



Ocean Technologies in Atlantic Canada

In Atlantic Canada, the economic importance of the ocean technologies industry far exceeds its size. Ocean technologies are one of the region's largest advanced technology industries, with high levels of research, development and innovation, a highly skilled labour force, and an export focus.

From sophisticated navigational tracking tools to underwater acoustics, Atlantic Canada is recognized around the world for its ocean technologies products, services and expertise. Atlantic Canada has a strong ocean technologies industry with approximately 140 companies generating an estimated \$330 million in sales annually and responsible for approximately 5,300 person-years of employment.

COMPARATIVE BUSINESS COSTS INDEX*

OVERALL RESULTS

LONDON, UK	109.1	ATLANTIC CANADA	CHARLOTTETOWN, PE	91.7
NEW YORK, NY	112.6		HALIFAX, NS	92.2
YOKOHAMA, JP	108.3		MONCTON, NB	91.1
SAN DIEGO, CA	103.2		ST. JOHN'S, NL	94.3
BOSTON, MA	107.8		SYDNEY, NS	92.2
TAMPA, FL	96.5		TRURO, NS	89.4
SEATTLE, WA	104.4		PICTOU, NS	89.9

source: *Competitive Alternatives: KPMG's guide to international business costs, 2006 Edition.*

* Business costs are expressed as an index, with the United States average being assigned the baseline index of 100. A cost index of less than 100 indicates lower costs than those in the U.S.

BUSINESS COSTS

In addition to strong university and research capabilities, low business costs are helping drive the growth of the ocean technologies industry in Atlantic Canada. According to *Competitive Alternatives: KPMG's guide to international business costs, 2006*, Atlantic Canada, as a region, has the lowest business costs in the G7 countries.

LEADERSHIP

Continuous development of cutting-edge technology and the willingness to form strategic partnerships make Atlantic Canada a centre of excellence for ocean technologies. This is particularly relevant due to the changing dynamics of the ocean economy, which is being influenced by global trends in defence, security, national sovereignty, environmental management, offshore oil and gas, and trade.

CHARACTERISTICS

The rapid growth of ocean technologies in Atlantic Canada is fuelled in part by the strong growth of the offshore oil and gas and the defence/marine security industries.

There are currently approximately 140 companies active in the ocean technologies industry in Atlantic Canada, with combined annual sales of approximately \$330 million in 2005. On average, Atlantic Canada's ocean technology companies expect sales to increase by 16% per year over the next five years. This is according to the *2005 Study of the Atlantic Canada Ocean Technology Sector* by Canmac Economics.

Atlantic Canada is home to a wide range of scientific and engineering expertise in this field, from ocean mapping and charting to cold water engineering and geophysical surveying.

Some of the world's most modern naval vessels and their integrated electronic systems have been designed and built in this region. Atlantic Canadian companies are also designing and installing some of the most advanced integrated ocean surveillance systems in the world.

BUSINESS ENVIRONMENT

There are many reasons why Atlantic Canada has become a thriving centre of excellence in ocean technologies. There is an abundance of academic and technical expertise, extensive investment in research and development infrastructure and a strong entrepreneurial spirit.

The ocean technologies industry in Atlantic Canada is also buoyed by a low business cost environment, an extensive transportation infrastructure and a well-educated workforce.

Ocean technology companies benefit from the strong synergy between the private sector, academia and government in the region. This collaborative environment encourages technology transfer and strategic partnerships that are contributing to the growth of a robust ocean technologies industry in Atlantic Canada.

Canada is recognized internationally as a leader in marine industries, including specialized areas such as cold water technology.

Atlantic Canada is home to the Bedford Institute of Oceanography, Canada's largest centre for ocean research and the first major national centre devoted to oceanography.

Expertise in Cold Water Engineering

Atlantic Canada's highly developed skills in cold water engineering are in full view with the \$1-billion Confederation Bridge. This 13-kilometre (8-mile) structure spans the Northumberland Strait between the provinces of New Brunswick and Prince Edward Island and has been named one of Canada's top five engineering achievements of the 20th century.

The **National Research Council - Institute for Ocean Technology** (St. John's, NL) is an internationally recognized leader in ocean engineering research. The Institute develops structures capable of functioning in hostile conditions and studies the performance of those systems.

Expertise in Instruments and Communications

Metocean Data Systems Limited (Dartmouth, NS) develops state-of-the-art data acquisition and telemetry systems for severe environments. The company's international niche markets are in oceanography, meteorology, defence, oil and gas and coastal environments.

NorthStar Technical Inc.

(St. John's, NL) manufactures underwater wireless communications systems and offers advanced electronic contract manufacturing. The company has developed an innovative net monitoring system designed to eliminate over-fishing and excessive by-catches.

Seimac (Halifax, NS) produces radio and data acquisition products for global customers in the research, military, search and rescue, and oil and gas industries. The 25-year-old company is a world leader in the design and manufacturing of specialized radios for mission critical applications.

Stratos Global Corporation

(St. John's, NL) manufactures software and communications systems for marine environments for military, media, aeronautical, industrial and recreational users around the world. Stratos offers its services through more than 300 authorized dealers around the world.

Expertise in Ocean Mapping and Charting

Geological Survey of Canada

(Dartmouth, NS) is the principal marine geoscience facility in Canada providing expertise in geophysical mapping. Its team of specialists provide integrated knowledge and advice on marine geoscience.

GeoNet Technologies Inc.

(Central Bedeque, PE) provides geographic information production and consulting services, specializing in map and chart production and consulting. Since its incorporation in 1994, GeoNet has completed projects in most Canadian provinces and territories as well as in several countries throughout the world.

Expertise in Ocean and Marine Shipboard Technology

Brooke Ocean Technology Limited

(Dartmouth, NS) develops and delivers equipment and systems to operate in harsh marine environments including shipboard launch/recovery systems and cable handling systems. The company has also developed a new instrument platform to measure surface-layer water properties under mobile ice.

Expertise in Remote Sensing

The Alliance for Marine Remote Sensing

(Bedford, NS) owns and operates the Centre for Marine Remote Sensing. The Alliance is a private, not-for-profit environmental technology association. Its mandate is to promote the use of remote sensing technologies in aquatic environments through the provision of various print and multimedia publications. Alliance membership includes representatives from the private, public and academic sectors in 27 countries.

Northern Radar Inc.

(St. John's, NL) provides marine surveillance and remote sensing systems and services. Its products and services are based on surface wave radar technology that allows the tracking of ships, icebergs, sea ice and low flying aircraft, as well as the measurement of surface currents and wave height.

Satlantic Ltd. (Halifax, NS) designs and markets portable earth stations, precision sensors, optical sensors, data extraction tools and other systems for the study of aquatic environments. The company also offers instrument integration, large-scale

ocean observatory solutions and data extraction tools for real-time decision-making.

Expertise in Survival Offshore Safety and Survival Centre - Memorial University of Newfoundland (St. John's, NL) delivers safety, survival and emergency response training to offshore industries. Its world-class facilities include a survival tank, helicopter underwater escape trainer, a marine base with launching systems, rescue capsules and an ocean-going vessel.

Survival Systems Training Ltd. (Dartmouth, NS) provides basic safety and survival training for the aviation, marine and offshore industries. The company develops custom-designed programs for clients around the world.

Expertise in Training Marine Institute - Memorial University of Newfoundland (St. John's, NL) is Canada's leading centre of fisheries and marine training. Its programs utilize a state-of-the-art navigation simulator designed to train bridge officers. The Marine Institute is in an elite group of public educational institutions that have ISO 9001 certification.

The **Holland College Marine Training Centre** (Summerside, PE) has been providing training to the marine industry for more than three decades. Providing the full range of certifications from deckhand to master mariner, the College also offers a number of specialized courses and customized training.

The Canadian Coast Guard College (Sydney, NS) develops and delivers maritime safety training, education and research programs on behalf of the Government of Canada. The College is a residential facility that provides training in both English and French to hundreds of students from around the world.

Expertise in Underwater Acoustics Defence Research and Development Canada - Atlantic (Dartmouth, NS) has world-leading expertise in underwater acoustics, antisubmarine warfare, mine and torpedo defence, shipboard command and control, and air and naval platform technology.

MacDonald Dettwiler and Associates Halifax (Dartmouth, NS) produces digital signal processing hardware, surveillance and monitoring systems. Its core competencies are in system engineering, software engineering, real-time digital signal processing, acoustics, information systems, space communications and integrated logistics support.

VEMCO Ltd. (Shad Bay, NS) designs underwater acoustic telemetry equipment. Exporting to more than 50 countries worldwide, it specializes in providing customized tracking equipment, depth data storage recorders and receivers that deliver real-time, high-resolution position and temperature information.

RESEARCH AND DEVELOPMENT

The ocean technologies industry is best characterized as a knowledge-based industry and its competitive advantages lie in its ability to innovate. The *2005 Study of the Atlantic Canada Ocean Technology Sector* by Canmac Economics found that, on average, regional firms devote 31.1% of full-time employee time to research and development.

In Atlantic Canada, many research and development facilities are dedicated to supporting the ocean technologies industry.

Bedford Institute of Oceanography (Dartmouth, NS) is Canada's largest centre for ocean research and the country's first major centre devoted to oceanography. The Institute advises on the management of fisheries resources, fish habitat and marine environments. It houses the Department of Fisheries and Oceans' Maritime Regional office, the Atlantic Geoscience Centre, and Environment Canada's Regional Wet Laboratory.

Canadian Centre for Marine Communications (St. John's, NL) develops information technology as well as products and services for marine communications and navigation. The centre also facilitates strategic partnerships among industry, research centres, academia and government.

C-CORE (St. John's, NL) develops and applies advanced technologies to address production and market issues faced by natural resource sectors such as oil and gas, mining, pulp and paper, forestry, fisheries and aquaculture. Key areas of

OCEAN TECHNOLOGIES IN ATLANTIC CANADA

The following organizations work together to develop and enhance the ocean technologies industry in Atlantic Canada.

The Atlantic Coastal Zone Information Steering Committee (Halifax, NS) promotes collaborative coastal management in Atlantic Canada by supporting the distribution and exchange of geospatial data and other industry information.

Oceans Advance (St. John's, NL), Newfoundland and Labrador's ocean technologies cluster, is a partnership of business, government and academia aimed at making the region an international location of choice for ocean technologies. The cluster builds research and development capacity in the region to enhance international export and business opportunities.

The Ocean Management Research Network (Halifax, NS) distributes information to ocean management researchers across Canada on such topics as fisheries and aquaculture, oil, gas and mineral extraction, ports, shipping and other areas of transportation, and integrated multiple-use management. The Network boasts close to 60 national and international partners.

expertise include ice engineering, remote sensing, expert systems and geotechnical engineering.

Centre for Marine Environmental Prediction - Dalhousie University (Halifax, NS) conducts research to develop tools for observation, prediction and visualization of the marine environment. The Centre is developing a physical-biological observation system that will be linked to a constantly updated descriptive and predictive model.

Chair in Ocean Mapping - University of New Brunswick (Fredericton, NB) conducts research in the development of innovative methods to process, depict and interpret ocean mapping data. Research also includes solving problems associated with high-volume seafloor bathymetric and imaging systems.

OCEAN TECHNOLOGIES IN ATLANTIC CANADA



International Oceans Institute of Canada – Dalhousie University

(Halifax, NS) promotes and supports sustainable management and regulation of ocean resources as well as the protection and conservation of the marine environment both nationally and internationally.

National Research Council's Institute for Ocean Technology – Offshore Engineering Research Group

(St. John's, NL) conducts research to improve the prediction of offshore system performance in marine and ice environments. Its ship Technology Research Group predicts and interprets environmental forces on marine structures to ensure safety, manoeuvrability and adequate powering.

Newfoundland and Labrador Association of Technology Industries

(St. John's, NL) provides the ocean technologies industry with market research, program support to companies, human resource services and networking opportunities.

Ocean Engineering Research Centre – Memorial University of Newfoundland

(St. John's, NL) is the only university in Canada that offers a Bachelor of Engineering degree in Ocean and Naval Architectural Engineering as well as a Master of Engineering and a doctorate degree in ocean engineering. The main areas of study include: marine hydrodynamics and wave structure interaction, sea ice mechanics, risk analysis in offshore systems, ocean monitoring, acoustics, geotechnology and instrumentation.

PROVINCES AND ABBREVIATIONS

- NB - NEW BRUNSWICK
- PE - PRINCE EDWARD ISLAND
- NS - NOVA SCOTIA
- NL - NEWFOUNDLAND AND LABRADOR

If you would like more information on this industry, please contact:

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OCEAN TECHNOLOGY IN ACTION

CARIS (Fredericton, NB) develops geomatics software and information management software for use in marine as well as land software development applications. The company is represented in over 70 countries and employs 125 people.

Deep Vision (Dartmouth, NS) specializes in developing real-time, intelligent machine perception technology. The company has developed a unique and proprietary technology that enables systems or devices to detect, recognize, and interpret objects and events, in their environment, with blazing speed. Deep Vision's technology is applicable to intelligent surveillance, robotics, intelligent transportation systems, automated inspection systems and a host of other applications.

Interactive Visualization Systems (Fredericton, NB) is the market leader in the provision of interactive 3D visualization and analysis software for marine information in commercial, academic and military fields.

Ultra Electronics Maritime Systems (Dartmouth, NS) is recognized as an international leader in the design, development, and production of advanced antisubmarine solutions. Over the last half century, Maritime Systems has built its reputation for excellence as an innovative provider of low frequency sonar, military towed arrays, and undersea surveillance systems. The company is renowned as the industry leader in its capability to design and manufacture high-performance sonobuoys and bathythermal buoys for ASW platforms worldwide. Key areas of technical expertise include digital and analogue electronics design, telemetry systems, acoustic transducer design, construction, and calibration, autonomous undersea surveillance systems, and mechanical design and packaging for the rigours of the marine environment.



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