

## Fostering Canadian Technological Innovation

### SINK OR SWIM - NEW DEVICE DOES BOTH WHILE MONITORING THE OCEANS

#### ATLANTIC

METOCEAN Data Systems  
Dartmouth, Nova Scotia

**A** Dartmouth, Nova Scotia company is helping scientists monitor the state of the earth's oceans. METOCEAN Data Systems has developed a "profiling autonomous float" that can measure the temperature and salinity of oceans anywhere in the world-gathering valuable data about climate change.

The float, called PROVOR, is a two-metre-long tube with an antenna at one end, giving it the appearance of a giant hypodermic needle. Once dropped into the ocean from a plane or ship, the float descends to a depth of 2000 metres. It drifts with the underwater current for about 10 days, then ascends slowly, taking measurements all the way. Once at the surface, it sends its data back to the user via satellite, then descends and repeats the process, a cycle called "profiling."

"This was our first venture into something that profiles," says Project Manager Todd Swinamer. In the past, METOCEAN had worked only with floats that remain on the surface. With its profiling technology, the company tapped into a new market created by the ARGO initiative, a global array of 3000 free-drifting floats that measure the temperature and salinity of the upper 2000 metres of the ocean. Scientists and oceanographers use this data to predict long-term changes in the earth's climate, and it also serves as an early warning system for global patterns of rainfall, winds, storms, and atmospheric circulation.

With the many advantages of its float, METOCEAN's technology was a perfect fit for ARGO. The life cycle of PROVOR float is up to five years, and adapts easily to



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*METOCEAN Data Systems Limited*

changes in salinity from ocean to ocean. "Our float can go anywhere in the world and operate from depths of zero to 2000 metres with no modifications," says METOCEAN president Tony Chedrawy.

The main feature of the float is a hydraulic engine, which regulates buoyancy. It works on the same principle as swimming: when you inhale, you float higher, and when you exhale, you sink. Instead of air, the float uses hydraulic oil that is "inhaled" into an external sack, causing the float to rise. When the oil is "exhaled" back into

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the body of the float, it sinks. "This technology allows it to go to deeper depths and carry a heavier payload," says Chedrawy.

The PROVOR float also has potential for other areas of science. For example, it can be fitted with an optical sensor to measure the depth of light penetration in the ocean, something of interest to biologists.

NRC-IRAP Industrial Technology Advisor Glenn Isenor helped METOCEAN to develop a strong work plan, and linked the company with researchers at Dalhousie University who helped in modeling float behaviour and analyzing the composite materials that made up the hull. "The contacts that NRC-IRAP made helped us to solidify the design," says Swinamer.

NRC-IRAP also provided financial assistance to help complete the R&D work quickly. This support helped METOCEAN speed up its development process in time to catch the wave of opportunity that otherwise would have passed it by. "It has established them as a market leader in this technology," says Isenor.

NRC-IRAP is a key component of a countrywide innovation system linking a diverse network of institutions, organizations, and programs to help small and medium-sized enterprises (SMEs) develop and exploit technology in a competitive, knowledge-based economy. The NRC is the federal government agency that supports scientific research, development and innovation in every region of Canada.

In its first year of production, METOCEAN sold floats to Japan, India, China, Australia, Korea, and the U.S. Thanks to its new market, the company saw a \$2 million increase in sales in 2001. Sales have been between \$6-7 million annually for the past three to four years.

"The market for this technology is really ramping up now," says Swinamer. "If it had taken us another three years to develop this technology, we would have missed the boat."

[www.metocean.com](http://www.metocean.com)

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