The Canadian Trade Commissioner Service

Everywhere you do business

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International Business Development
Embassy of Canada to Iceland

June 2015

Government of Canada
Trade Commissioner Service

Gouvernement du Canada
Service des délégués commerciaux

Canada

PHOTO CREDITS: PGS/Marine Institute/Pro-Dive

Arctic Technology and Atlantic Canada Opportunity

Atlantic Canada Opportunities Agency
Agence de promotion économique du Canada atlantique

Canada

Atlantic Canada

- Four of Canada's easternmost provinces:
  - Newfoundland and Labrador (NL)
  - Nova Scotia (NS)
  - New Brunswick (NB)
  - Prince Edward Island (PEI)
- Combined population of over 2.3 million
- 501,000 km^2
  - About 5 times larger than Iceland
- Strong, historical connection to the sea and northern regions
  - 50,000 km of coastline
- Offshore marine industries: oil and gas, fishing, transportation, shipbuilding are a staging ground for building R&D capacity and ocean technology expertise

Where We Are

- Arctic gateway with close proximity to Greenland and Eastern Arctic
- Labrador, the most northeastern edge of North America, is an ecological boundary between the Arctic tundra and the sub-Arctic boreal forest
- Well connected to major North American markets by road, sea, and air:
  - Day's driving distance of more than ⅓ North American population
  - 2 days closer to Europe vs other eastern seaboard ports

- Eastern edge of the North Atlantic on international shipping lanes and close to Europe
  - 1.5 day sailing/1,800km closer to Mumbai, India vs West Coast Canada

Oil Production and Opportunities

- Three major projects (Hibernia, Terra Nova, White Rose) producing about 230,000 barrels/day
- Over 1.5 billion barrels of cumulative production to date
- Hebron (~700 m/bbl recoverable oil) under development with first oil expected in 2017
- Operators making significant investment in project extensions.
- Active exploration environment:
  - Statoil's Bay du Nord: world's largest offshore discovery in 2013
  - Multi-client seismic programs delineating new basins
  - New scheduled land tenure system
  - Over $2B in recent exploration commitments in offshore Nova Scotia
  - Government geoscience investments support future activity
- All projects operate in ice-prone and harsh environments

PHOTO CREDIT : HMDC

Leader in Ocean/Arctic Technology

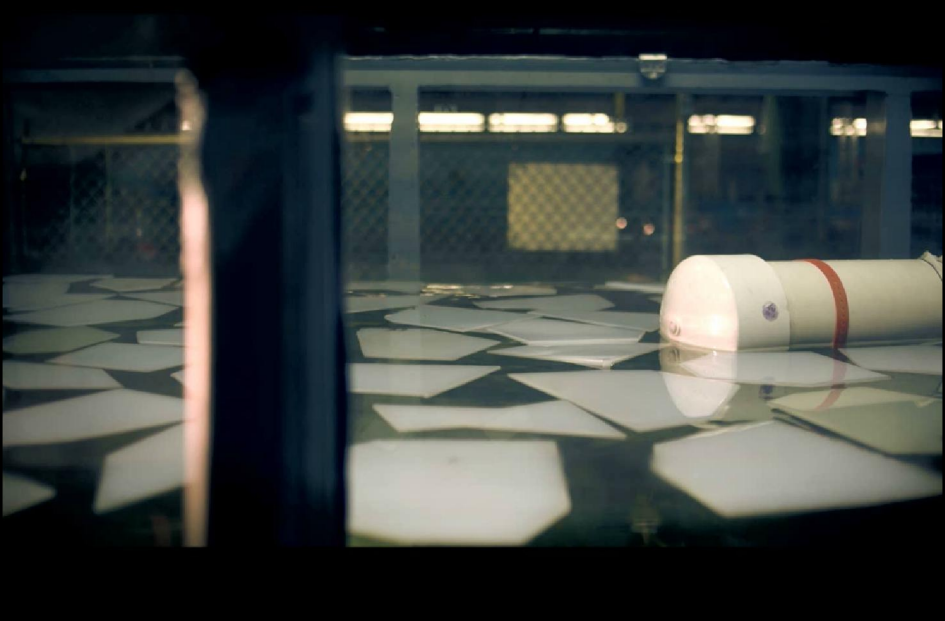
- Readily accessible sub-Arctic area with established and reliable regulatory regimes
- Significant traditional and technical knowledge of harsh environment and ocean resources
  - Skills that transcend generations/sectors
- Real time "Arctic lab" for understanding ice dynamics, cold ocean & harsh environment conditions
- World-class ocean technology capacity and experience offering some of the most innovative technologies through:
  - Private sector companies
  - Public institutions
  - Skills and training support
  - R&D infrastructure

Dr. Claude Daley of Memorial University's Faculty of Engineering and Applied Science

Private Sector Expertise

- Presence in Newfoundland and Labrador of world class private sector expertise and products from international, national and local companies
- Newfoundland and Labrador Oil and Gas Industries Association (Noia) has a membership of over 600 companies
- An oceans technology cluster of more than 50 export-driven companies
- Unique solutions to challenges of operating in a harsh environment, such as:
  - metocean forecasting;
  - ice engineering and detection;
  - tracking and management;
  - construction and fabrication for harsh environments.
- Major companies such as ExxonMobil, Suncor Energy, Husky Energy, Chevron, Statoil either leading or participating in major offshore projects

Bill Fanning, president and country manager for **Kvaerner's Canadian operations,**
Matt Debicki Director of NL operations for **Canatech – a Calgary and St. John's-based firm**



Research Infrastructure & Expertise

C-CORE

- World leader in ice-engineering & satellite monitoring of the North
- Three core areas of expertise:
  - Remote sensing; Ice engineering; Geotechnical engineering
- Specializes in advanced R&D and operational services for resource sector and government clients
- C-CORE hosts two Centres of Excellence: CARD and LOOKNorth
- CARD (Centre for Arctic Resource Development)
  - Dedicated program in Arctic technologies for resource development
  - Increased understanding of Arctic environment for design/operation
- LOOKNorth
  - National Centre of Excellence for Commercialization and Research
  - Remote sensing and monitoring solutions to address resource development challenges in the North

www.c-core.ca

Research Infrastructure & Expertise

National Research Council *(www.nrc-cnrc.gc.ca)*

- National research institution w focus on ship/underwater vehicle dynamics, ice effects on marine systems, mooring and towing simulation, wave current interaction, and wave impact analysis:
  - Offshore Engineering Basin w wave-maker for testing models of bottom-founded or floating structures and ships
  - 200-metre Towing Tank wave-maker, 90-metre Ice Tank is longest in the world

Marine Institute *(www.mi.mun.ca)*

- Memorial University campus with focus on oceans education, training and applied research
  - Offshore Safety and Survival Centre (OSSC)
  - The Centre of Marine Simulation (CMS) includes full mission Ship Bridge Simulator, Ballast Control and Cargo Operations Simulator, Dynamic Positioning Simulator, & Navigation and Blind Pilotage Simulator

Halifax Marine Research Institute

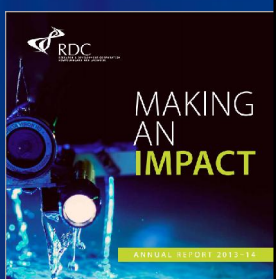
- Marine: observation/prediction; resource conservation/biodiversity; energy; security; and technology.

Enabling Organizations

Research & Development Corporation (RDC)

Provincial Crown Corporation mandated to strengthen R&D for economic benefit

- Priority Sectors:
  1. Energy
  2. Ocean Technology
  3. Mining and minerals
- Lines of business:
  1. R&D Programs - $101 M invested in 553 R&D projects to date. Leveraged $316 M ($162 M from industry).
  2. R&D Solutions - Atmospheric Corrosion Test Site launched in 2014. Collaborating with NASA to develop a harsh environment classification for the site



www.rdc.org

Enabling Organizations

Petroleum Research Newfoundland and Labrador (PRNL)

- Not-for-profit organization with membership comprised of ExxonMobil, Suncor, Husky, Statoil and Chevron
- Strategically and commercially relevant projects undertaken through Joint Industry Partnerships
- Key Priorities

  Arctic and Harsh Environments: (ice management, ice loads on structures, and subsea asset protection)

  Health, Safety and the Environment: (reducing risk for operations in Arctic/harsh environments)
- Projects outside the strategic focus areas may be undertaken from time to time

www.petroleumresearch.ca

Enabling Organizations

Atlantic Canada Opportunities Agency (ACOA)

- Government of Canada's Economic Development Agency for the four Atlantic Canadian Provinces
- Focus on economic growth by:
  - helping businesses become more competitive, innovative and productive;
  - assisting communities to develop and diversify local economies; and
  - championing the strengths of Atlantic Canada.
- Business Development Program helps to establish, expand or modernize businesses.
- Atlantic Innovation Fund supports innovation and commercialization of R&D
  - since inception, has approved $836 million in funding to 330 innovative R&D projects.

www.acoa-apeca.gc.ca

Sub-C Control - developing a new level of underwater imaging control for ROVs and AUV, for extremely cold climate/Arctic applications.

Selected R&D Project Examples

Steps² – Memorial University/National Research Council project to assist the design of vessels and offshore structures exposed to sea ice. Industry partners include Husky Energy, Samsung Heavy Industries, Rolls Royce, American Bureau of Shipping and BMT Fleet Technology.

HF-ROSA: High Frequency Radar Ocean Surface Applications – Memorial University's/Northern Radar Inc. project developing software to extract information about surface currents and wave heights; identify the path and speed of ships and icebergs; and track oil spills.

Integrity and Security of Critical Infrastructure – C-CORE project creating integrated space/ground/subsurface monitoring of stability/security of critical infrastructure.

Oil in Marine Waters and Harsh Climates – Memorial University researchers are developing a sensing device for the rapid detection of contaminants in remote and harsh environment

Sub-C Control – Sub-C Control, a small, private company is developing underwater imaging control for ROVs and AUVs for extremely cold climate/Arctic applications

PHOTO CREDITS:: Dave Howells for RDC

Notable Upcoming Events – Atlantic Canada

NOIA 2015:

June 15-18, 2015, St. John's, NL

www.noiaconference.com

Arctic Technology Conference 2016:

October 24-26, St. John's, NL

www.arctictechnologyconference.org

CORE Conference:

September 29-30, 2015, Halifax, NS

www.maritimesenergy.com

The Canadian Trade Commissioner Service

For more information
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