers and local communities work together to generate the information needed for the sustainable management of ocean resources.*

Dr. Fred Whoriskey, Executive Director, Ocean Tracking Network

### The Challenge

The Ocean Tracking Network (OTN) is dedicated to supporting coastal communities, fisheries managers, and policy makers around the globe through science. In Nova Scotia, snow crabs are commercially very important and play an important role in the ecosystem, and OTN wanted to develop a better understanding of their movements and behavior. Traditional tagging methods for these mobile undersea animals relied on static receivers on the ocean floor and even more rudimentary tags that required recapture, and therefore were not always practical or cost-effective. OTN needed a better way to track individually tagged crabs and understand their movements and patterns, even when they were not moving past a receiver line.

### Mission Location



### Customer

Ocean Tracking Network at Dalhousie University



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## *Tracking Crabs in Real-Time to Improve Fishery Management (continued)*

### The Approach

To monitor snow crab migration, OTN joined forces with Canada's Department of Fisheries and Oceans (DFO) and local harvesters. The DFO and local harvesters had decided to augment traditional tags with acoustic ones, with local harvesters tagging additional crabs at their own expense in order to get additional data.

OTN already had three years of experience using the Wave Glider to pull data on fish detections from bottom-moored acoustic receiver stations. With its mobility, longevity and autonomy, the Wave Glider could retrieve data more frequently and with lower costs and risks to staff. Previously, researchers had to spend up to a week at sea retrieving data from fixed receivers. The Wave Glider initiative reduced the average cost of these voyages by 66 percent.

Expanding the use of the Wave Glider to patrol the Scotian Shelf to identify tagged crabs was a logical extension of its capabilities. The mobility of the Wave Glider enabled them to capture the movements of tagged crabs even if the animals didn't pass by static receiver lines.

Local harvesters found continuous patrolling especially valuable, because they could view individual samples of crab data in real time, instead of relying only on the DFO's annual biomass surveys. Harvesters contended that annual "snapshots" of the population were not an accurate way to model fishery health and set quotas, since they could not account for the mobility across fishing boundaries.

### The Results

The Wave Glider has completed three missions to detect the presence and movement of tagged crabs, relaying data via satellite in real time during each mission to provide new and important insights. Researchers were surprised to learn that snow crabs can migrate up to 600km. This information was especially important to the DFO and local harvesters, and could possibly impact future quotas.

OTN is expanding the Wave Glider's patrol area to provide additional support for the DFO crab fishery assessment. Participants view the crab tagging initiative as an extremely positive model for the future. The crab industry and boat owners now participate in the measurement of data about crabs and their movements. DFO gains an additional source of data on crab populations and movement for its fishery assessment models and ultimately industry catch allocations.

"One of the most striking aspects of this Wave Glider project is the intricacy of all the connections," said Whoriskey. "It draws on technology development, good science, and community engagement. It's all targeted at finding the right way to do it, and making sure everyone is on board. Hopefully we will have developed some lasting changes as to how scientists and managers and local communities work together to generate the information needed for the sustainable management of ocean resources."

### What's Next?

OTN continues to explore new uses for the Wave Glider. The mobile platform is ideal for monitoring marine protected areas, where traditional moorings might be risky for sensitive environments. In some cases, deep sea moorings can cost between \$600,000 and \$1 million a year just to maintain in place. A Wave Glider patrolling the area could cover the same area less expensively, and could be moved to monitor other areas if needed.

