



# Strong Growth, Private-Sector Leadership Characterize the Newfoundland and Labrador Ocean Technology Cluster

By Andrew Safer

The Newfoundland and Labrador ocean technology cluster is focused in St. John's, the City of Ocean Excellence—with a metropolitan area population of 196,000—which is served by 15 research and educational institutions in its surrounding area. The primary driver for ocean technology development in this province has been the requirement to overcome the challenges of developing offshore oil resources in the presence of sea ice, icebergs, and fog. In addition to overcoming the harsh-environment challenges to oil exploration and development, fishing and processing and weather forecasting has spurred further technology development.

OceansAdvance, the organization that represents the cluster, has identified a \$1 billion private-sector revenue target by 2015 in this province of just 510,000 people, more than a four-fold increase since 2006. According to the Government of Newfoundland and Labrador's Department of Innovation, Business and Rural Development's report, *Surging Ahead: A Profile of the Ocean Technology Sector in Newfoundland and Labrador – 2010*, between 2006 and 2010, sales revenues of 50 ocean technology companies rose by 126 per cent to \$509 million. "The major differentiator for our cluster," says Les O'Reilly, executive director of OceansAdvance, the organization that represents the ocean technology cluster, "is that it's an inverse-pyramid, industry-led model." He adds that most clusters are pyramidal and are led by research and

educational institutions, agencies or governments.

"The private sector is the muscle," says OceansAdvance Chair Anthony Patterson, "that takes the creativity and innovation coming out of the academic milieu and converts it into something that can be used in the real world. It's the flip-side of academic-led curiosity that says, 'If you build it they will come.'"

He adds that Memorial University, the National Research Council's Institute for Ocean Technology (NRC-IOT), Fisheries and Marine Institute of Memorial University (Marine Institute), and College of the North Atlantic are the heart of this private sector-academia-government cluster. Memorial offers the only undergraduate program in Ocean and Naval Architectural Engineering in Canada. Its Ocean Engineering Research Centre carries out applied research and consulting activities in ocean engineering related to the offshore, marine transportation, and fishing industries, operating a 58-metre-long towing tank with wave-making capabilities. Memorial has research chairs in disciplines ranging from ocean technology and Arctic and cold region engineering to reservoir engineering and reservoir characterization, and petroleum engineering. The Marine Institute's seven applied research centers support applied research and development, education and training in areas ranging from marine simulation, safety and survival in the offshore, and sustainable aquatic resources, to ocean mapping and ocean observing systems.

The School of Ocean Technology provides education and training for the next generation of maritime professionals, including the only ROV technician diploma course in Canada. The National Research Council's Institute for Ocean Technology supports the cluster by providing access to knowledge, experience, and facilities—including the longest ice tank in the world—that are unique in Canada, fostering innovation, and helping businesses commercialize science and technology innovations.

OutwardBound 2015, a Strategic Agenda for Accelerating Growth of the Ocean Technology Sector in Newfoundland and Labrador, released by OceansAdvance in 2009, identified three major market thrusts for the cluster to focus on: Arctic/Remote Energy, Next Generation Intelligent Ship, and Ocean Intelligence. Key technological areas that need to be strengthened include: autonomous systems, intelligent systems, robotics; microsystems; information systems; vessel/platform engineering; risk management/loss control; environmental science; remote power supply; and 'convertible' energy systems. While academia is the heart and the private sector is the muscle of the ocean technology cluster, government is the third key element.

Federal and provincial government departments and agencies have identified ocean technology as one of the fastest-growing sectors of the economy. They provide an integrated network of programs to support activities ranging from collaborative research and innovation, to business development and marketing. Established three years ago, the Research and Development Corporation of Newfoundland and Labrador focuses on increasing R&D investment through both business-led and academic-led programs.

The Government of Newfoundland and Labrador's Department of Innovation, Business and Rural Development supports the sector through its Oceans of Opportunity strategy and the Global Travel, OceanTech SmartGrowth, and OceanTech Intelligence programs. The Atlantic Canada Opportunities Agency supports innovation through the Atlantic Innovation Fund, and business development and marketing through the Business Development Program. Other federal government departments support the sector through activities ranging from hosting trade missions to supporting science and technology innovation projects.

"There are things happening here, quite frankly, that are not happening anywhere else in the country," says Derek Scott, Vice President, Provincial Aerospace, who joined the OceansAdvance board in November. "What is getting known is that there is a surge of activity in the technology

sector in this province that brings with it not only direct business activity, but a lot of R&D activity. Over the last five years, this activity has increased dramatically." According to Surging Ahead, between 2006 and 2010, private-sector research and development expenditures increased 57 per cent to more than \$23 million. Institutional spending on ocean technology research added in excess of \$20 million, totalling more than \$43 million in research and development spending across the sector. Leveraging technology products into global sales is the modus operandi of cluster companies. In 2010, nearly 50 per cent of ocean technology-related sales revenues were from exports, a 301 per cent increase from 2006.

**Networking and collaboration** are key accelerants to cluster activity. Recognizing there was a need to raise the competitive intelligence of the cluster, foster collaborative actions that support the cluster overall, and help support OceansAdvance's OutwardBound 2015 strategic agenda, the Atlantic Canada Opportunities Agency (ACOA), OceansAdvance, and Memorial University partnered to launch the Ocean Technology Commercialization Initiative (OTCI) in 2010. The Newfoundland Association of Technology Industries (NATI) administers the program.

"Strategic collaboration levers results, so we are encouraging companies to collaborate on initiatives and engage in activities that benefit the cluster as a whole," says (NATI) Business Development Coordinator Natasha Hudson. When PanGeo Subsea's Vice President of Technology Development Gary Dinn, past Chair of Oceans Advance, attended the World Oceans Council's Smart Ocean/Smart Industries Workshop on Ocean and Climate Observation in Paris in November, OTCI provided OceansAdvance funding to cover his expenses. "The WOC meeting with scientists provided two strategic pieces of intelligence for the cluster," Dinn reports. "One was understanding from a science point of view how industry will be interacting with leading oceanographic scientists to support data collection from existing platforms, and from a corporate point of view, it may open up opportunities for participation from cluster members in providing solutions to allow that data collection to occur."

NATI CEO Ron Taylor explains the longstanding partnership between NATI and OceansAdvance: "The vision and the strategy of the sector is through OceansAdvance. When it becomes a business-to-business initiative or an international opportunity, it's usually through NATI." Through its export development program, NATI assists OceansAdvance and NATI member companies by supporting exporting opportunities

in global markets. "The benefit of OceansAdvance and NATI working together collaboratively to assist the sector is huge," says Taylor.

When C-CORE wanted to apprise cluster members of their latest initiatives related to resource development in the Arctic and Canada's Northern regions—LOOKNorth and the Centre for Arctic Resource Development (CARD)—the Ocean Technology Speaker Series, co-sponsored by the City of St. John's and OceansAdvance, invited them to present in the meeting room at NRC-IOT where the series meets six times a year. "The roundtable venue creates a mechanism for feedback and discussion," says C-CORE CEO Charles Randell, "which is a great way to generate and gather new ideas."

Even though it seems that the cluster is firing on all cylinders, a glance under the hood points to some challenges ahead. "We're maxing out the capabilities of our academic partners," says Anthony Patterson, who adds that more infrastructure for both academia and the private sector is needed to step up the rate of innovation. "What we have now is not sufficient to meet the needs of the opportunities we are uncovering. We need more facilities and HQP." O'Reilly suggests how these requirements can be met. "What has helped us get to this stage is a foundational piece that we need to build on aggressively," he says. "Imperatives for growth are new intellectual property, new products and services that can be commercialized, an increase in HQP and, of course, an abundance of new start-up SMEs." He adds that to achieve these objectives, both increased institutional research output and industry commercialization, as well as new models, will be required. "We need innovative platforms where industry-led directed research can be developed, matured and sustained in partnership with universities and research organizations," he says. "We are currently conceptualizing the development of industry-led consortia where companies partner on a shared pre-competitive research agenda."

O'Reilly adds that this would provide the potential to (1) achieve new intellectual property, (2) create an environment where new graduate students can flourish, and (3) stimulate new company growth. He is quick to admit that there are challenges that need to be overcome, but he also sees "fantastic opportunities" as the cluster's collaborative culture matures, continuing to demonstrate that 'the whole is greater than the sum of its parts'. He sees the existing alignment and cooperation providing the foundation for the development and sustainability of the new models. Patterson points out there are groups actively exploring O'Reilly's idea, and concurs



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that it's achievable. Putting this aside, he sees the cluster surpassing the \$1 billion revenue target by 2015. "The companies that are bringing products to market from Newfoundland and Labrador are very innovative," he says. "They're becoming larger and they're establishing more sophisticated distribution networks. Innovation matched with companies with established market presence is what's giving us our growth rates. In my view, the billion dollars is a milestone we will hit and then surpass, and then we'll set another milestone." In the meantime, there are companies that are waiting to make breakthroughs, Patterson says.

"Connecting university collaboration with market opportunity," he adds, "works extremely well." He cites Provincial Aerospace, with 900 employees, and Rutter, Inc., with 100 employees, who became large companies headquartered in Newfoundland and Labrador with employees in other countries. "When you get a breakthrough," Patterson says, "you've got to have a global presence. That's what we're all dreaming for."