BEAM ME IN

Placentia Bay's ocean-observation system could change how weather is monitored in busy harbours anywhere. Called SmartBay, it's real-time, partnership model may also change how tech transfer and commercialization is done

BY ANDREW SAFER

It was the week before Christmas of 2007 and time for a crew change on the *M.T. Kometik*, the shuttle tanker that had carried oil from the Hibernia platform to the trans-shipment terminal in Newfoundland's Placentia Bay. The *Kometik* was anchored in the bay. "We had received orders to proceed to the Hibernia platform the next day," recalls Reg Mullett of St. John's-based Canship Ugland Ltd., the captain of the *Kometik*. "The windspeed was 35 knots, which is outside our criteria for operating launches." Based on Environment Canada's forecast for the next few days, it looked like charterer Dave Slade wouldn't be able to transfer the new crew to the *Kometik* before departing.

Then Mullett checked the SmartBay forecast and noticed a favourable weather window in the morning lasting about three hours, long enough to

ERIC DAVIS, MARINE INSTITUTE

SmartBay buoy being deployed in Placentia Bay.

make a safety change-out of the crew. Slade made the transfer. "That worked out very well," says Mullett. "The last thing you want to do is have the crew miss their time off with their families over Christmas."

SmartBay is an ocean-observing system

that provides mariners with near real-time wave, wind, and water data from three buoys in Placentia Bay, as well as hourly weather forecasts. The buoys provide information on wind direction and speed, air temperature, humidity, dew point, barometric pressure, water temperature, salinity, current speed and direction, wave height and direction, and wave period.

One St. John's-based SmartBay partner is AMEC Earth and Environmental, which provides regional weather forecasts for Placentia Bay that are updated every six hours, as well as hourly site-specific forecasts for two high-interest locations in the bay, one at the pilot boarding station. All of the SmartBay information is accessible to the public at www.smartbay.ca, which was developed by Earth Information Technologies (NL) Ltd., also based in St. John's.

In August of 2006, the School of Ocean Technology of the Fisheries and Marine Institute of Memorial University of Newfoundland launched SmartBay as a demonstration project. Under the Oceans Action Plan, Fisheries and Oceans Canada provided $2 million, which was administered by the Atlantic Canada Opportunities Agency. The Government of Newfoundland and Labrador has contributed about $700,000 from the Department of Innovation,

Test-driving new technology

Morris Fudge of Burin, N.L., fished for 45 years before having an Automatic Identification System (AIS) installed on his boat; now the sixty-three-year-old won't go out on the water without one. "Once I leave Burin, I know every boat that's out there and I can tell which way they're going," he says. "It's almost impossible to go ashore or run into something. It's one of the best navigation tools I've seen since I started."

AIS pinpoints the vessel's position using GPS, then transmits this and other vessel information via transponder while receiving such information from all the other AIS-equipped vessels within radio range, typically 32 kilometres. Compared to radar, AIS is reliable in all weather conditions, isn't susceptible to sea clutter, and a radar reflector on a buoy can't be mistaken for a vessel. In Placentia Bay, AIS is especially useful for crab fishermen who navigate the shipping channels used by the tankers.

Fudge is one of five fishermen who participated in an AIS implementation project in 2006–07, which was undertaken in conjunction with the launch of the SmartBay ocean-observing system. The Fisheries and Marine Institute of Memorial University of Newfoundland footed the bill and arranged for the installation on eight vessels to demonstrate the importance of situational awareness to both the smaller boat operators and oil tankers. (The other three vessels fitted with AIS belong to a charterer, the RCMP, and the Marine Institute.)

ICAN Ltd. partnered with the SmartBay initiative on the AIS installations by integrating a commercially available AIS with the company's Aldebaran electronic chart software. The information the AIS transmits includes vessel name and call sign, latitude and longitude, speed over ground, estimated time of arrival, navigation status, destination, length, type of ship and cargo, and IMO number.

Earl Johnson

While all tankers and commercial vessels that are over 300 tonnes must carry AIS, it's optional for almost all fishing vessels and recreational boats operating in Placentia Bay. Earl Johnson of North Harbour, N.L., had AIS installed on the 11-metre catamaran he uses to catch cod and crab. At 59, he has been fishing professionally since 1976. "Here in Placentia Bay, we deal with a lot of oil tankers and fishing near the traffic lanes," he says. "The more they know where we are, and the more we know where they are, the better for everybody."

Before AIS, Johnson says if he saw a radar target, he'd have to call Placentia traffic services to find out what was in the area. Today he checks the AIS in the wheelhouse every now and then. "It means we can focus more on our livelihood," he says. When he sees a target, he knows right away if it's an oil tanker, and the system enables him to communicate directly. "They'll say, 'We see you on our AIS. We know you're there. Go to port or go to starboard.' So far there haven't been any problems with tankers."

When asked about the importance of AIS, Reg Mullett of Canship Ugland Ltd. says that having AIS on all vessels would increase safety in Placentia Bay. For the smaller vessels, he suggests passive transponders that don't require a computer screen. Ivan Lantz, the Shipping Federation of Canada's director of marine operations, has this to say: "I believe that some class of AIS instrumentation should be on all vessels. I don't think it should be optional." — A.S.

Trade and Rural Development's funding mechanisms, the Innovation Program, and the Ocean Technology Sector Development Fund. Industry contributions have totalled $100,000. The Marine Institute and the Canadian Coast Guard have made significant in-kind contributions in labour, equipment access, and buoy deployment and retrieval.

Between 500 and 600 local and international tankers enter the bay annually, Cape St. Mary's Seabird Ecological Reserve is nearby, visibility is less than one-eighth of a kilometre 187 days of the year due to fog, and vessels must be operated in a confined area. Considering these factors, the Marine Institute chose Placentia Bay for its SmartBay deployment to support the safety of vessel traffic operations.

Canship Ugland Ltd. of St. John's operates three shuttle tankers between the Hibernia, Terra Nova, and White Rose oil fields and Newfoundland Transshipment Ltd. at Whiffen Head. Reg Mullett was a master on the shuttle tankers for years before becoming the company's senior safety officer in 2009. Since Placentia Bay is a compulsory pilotage area for all vessels over 300 gross registered tonnes, a pilot must board and guide each tanker after it enters the bay and again when it departs. "When we're proceeding to pick up a pilot and we know exactly what the wind and sea conditions are at the pilot station in real time, that's fantastic," says Mullett, who has used SmartBay to decide whether or not to bring a shuttle tanker into the bay.

ATLANTIC PILOTAGE AUTHORITY

Pilot boarding a tanker in Placentia Bay.

The Placentia Bay pilots are among SmartBay's chief users. When the Atlantic Pilotage Authority determines the weather and sea state conditions are unsafe for a pilot to board or disembark, the shuttle tankers either remain at anchorage or stay at sea. The pilot boarding station (PBS) is 27 nautical miles from the pilots' home base, and weather conditions at the two locations often differ considerably. With SmartBay, pilots can remotely assess the boarding conditions at the PBS, eliminating the need to steam out there to determine if it's safe to board. That keeps them out of harm's way and saves three to four hours of their time and between $1,000

and $1,500 in fuel costs per trip.

Andrew Rae, the vice-president (Atlantic) of the Canadian Marine Pilots' Association, says that the buoy at the mouth of the bay "gives the pilots a heads up because they know from the outside buoy to the PBS they have a four-hour lead time of the onset of weather. That gives them time to move if they want to get a ship out." Rae estimates that SmartBay reduces vessel delay time by 25% because pilots can reopen the bay sooner after a closure. That said, the safety factor is the main benefit.

All of this begs the question: Is SmartBay the wave of the future for all ports? "There's a definite need for a SmartBay in the Bay of Fundy," says Rae. "They need that kind of data to support the tanker operations for Canada's first LNG terminal. We'd like to see it available at the four major ports in Atlantic Canada—St. John's, Halifax, Chedabucto Bay [in the Strait of Canso], and Saint John." But SmartBay isn't as applicable on the West Coast, where pilot boarding stations aren't as exposed to the elements as the stations in Atlantic Canada.

Montreal-based Ivan Lantz, the director of marine operations for The Shipping Federation of Canada, envisions applications for SmartBay outside Atlantic Canada as well. "Baie-Comeau and Port-Cartier [in Quebec] could use it when there's no ice," he says, "and possibly Prince Rupert [in B.C.], where the pilot boarding station is far offshore and there's violent weather." Lantz estimates that five to seven times a year, a large crude oil tanker is delayed from entering or leaving Placentia Bay; he figures SmartBay could reduce the delay time on average by six hours at a daily vessel cost of $75,000.

In its continuous VHF broadcast to mariners, which is updated hourly, the Canadian Coast Guard's Marine Communications and Traffic Services broadcasts information from the SmartBay buoy at the mouth of the bay. "From our perspective, SmartBay provides information to the marine community that allows them to make better decisions about how they would perform operations on a daily basis," says Ray Brown, the Canadian Coast Guard's Maritimes Services regional director. "When you're able to do that, it makes your job more efficient but also adds safety value to your operations."

In addition to shuttle tanker operators, charterers, pilots, and the federal government, other users of SmartBay include tug operators and support services to the oil industry, fish harvesters, recreational boaters, tourism operators, research scientists, and other commercial and industrial users of the bay. "Considering the close proximity to one of the most pristine land masses in North America, including bird sanctuaries, and the captain's own connection to the island," says Mullet, "you want to have all the information you possibly can."