Good Afternoon Mr. Chair and honorable senators, thank you for the invitation to appear before this committee and bring observations and opinions on the issues surrounding Maritime Search and Rescue. My name is Chris Hearn, I am a Master Mariner and formerly a captain serving on ships working domestically and foreign going. I am serving presently as the Director for the Marine institute’s Centre for Marine Simulation, and in this role I have been asked by the Marine Institute’s Vice President Glenn Blackwood to bring greetings and comments before this committee today.

The Fisheries and Marine Institute of Memorial University of Newfoundland (MI) is a world-class center of advanced marine technology, education, and training. Initially conceived as the College of Fisheries, Navigation, Marine Engineering and Electronics in 1964, the Marine Institute has grown and developed to become Canada’s leading fisheries and marine institute. Today, this progression can be seen in MI’s superb facilities, strong education and training programs, and highly qualified and dedicated people.

Through its wide range of technical education and training courses, including short industrial response courses, diploma of technology programs, Bachelor’s and Master’s degree programs, as well as its participation in research and development, and public policy advocacy initiatives, the Marine Institute is actively involved in contributing to the economic development of Newfoundland and Labrador and the North Atlantic region as a whole.

I have provided this committee with an overview of the Marine Institute briefly describing its structure and organization and I will be referring to this overview for the following commentary.

The Marine Institute has three Schools – the School of Fisheries, the School of Maritime Studies and the School of Ocean Technology – and within these Schools a number of specialized centres and units. These centres and units lead the Institute, both nationally and internationally, in applied research and technology transfer and in the provision of training to a variety of industry clients all in the oceans domain.

For the purposes of the discussion today I will focus on the schools and centers that are most focused on areas of Maritime search and rescue and survival from an education, training and research point of view.

Fundamentals

The School of Maritime Studies. The School is also well known for its long standing and highly successful programs that prepare individuals for entry level operational positions as Deck Officers, Engineering Officers and Ratings. The school also provides education and training in
the design of ships and associated marine systems. The Bachelor of Maritime Studies and Master of Maritime Management Degrees are designed for those who wish to enhance their knowledge and skills to prepare themselves for other positions in the marine industry.

The 4 year Nautical Science and Marine Engineering, Naval Architecture and Marine System design programs produce on average 100 graduates per year.

Prevention

The Centre for Marine Simulation (CMS), part of the Marine Institute’s School of Maritime Studies, was originally conceived and created from the lessons learned following the Ocean Ranger disaster. This tragedy catalyzed the province’s offshore industry’s focus on formalized safety training and led to advanced simulation development. After 25 years, CMS now possesses the most comprehensive suite of marine simulation capabilities in North America and is a leader in providing top quality education and simulation-based training using highly equipment. Given the climate, our specialty is in harsh operating condition and ice covered waters.

- 31 simulation based courses ranging from half day to a full week.
- 300 people per year and 8-10 industrial response projects for shipping, offshore oil and gas industries
- Undertakes research in areas of technology and human factors
  - ECDIS and AIS displays
  - Situational awareness for watch keeping officers in complex multi-tasking situations (SAR)
  - Motion induced interruptions on performance of people in high sea states
  - Modeling and simulation of harsh environments (5 years)
  - Ship operations in Ice covered waters

Response

The Offshore Safety and Survival Centre (OSSC) delivers a comprehensive range of safety, survival and emergency response training for offshore petroleum, marine transportation, fishing and land based industries. Through its satellite Safety and Emergency Response Training (SERT) Centre located in Stephenville, it also offers emergency response training to the firefighting and aviation industries.

The OSSC works closely with industry, researchers and industry associations to improve safety technologies and practices and can design and customized courses to meet the specific training needs of its clients. Includes Ocean Safety Research
Senate Committee Hearing on Maritime Search and Rescue: Certification, Training and Research

- 57 short industrial course ranging half day to 12 days for wide variety of clients including the SMS
- 5000 students and clients per year with 4000 directly related to safety and survival training
- Undertakes research on areas of survivability, evacuation, in harsh conditions.
  - Thermal Protection in Life Boats and Life Rafts
  - Life Boat Maneuverability in ice
  - Evacuation and recovery of personnel

Further Details

External engagement on areas of emergency and survival

MI with its schools and centers works with multiple agencies domestically and internationally in the areas of safety at sea and engagement on public policy, a short list would include:

IAMU (International Association of Maritime Universities)
INSLC (International Simulation Lecturers Conference)
Once Ocean (Joint offshore industry-Fisheries resources group)
Transport Canada (Canada’s marine regulatory body)
SAR NIF
CCPFH (Canadian Council of Professional Fish Harvesters)
IMO (International Maritime Organization)
IASST (Integration Association of Safety and Survival Training)
IMCA (International Marine Contractors Association)

The MI host seminars and conferences on aspects of ocean safety such as Ocean Innovation, E Navigation, Arctic Search and Rescue, Cold Ocean Survival, Arctic Shipping, Safe Fishing, Offshore Mooring of Structures, Ice Navigation,
CBED and Fisheries

The Community Based Education Delivery group or CBED is training elements of the MI’s School of Fisheries and works with the fishing industry to delivery navigation, safety and survival training to people in their own communities. The organization has a long standing history of working with stakeholders to improve the personal safety on eth water. The unit trains over 100 fishers yearly.

Numbers of Students

The Marine Institute actively recruits students from Newfoundland and Labrador, Canada and internationally. Based on in-depth recruitment and enrolment reports we have been focusing on the following provinces for in-person recruitment activities:

- Newfoundland & Labrador (we attempt to cover the entire island)
- Nova Scotia
- New Brunswick
- Prince Edward Island
- Ontario
- Alberta
- British Columbia

Market research is completed on these areas every year and evaluated for future recruitment initiatives. While we are still in the early stages of international in-person recruitment initiatives, we do a considerable amount of recruitment activities online and this is where the majority of our international recruitment is coming from to date. The Recruitment team consist of 5 people.

Further, Within the Office of Career Integrated Learning, there is a new position that covers career services and focuses on our graduates. This past year was the first year that the Office of Career Integrated Learning administered a graduate employment survey, so while we are now collecting this data the information has not yet been released for the 2016 graduates.

Sample Numbers of student intake across the MI schools and centers, including academic programs, technical program, and short courses

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<td>2016-17</td>
<td>7,342</td>
<td>8,916</td>
<td>9,208</td>
<td>9,062</td>
<td>9,171</td>
<td>7,967</td>
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Sample of Research in SAR and Related Marine Safety

Operational:
- Integrated Navigation Systems- Situational Awareness in Critical Situations
- Assessment of Motion Induced Injuries on Seafarers- NATO
- Effects of Motion Sickness on Persons
- Development of Fast Rescue Craft Simulation Tool
- Development of Fishing Vessel Stability Simulator

Evacuation:
- Quantifying Human Performance during Mustering onboard Large Passenger Ships
- Quantifying Human Performance during Abandonment from Passenger Ships
- Field Testing of a Totally Enclosed Lifeboat’s Manoeuvrability in Managed First Year Sea Ice
- Measuring Forces and Accelerations Experienced by users of Evacuation Slides and Chutes
- Stretcher Case Abandonment using Evacuation Slides and Chutes
- Movement of Stretcher Cases on Stairs in an Offshore Environment
- Operational Performance of Life Rafts at Sea: Evaluation of Technology, Human Factors and Training Elements

Survival:
- Measurement of Thermal Performance for Two Thermally Insulated Lifejackets
- Determining the Thermal Requirements for Surviving a Mass Evacuation Incident in the Arctic
- Quantifying the Thermal Protection Provided by Totally Enclosed Lifeboats
- Thermal Protection Life Rafts: Assessing Occupant Heat Balance and Development of Performance Criteria
- Determining the Compatibility Between Lifeboat Capacity and Workers Wearing Abandonment Suits

Rescue:
- Recovery of Loaded Life Rafts at Sea using a Dacon Scoop
- Verification and Quantification of Rescue Performance for Offshore Supply Vessel Crews during Rescue at Sea
- Quantifying Performance of Personal Locator Bacons in Realistic Sea Conditions
Areas of Concern and Observation

The following comments reflect my own observations on SAR in the North Atlantic

Much of the SAR training in MI programs involves the specialized focus that makes up the Marine Emergency Duties (safety, survival, and medical). As all ships can be tasked to render assistance to another vessel, there is additional content in formalized marine programs that deal with the fundamentals of search and rescue. However, the old adage that an ounce of prevention is worth a pound of cure plays much into discussion on SAR in the context of the North Atlantic when considering the wide diversity of vessels, geography, sea states and marine activities. In this view the following observations are made with the view to preventative strategies

- **Ships** are the safest, most efficient and environmentally friendly mode of transport and the only way to carry crude oil to markets. However, marine transportation does not stay that way without highly competent seamen, officers and inspectors. Canada needs to strengthen the marine inspection to keep ships and shipping where it is today. The need to train and recertify is an ongoing effort within the marine industry to ensure competency in emergencies but also stay ahead of new technology. While active shipboard personnel need to maintain their knowledge emergency management skills - has government done the same with their personnel??

- The recent announcements by the government on marine safety are welcome. However, there should be investment for additional research and investment in the concept of Places of Refuge for stricken vessels in keeping with maritime practices in other countries (such as UK or Australia). Designation of a Place of Refuge can assist SAR, salvage, recovery and other emergency services to maximize and focus efforts. When safety fails, there will be a marine emergency to deal with and in keeping with Recommendation 3.1 of Phase 2 of the Expert Panel Report in Tanker Safety, there should be efforts put towards a centralized decision making authority to deal with marine emergencies and each across various government department to effect action in the case of major marine casualty which could include oil spills.

- Government should examine the possibility to assist industry in times of downturns to ensure that training budgets, especially in areas of safety are maintained. This is particularly vital when it comes to SAR resources such as the Coast Guard. Coast Guard like any operational organization is subject to many variables in budgets. Quite often, training is reduced in the face of maintaining vessel operations.

- SAR through the CCG and associated agencies are doing an incredible job in the face of aging equipment and a vast area of responsibility. Government should continue to invest in new vessels and equipment.
Recently, full scale experiments on survivability in harsh conditions with SOLAS class equipment commonly found on ship (life boat, life rafts, thermal wear) were carried out in Norway’s Svalbard Archipelago. The tests were conducted as part of an international collaboration, and while the Marine Institute was invited to be part of the program, and there was representatives from Canadian organizations, this type of important work should be underway here as well. There should be funding available to carry out more industry related projects of this nature on areas of SAR and survivability for the north eastern Atlantic, which should be led by Canada.

Offshore oil and gas industry continues to expand in the Newfoundland region and the Grand Banks. The Hebron project will see a new Gravity Base Structure (GBS) towed to field in 2017 to start production. This will be the 4th producing oil field in offshore Newfoundland and with the recent announcement of nearly a billion dollars of investment in new field licenses and exploration by the industry the indicators are that the industry will continue to grow. The addition of Hebron adds further demand for state of the art SAR resources to respond to any crises. New exploration and development activity is taking place further offshore at greater distances and in deeper and more northern water increasing the pressure on response times. SAR collaboration with offshore oil and gas interests should be continue to be emphasized and strengthened with opportunities for joint training and collaboration encouraged.

Technology such as the widely accepted and popular SMART Bay Technology (pioneered and developed at the Marine Institute through its CETEC group) should be considered for additional funding by government. The Smart Bay system provides real time met ocean data to mariners and can assist in improving safety in areas of marine traffic. The technology is a successful example of made in Canada E- Navigation solution. The project is currently largely funded by pilots associations, ports, and industry because government hasn’t see any value in continuing the project gathering environmental data as a safety factor. With dense shipping traffic in the seaways into the Gulf of St. Lawrence and Placentia Bay there is continued need for enhanced technology in the areas to improve resources for navigational safety.

While the arctic isn’t part of this discussion, Labrador and eastern Arctic waters represent challenges in the area of response times and demands on personnel and equipment. SAR in general in the northern waters is a massive challenge. There is detail in the recent marine safety announcement on aspect of improving ability to respond in the Arctic but more work need to be done on the current equipment in place for survival ( rafts, thermal aides) and for meaningful assessment of large scale recovery operation which could include casualties, oil spill, salvage and clean up.

The committee should examine the model of an expanded auxiliary to assist in the area of SAR. The current auxiliary system make use of volunteers and their private boats drawn from across the recreational and fishing industry to provide an additional resource to SAR operations, and in
many cases are often the first responder. Under the current arrangement the members of the auxiliary are compensated only for their use on fuel as part of a SAR, with some degree of insurance coverage for undertaken the operation. This value comes out of the total budget allocated for an auxiliary in any one region. Training is a critical elements to maintaining competency. The costs for training for membership also comes out of the budget envelope for the auxiliary organization. The government should examine the model for the Royal National Life boat Institution or RNLI, a near shore all volunteer based organization in the UK that has been operational for over 100 years. The organization consisting of some 4000 volunteers operates a fleet of small rescue craft and conducts training in the area of ocean safety. Funding of the RNLI is a combination of public donation, legacy bequeathal, and through result of merchandizing and sales along with government investment. There may be opportunity to study the funding mechanisms and marketing used by the RNLI as an option to assist with Auxiliary funding to expand interest and sustain operations.