



# Academic Unit Planning

SELF STUDY – School of Maritime Studies

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## INTRODUCTION

The Fisheries and Marine Institute of the Memorial University of Newfoundland (Marine Institute) is a world-class centre of advanced marine technology, education, and training. Instructional activities at the Marine Institute are organized around three schools, the School of Maritime Studies (SMS), the School of Fisheries (SOF), and the School of Ocean Technology (SOT), the Department of Ocean Safety, all of which are supported by the Division of Academic and Student Affairs (ASA). The focus of this self-study is the School of Maritime Studies.

The School of Maritime Studies endeavours to provide quality courses and programs at all levels to meet the needs of the marine transportation industry. This is accomplished by working closely with the regulatory authority (Transport Canada), international maritime education and training organizations such as the International Association of Maritime Universities (IAMU) and the International Maritime Lecturers Association (IMLA) (and its subsidiary groups). Faculty involvement with organizations such as Royal Institute of Naval Architects (RINA), Society of Naval Architecture and Marine Engineering (SNAME), the Master Mariners of Canada (MMC), and the Canadian Institute of Marine Engineering (CIMarE) also keep us current with the industry.

The Marine Institute is a founding member of the Canadian Association of Marine Training Institutes (CAMTI), and the Head of the School of Maritime Studies presently chairs this organization. Through its close working relationship with Transport Canada, the Marine Institute has the opportunity to interact with the International Maritime Organization (IMO) which ensures the institute is aware of and able to implement changes to programs to reflect key changes on the international level.

Membership with the IAMU, IMLA and other groups provides linkages with maritime educators around the world and through annual meetings affords MI the opportunity to share ideas on advances in technology, challenges with the marine transportation industry and other factors which affect the type of programs we offer.

With a strong base, in terms of being current with the needs of the marine transportation industry, MI is able to offer the range of programs needed to meet the needs of the individual and the industry. Offering courses and programs that address the various careers paths for people in this industry is accomplished by being aware of the industry and developing programs to meet its needs.

The Fisheries and Marine Institute has in place a quality management system that is certified to ISO 9001:2008, and is currently transitioning to the new standard ISO 9001:2015. The scope of the system is:

*“The design, development and provision of education and training, industrial and applied research, and industrial assistance for the fisheries and marine related industries provincially, nationally and internationally.”*

The quality system applies to all activities relating to learning opportunities, industrial and applied research, industrial assistance and related services designed, prepared or delivered by the Marine Institute.

As part of Memorial University, the Institute falls within the overarching quality policies and procedures of the university. Generally these policies and guidelines are compatible with the objectives of the Institute and the University allows considerable latitude for the Institute to set its own goals within the mandate specified in the Memorial University Act. Where changes in policies or guidelines are necessary to meet the Institute’s quality objectives, the Institute works with the University to effect these changes.

## 1. SELF STUDY PROCESS

The approach taken by the School of Maritime Studies (SMS) for the Self Study portion of the Academic Unit Planning (AUP) process was to seek the direct input of key stakeholders, these included faculty, staff and students. This process was carried out through a series of discussion and information sessions focused on the specific elements that make up the report. As follows are identifying descriptions and the dates said sessions occurred:

*September 19, 2016* – Initial meeting with program chairs and others to start the discussion on the AUP process and how to involve faculty, staff and students in the process.

*October 20, 2016* – Presentation by Paul Chancey, Director, Centre for Institutional Analysis and Planning, regarding the AUP process. This session was open to the entirety of SMS which includes the Centre for Marine Simulation (CMS).

*November 1, 2016* – Discussion on enrolment and retention in the undergraduate programs in SMS. This session was open to all faculty in SMS.

*November 16, 2016* – Small group discussion regarding the future of SMS programs and whether the school should convert diploma programs to degrees. Key informants were selected to attend this discussion.

*November 17, 2016* – Monthly school meeting with the topic of discussion being the undergraduate programs in SMS. All faculty in SMS and CMS invited.

*November 24, 2016* – Discussion on the graduate programs in SMS. Small group discussion with those involved in the MMM.

*December 6, 2016* – Small group discussion dedicated to answering the question, “How do we further research within SMS”. Faculty who have an interest in research were invited to attend.

There was excellent attendance at each session with a lot of feedback and healthy discussion occurring from those in attendance. In addition to the sessions, a dedicated D2L site was set-up so that information and feedback could be posted and shared among those who were unable to attend the sessions.

The feedback from each of these sessions is incorporated in the relevant sections of the self- study report.

Throughout the self-study process valuable contributions were made from a multitude of individuals including Catherine Dutton, Head of the School of Maritime Studies, who provided structure and strategic direction while operating as a session moderator. Jonathan Dredge, Planning Analyst, who provided input on the questions to be posed and documenting the feedback from the discussions. Heather Canning, Institutional Analyst, who provided all statistical data with the report, and Lynn Taylor, Senior Planning Analyst, whose extensive experience with the AUP process provided valuable insight.

## 2. SCHOOL BACKGROUND

The School of Maritime Studies has been a part of the Marine Institute from its inception in 1964 as the College of Fisheries, Marine Engineering, Navigation and Electronics. Although the name of the College has changed as well as the name of the School, the courses and programs it offers have been core to the Institute since it opened.

The development of the School of Maritime Studies with its present suite of courses and programs came into existence shortly after the Institute merged with the Memorial University of Newfoundland and Labrador (MUN) in 1992. Prior to that juncture the School of Marine Transportation, which would later become SMS, was focused on the programs that prepared its students for seagoing careers. Upon the Institute and Memorial merging there was a subsequent change in the provincial post-secondary system – often referred to as the Wet-Dry split. This split resulted in a number of duplicate programs offered by the College of the North Atlantic (CNA) and were considered “dry” being transferred solely to the College. The number of the remaining “wet” programs became part of the School of Maritime Studies, in particular Naval Architecture and Marine Engineering Systems Design. SMS continued with the delivery of the Diplomas of Technology in Nautical Science and Marine Engineering and the Technical Certificates in Bridgework and Marine Diesel Mechanics. All four of these programs are recognized by Transport Canada for remission of sea-time, as well as a number of technical credits.

The driving force behind a number of programs within SMS is set by the International Maritime Organization (IMO) and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW). The Convention sets qualification standards for masters, officers and watch personnel on seagoing merchant ships, the purpose being promotion of safety during maritime operations and protection of the marine environment. The most recent amendments to the convention were adopted in Manila in 2010. Commonly known as “The Manila Amendments”, these amendments were necessary to keep training standards in line with technological and operational requirements that necessitate new shipboard competencies. The introduction of these and all previous amendments have led to changes within the programs within SMS.

In addition to these programs, the school also obtained responsibility for the delivery of a number of the academic courses that are core to all programs, i.e. Mathematics, Physics, Communication Skills and Electrotechnology. The latter being transferred in 2007 to the newly created School of Ocean Technology.

The School of Maritime Studies also has responsibility for the administration and delivery of technician diploma programs for the Canadian Navy. This has included at times large numbers of students in the Electronics, Electro-Mechanical and Marine Engineering Technician programs. With changes in contractual requirements the only program that is still delivered by the Marine Institute is the two-year marine engineering technician program. Although part of the programs delivered by the SMS, these will not be included as part of this report in any detail as the recruitment of students and scope of the program is set by the Department of National Defence (DND).

Another aspect of becoming part of Memorial University was the ability to offer bachelor degrees, and SMS introduced the Bachelor of Maritime Studies (BMS) in 1995. This program was initially built upon the Nautical Science and Marine Engineering programs with a suite of 13 courses focused on business, economics, sociology, etc. The program is now open to NARC and MESD graduates, as well as graduates of similar programs in Canada. Tied to the connections of the school with the Canadian Navy a detailed

assessment of the training and experience of Navy officers was carried out to facilitate a route for them to complete the BMS as well. We subsequently have seen a number of naval officers enrol in this program.

The Master of Maritime Management, the first of its kind in Canada, which provides professional development opportunities for working career-minded professionals, was introduced in 2010. It is a course based master's programme that provides students a broad understanding of the structure, operation, and factors that influence business decisions of, maritime-based organizations.

## Industry Response

The school is also involved in the delivery of a variety of industry response courses. A number of these are specialized courses that are required by Transport Canada for certification purposes. These courses include, but are not limited to, Ship Security Officer, Passenger Safety Management, Advanced Training for Oil Cargo Operations, Simulated Electronic Navigation (SEN), Electronic Chart Display Information Systems (ECDIS), Propulsion Plant Simulator, etc.

A number of industry clients often require training courses developed to their own specific needs. In such instances the school works in tandem with the client to develop a workshop or course to meet this need. A recent example of this process includes a site specific course for Crowd Control for Hebron GBS/Flotilla during Construction Activities at the Deep Water Site or Maritime Occupational Health and Safety (MOHS) Training for Senior Managers & Supervisors.

## Centres

The Centre for Marine Simulation began its operations in 1994 and 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. CMS now possesses the most comprehensive suite of marine simulation capabilities in North America. Its marine simulation facilities cover an entire range of training, educational, and research and development capabilities ranging from computer based part-task simulators to large and complex full mission simulators.

The Centre offers a variety of industry response training courses such as Advanced Ship Maneuvering, Bridge Resource Management, Dynamic Positioning, Fundamentals of Ice Navigation, and Anchor Handling. They will also tailor a course to a specific client need.

The advanced simulation capability available at the Centre for Marine Simulation also provides researchers with a valuable tool to conduct controlled studies in a ship board environment that would be impossible or incredibly expensive to conduct with sea trials. Research topics that are especially suited for marine simulation include: ice and harsh environment operations, ice navigation, human factors studies, ship systems and testing, simulation technologies, and technology transfer.

The Centre for Marine Simulation's particular focus of research is the modeling and simulation of harsh environments. The objective of this research has been to improve the safety and efficiency of offshore operations in harsh maritime environments through the development of innovative modeling and simulation capabilities focused on reducing human error. The research addresses an industry demand for more accurate, innovative and reliable solutions to human factor challenges within the design and

delivery of training programs for harsh environments. The Centre’s research incorporates three independent activities; simulation infrastructure, model development, and human performance.

### ***School of Maritime Studies Today***

*The best description for the school now is that it prepares students to pursue careers in the marine transportation industry, from design to operations to management; undertakes research and applied technology transfer initiatives; and responds to technological and public policy issues affecting the marine transportation industry. The School of Maritime Studies offers a masters degree in maritime management and a bachelor’s degree in maritime studies - the first of their kind in Canada, diploma programs in nautical science, marine engineering, naval architecture, marine engineering systems design technology and certificate programs for marine diesel mechanics and bridgewatch ratings. The School of Maritime Studies also delivers a variety of industry response courses and has the Centre for Marine Simulation that undertakes applied research, technology transfer functions and industrial response training for the marine and offshore industries.*

## **3. STRATEGIC OBJECTIVES**

### **3.1 STRATEGIC GOALS AND PRIORITIES**

#### **3.1.1 SHORT TERM**

The Marine Institute (MI) takes an intergraded approach to the planning and the development of strategic objectives for each of its schools and centres. Resulting from this approach are yearly retreats for each unit within the institute, these retreats are a time when the units can reflect upon the objectives set in the previous year, gauge their success, and plot the course for the coming year(s). The following goals and priorities were established during the School of Maritime Studies (SMS) retreat of 2016:

- **Student success mechanisms.** Creation of a student course map along with a mentorship program for students.
- **Research planning.** Develop a research plan for SMS to follow.
- **Leadership.** An increased emphasis on leadership that will include initiatives such as cross-program events, workshops and demonstrations in teaching and learning.
- **E-Learning.** Promotion of e-learning through additional course offerings, particularly for Transport Canada courses
- **Mariner professional development.** Develop a plan for a centre focused on professional development for Mariners.
- **Taking ownership.** Take full ownership of the BMS through expanded course offerings.

These priorities are designed with the intent to be broad enough to allow the school to be flexible and responsive to the changing needs of industry while specific enough to keep SMS on a clear path to achieving the long term goals and priorities it has identified.

### 3.1.2 *LONG TERM*

While the previously described short term goals and priorities serve as year-to-year guidelines for the School of Maritime Studies, their long term counterparts operate as the pinnacle of what SMS seeks to achieve.

The core long term goal identified by the School of Maritime Studies is to enhance the suite of education and training programs in the marine transportation and offshore sectors ensuring high quality, viability, and recognized stature nationally and internationally.

To achieve this goal SMS have set the following long term priorities to incorporate into all the strategic decisions made:

- Further develop and strengthen the present suite of Diploma and Degree programs, industry training courses, and applied research activities within the School.
- Enhance the complement and capabilities of faculty to enable the School to respond to international opportunities while at the same time enhancing the quality of our present suite of in-house courses/programs.
- Recruit diverse groups of students in currently offered programs.
- Establish strategic linkages with national and international Institutions/Universities and develop partnerships with Industry which assists our School in expanding our outreach, capabilities, profile and revenue base.
- Increase the School's involvement with international associations and organizations thereby enhancing our international visibility and reputation.

For the Centre for Marine Simulation (CMS) the following are their Key Performance Indicators (KPIs) that are reviewed on an annual basis:

- To ensure effective and quality training services are provided to clients.
- To ensure effective and responsive industrial assistance is provided to clients.
- To ensure our personnel are professional, motivated, and prepared to perform their assignments and committed to improving the quality of CMS services.
- Ensuring that our facilities, equipment and technology are functioning correctly and fully operational for provision of training and industrial services.

### 3.2 ALIGNMENT WITH THE STRATEGIC PLANS OF MEMORIAL UNIVERSITY AND THE MARINE INSTITUTE

The Memorial University strategic documents, which includes the 2020 document (vision, mission and values), research frameworks, plans for internationalization, enrolment and faculty among others, were instrumental in the development of strategic plans for the Marine Institute. These strategic plans include MI Vision 2020 and the strategic goals and priorities of SMS. These plans were designed to adhere to the values, goals and strategies outlined in the various Memorial documents discussed above. All strategic decisions pursued by the Marine Institute and/or SMS are examined through the lens of both the Institute’s Vision 2020 document and the strategic plans of Memorial University. The following indicate documents and how the goals and priorities of SMS align with them.

#### 3.2.1 *MI VISION 20/20*

The Marine Institute’s vision is to ***be a world oceans institute, setting the standards for education, training, innovation, and research***. As a part of the Vision 2020 documents MI has identified a number of values: fostering a learning culture, incorporating learning technologies, furthering research and development and being a world-class institute, among others. To adhere to these values set by the institute, the School of Maritime Studies must stay on the cusp of emerging education, training and technology. Through the completion of the aforementioned long term goals and priorities and the short term ones that fall within them, SMS can meet the high requirements outlined in Vision 20/20 and continue to progress towards MI’s goal of being a world oceans institute.

#### 3.2.2 *THE 2020 DOCUMENT: VISION, MISSION AND VALUES*

The influence of the vision, mission and values of Memorial University (MUN) is evident throughout the manner in which the School of Maritime Studies conducts its business at the Marine Institute.

The core long term goal of SMS to enhance its suite of education and training programs to ensure high quality, viability, and recognized stature nationally and internationally offers a direct fit with the vision and mission of MUN. A vision and mission that seeks to be an inclusive community dedicated to innovation and excellence while also fulfilling its special obligations to the people of Newfoundland and Labrador. Additionally the guiding priorities set by SMS strongly echo the core values laid out in MUN’s 2020 document.

#### 3.2.3 *MEMORIAL UNIVERSITY RESEARCH FRAMEWORK*

Research has long been part of the Memorial University’s foundation and as the mission of MUN’s research framework state it will continue to “build upon Memorial University’s vibrant culture of creativity, innovation, and research excellence to create, transform, interpret, share, and apply knowledge with integrity, excitement, vigor and purpose.” This mission could appropriately describe the environment SMS is looking to build upon in setting its strategic initiatives for the future.

The synergies that exist between the goals of SMS and the research framework also exist in relation to MUN’s strategic research intensity plan. SMS is looking to accelerate the role of research throughout

the institute and moving forward aims to aid in this through fostering an environment more conducive to research and innovation.

#### ***3.2.4 PUBLIC ENGAGEMENT FRAMEWORK***

SMS has been tightly intergraded into communities throughout the province throughout its history. SMS is acutely aware of the importance in maintaining the positive relationship it has with the public. It is why each year the team looks for ways to better interact with the public through engagement activities. This fits directly into goal three of Memorial’s public engagement framework, “cultivate the conditions for the public to engage with us.” Further details on these specific public engagement initiatives are located in section 7.

#### ***3.2.5 MEMORIAL UNIVERSITY TEACHING AND LEARNING FRAMEWORK***

The linkage between the Memorial University Teaching and Learning Framework and the goals and priorities of SMS stems from a joint focus on enhancing the collegiality, inclusiveness, responsiveness, integrity and respect that exists between students and staff.

#### ***3.2.6 ENROLMENT PLAN***

The Memorial University enrolment plan 2020 indicates a focus on maintaining the level of undergraduates at the university while growing the number of graduate students by 2020, at which time the plan will be re-evaluated. SMS is following a similar strategy with an emphasis placed upon the masters programs that exist within the school. SMS recognizes the important impact these students can have on a school and how significant their role in research activities can be. This strategy means a shift to research prioritization may need to occur in SMS to appeal grad students, the AUP process will be relied upon to assist in determining these next steps.

#### ***3.2.7 STRATEGIC INTERNATIONALIZATION PLAN 2020***

The goals and priorities of SMS will support the strategic internationalization plan 2020 through two specific themes identified within the document: 1) attracting and retaining global talent, 2) enhancing the Memorial value proposition. The school of Maritime Studies always looks to raise its profile on the global stage, as indicated within its priorities of recruiting diverse students and increasing its involvement with international organizations. Completion of these activities will in turn enhance the attractiveness of not only the SMS and the Marine Institute but Memorial as a whole. It is anticipated this will have a positive impact on international enrollment and retention.

### **3.3 EVIDENCE OF ACHIEVEMENTS AND EXCELLENCE**

The school has been successful in a number areas in terms of meeting implementing strategies to help achieve long term goals. In particular SMS has become a leader in teaching and learning, with the development of on-line courses, particularly for curriculum as laid out by Transport Canada (TC). A recent presentation to representatives of TC had very positive feedback in terms of how this can assist with an individualized learning program for mariners as part of the certification process. The school has also been involved in a number of international projects through MI International, with the most recent project involving the Maritime Industry Authority (MARINA) in the Philippines.

With respect to CMS, these facilities represent the world’s latest developments in marine simulation. They have been used to deliver simulation services for a wide variety of clients including the offshore oil and gas industry, commercial shipping, navies, coast guard, port development and engineering companies and academic researchers.

The facility has won several international awards including the government of Newfoundland and Labrador’s Innovation Award, the Thai Canada Innovation Award. Other acclamations for the Centre has occurred via appearances on Discovery Channel, History Channel, BBC Documentaries and French National TV as well as various national channels. The Centre has been profiled in several industry periodicals including the Ocean Technology Journal, Maritime Reporter, and Seaways Magazine.

Details on other achievements tied to its long term strategies, are included in Annex A. Annual feedback on CMS’s KPI’s are also included in Annex A.

In addition to the accomplishments achieved by those within the School of Maritime Studies, there are various accomplishments external to the University body of Memorial that SMS can credit success to.

A great example of this includes the support provided by the Atlantic Canada Opportunities Agency (ACOA). The Marine Institute has a strong relationship with many external funding partners both provincially and federally but ACOA could be described as the model to guide other relationships cultivated by the Marine Institute and specifically SMS.

Some of the recent SMS projects supported by ACOA include:

- High Voltage Training and Simulation
- Full Motion Bridge Motion Server
- Ballast Control Simulator
- Cargo Handling Desktop Simulator

Coinciding with the various projects funded at SMS, many institute wide projects such as the development of the Holyrood Marine Base (HMB) are also ongoing. These pan-institute projects can be deemed an achievement for SMS given the wide ranging impacts they can have.

#### 4. UNDERGRADUATE CERTIFICATE, DIPLOMA AND DEGREE PROGRAMS

The programs within the School of Maritime Studies range from technical certificates, technician diplomas, diplomas of technology and a bachelor degree in maritime studies with the primary focus being ships and shipping – from design to operation and maintenance and management.

For the programs associated with the operation and maintenance of ships, the scope of the curriculum is tied to the standards set by the International Maritime Organization (IMO) in the International Convention on Standards for Training, Certification and Watchkeeping for Seafarers (STCW) 1978 as amended. The IMO is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships. In Canada, Transport Canada (Marine Safety Division) has the mandate for implementation of STCW and as such has established the training and certification regime under the Canada Shipping Act 2001 and the Marine Personnel Regulations.

Under the Canada Shipping Act, Transport Canada has the responsibility for the examination and certification of seafarers in Canada. Under the same legislation, specific regulations and related guidelines, spell out the details which govern the rights and responsibilities of seafarers who hold either deck or marine engineering Certificates of Competence (Certificates) issued by Transport Canada. In addition to enacting and enforcing the rules and regulations, Transport Canada also maintains the responsibility of providing opportunities for seafarers to attend education and training institutions so they can receive the appropriate preparation for such examinations.

Transport Canada has developed two education and training streams, one for domestic operations and one for international certification under STCW. The programs offered by the School of Maritime Studies are tailored to meet international certification, to give the graduates the best opportunities in terms of future employment. Details on the certification requirements are outlined in the Marine Personnel Regulations. The training courses or educational programs to complete these requirements are further outlined in various Transport Publications (TPs).

The range of programs that are covered under Transport Canada are:

Technical Certificate – Bridgework Rating (BWR)

Technical Certificate – Marine Diesel Mechanic (MDM)(which leads to an Engine Room Rating)

Diploma of Technology – Nautical Science (NASC)

Diploma of Technology – Marine Engineering (MARE).

A brief overview of the curriculum for each of these programs is included in the MI Calendar (<https://www.mi.mun.ca/media/marineinstitutewwwmimunca/mi/officeoftheregistrar/files/MICalendar2016-2017.pdf>). The content of all courses is dependent on the requirements set out in the relevant Transport Canada TP. There is also a requirement for work experience at sea, as set by Transport Canada and is verified through sea-phase logbooks.

There are two programs offered by the School of Maritime Studies that are related to the design of ships – Diploma of Technology in Naval Architecture (NARC) and the Diploma of Technology in Marine Engineering Systems Design (MESD). Both programs are 3 years in length, consisting of 6 semesters and 3 technical sessions. The Naval Architecture program is focused on the exterior design of the ship, taking into account its form and shape, whereas the Marine Engineering Systems Design program is focused on the design of the components of the ship that bring it to life – the engine and all of the auxiliary equipment. One unique aspect of both of these programs is the final year design project, where the students carry out a full ship design of their choosing.

For each of the programs in SMS there are Program Advisory Committees (PAC), made up of representatives from the various industry sectors that typically hire program graduates. These committees typically meet on an annual basis and provide the school with feedback regarding the success of SMS graduates in the workplace, areas where they may be lacking in skills (which SMS can address) and any changes in the applicable industry sector that may need to be addressed in program offerings. These PACs have proven to be valuable over the years in helping the school identify areas for program improvement, this is particularly true for the NARC and MESD programs. Minutes of the last PAC meeting are included in Annex B. For the technical certificate and diploma programs, which are very much regulated by Transport Canada, we are able to make industry aware of the changes we have to incorporate as a result of regulatory changes. We are also able to confirm that our graduates are meeting their needs on-board ships.

In terms of accreditation, these two programs have in the past been accredited through the Canadian Technology Accreditation Board (CTAB). There is no specific standard through CTAB for programs such as these with a marine focus so challenges were encountered in demonstrating how the programs were meeting the standards required. On that basis a decision was made to cease efforts to achieve this type of accreditation and instead seek program accreditation through the Royal Institute of Naval Architecture (RINA). This RINA accreditation is currently in progress.

#### 4.1 CURRICULUM

The following section gives a general overview of each of the program in the school. Detailed Information on the curriculum for each program will be available during the external review through the D2L site.

##### NAUTICAL SCIENCE

The Diploma of Technology in **Nautical Science** is a globally recognized, co-operative program which is accredited by Transport Canada in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended in 2010 (Manila Convention).

This cadet program is designed to:

- Provide a strong theoretical and practical education in the field of nautical science.
- Prepare students for employment in marine transportation.
- Produce graduates who are capable of accepting the responsibilities and performing the duties assigned to them as ship's officers.
- Prepare students for professional recognition as seafaring officers by Transport Canada and to sit for the remaining Transport Canada examinations for the Watchkeeping Mate Certificate of Competence.

This program prepares graduates for a successful sea-going career as a ships' officer. Transport Canada recognizes the professional competence of Marine Institute graduates through the provision of exemptions for specific certification examinations. Graduates also have the option of pursuing further education in the Bachelor of Maritime Studies.

##### MARINE ENGINEERING

The Diploma of Technology in **Marine Engineering** is a globally recognized, co-operative program which is accredited by Transport Canada in accordance with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended in 2010 (Manila Convention). It is designed to provide a strong technical education in engineering technology, by developing analytical and synthesis skills, complemented by practical training.

This program is designed to:

- Prepare graduate students with a variety of strengths that can be used in a large array of employment areas.

- Recognize the increasing role and use of computers in the technologies. Computer application and familiarity with common engineering software is stressed wherever possible. Students have CAD courses designed to give extensive exposure to packages such as advanced AutoCAD, which is required in the job market. These packages keep students current with industry standards and improve employment prospects.
- Credit students with 30-months of sea service upon graduation. To qualify to write the initial certificate of competency (4th Class), the graduate must submit to Transport Canada a Sea Training Manual together with proof of graduation and six months active sea service.

In addition to the certification opportunities described, graduates of the Marine Institute Diploma of Technology in Marine Engineering are eligible for admission to the Memorial University Bachelor of Maritime Studies and Bachelor of Technology programs.

### NAVAL ARCHITECTURE

The **Naval Architecture** program is designed to:

- Provide a strong technical education in naval architecture and shipbuilding technology.
- Prepare students for employment in shipyards and boat yards, consulting firms, research establishments, government agencies and the offshore oil and gas industry.
- Develop practical skills employed in ship and boat design, 2D and 3D draughting surveying and quality assurance.
- Prepare graduates to enter the workforce with a sound background in Naval Architecture technology along with a range of practical skills ready for use on their first day of employment.

The program recognizes the role being played by three dimensional computer modelling in modern ship design practice and includes training in many of today's widely used three dimensional design tools such as Maxsurf and Rhinoceros.

The offshore oil and gas industry is also employing many graduates, along with various regulatory bodies such as Transport Canada, the American Bureau of Shipping, and Lloyds Register. While many work in an office environment, some jobs involve ship survey work or overseeing construction in shipyards or offshore. Graduates will be well prepared for a wide variety of these employment opportunities.

### MARINE ENGINEERING SYSTEMS DESIGN

The **Marine Engineering Systems Design** program is designed to:

- Provide a strong technical education in marine piping, machinery & propulsion systems design supported by a good knowledge of marine engineering and naval architecture.
- Provide a good technical education in general mechanical engineering technology.
- Prepare students for employment in marine, offshore and land based environments.
- Develop analytical and synthesis skills complemented by practical training.

Marine Engineering Systems Design is a relatively unique program developed in the early 80's to bridge the gap between Naval Architecture and Marine Engineering. Students receive instruction in aspects of both disciplines and will work closely with Marine Engineers and Naval Architects throughout their careers.

The main areas of study in the program are auxiliary systems, power/propulsion systems, electrotechnology, fluid mechanics and thermodynamics

### BRIDGEWATCH

This eight month Technical Certificate Program is designed to:

- Prepare the student for employment in the merchant marine or fishing industry.
- Provide the student with a basic understanding of the organization and structure found on a typical merchant marine or fishing vessel.
- Develop and gain the knowledge and experience necessary to become part of a crew as found on any seagoing vessel.

The overall objective of this program is to train students in the skills of seamanship so they will be employable in the marine industry.

This program provides training and work experience to facilitate the transition of participants from school to the labour market, as well as offering a retraining opportunity. The design of this program includes the necessary academic skills training, as well as, the skills necessary to fill the position of deckhand. The many aspects of training in this program focus on preparing graduates to function and work confidently in the marine industry.

### MARINE DIESEL

In the program students learn to install, operate and maintain a variety of diesel engines. The program includes workshop, classroom and work term experience that all prepare you for a career in the operation and maintenance of marine diesel engines and auxiliary equipment.

Spanning the duration of a year, the program is divided into: on-campus study, safety training and one work term that can be either land-based or at sea.

This program is designed to provide the technical and practical knowledge necessary to run, maintain, and repair marine diesel engines and associated equipment.

#### **Main Areas of Study:**

- Marine Engineering Knowledge
- Electrotechnology
- Machine Shop Practice
- Welding Practice
- Engineering Drawing

### BACHELOR OF MARITIME STUDIES (BMS)

In this program students look at the impact of human resources, economics, marketing, policy, safety and quality management on today's marine industry.

This is a unique, professional degree that provides students with exposure to the business, as well as the marine and technology management concepts necessary to ensure the student’s success within it.

This one-year program consists of 39 credit hours, which includes core courses with a focus on maritime governance and ship management and a suite of electives that will allow the students to focus in an area of interest, such as marine occupational health and safety. It can be completed on a full or part-time basis, and is available through internet-based delivery.

This program is designed for students who have graduated from accredited, or Transport Canada approved, diploma of technology programs in the marine fields. The program is also available to professional mariners and professional fish harvesters who have achieved a top level certification in their respective profession. The program is also available to certain Canadian Forces (Naval Operations) personnel.

#### 4.2 STUDENT ENROLMENT AND RETENTION

The Marine Institute maintains detailed records on student enrolment and retention for all programs. For the purpose of this study for the certificate and diploma programs, the specifics within SMS will be reviewed.

##### **Enrolment**

The target enrolment and actual enrolment for Fall 2016 for each on campus program as follows:

Program	Target Enrolment	Actual Enrolment - 2016
Nautical Science	48	54
Marine Engineering	48	41
Naval Architecture	24	15
Marine Engineering Systems Design	24	7
Marine Diesel Mechanics	24	25*
Bridgewatch	24	29*

\* Note: There are some part-time students in these programs or some who are completing their workterm.

Details on enrolment in these programs from 2011 to 2016 are included in Annex C.

There are no specific targets for the DND programs or the Bachelor of Maritime Studies or the Master of Maritime Management.

##### **Retention**

We are also focused on Retention of students and maintain statistics on first year to second year retention. Results for the past 6 years are included in the following table:

	2015-16	2014-15	2013-14	2012-13	2011-12	2010-11
<b>Diploma of Technology</b>						
Marine Engineering	81%	81%	73%	86%	67%	93%
Marine Engineering Systems Design	62%	82%	92%	75%	80%	67%
Nautical Science	61%	70%	60%	83%	78%	84%
Naval Architecture	59%	70%	75%	79%	86%	52%
<b>Overall</b>	68%	<b>74%</b>	<b>70%</b>	<b>82%</b>	<b>76%</b>	<b>78%</b>

The Institute sets an overall target of 75% for retention. When a result is below this threshold, we will look to see what factors may have contributed to this and further analysis is carried out. The detailed reports on Retention (with information on reasons for students leaving) for all programs at the Marine Institute are included in Annex D.

There are also a number of services we have in place to assist students in their adjustment to post-secondary and to address the known areas of weakness – typically mathematics and physics. These include regular scheduled time for faculty to be available in the Learning Resource Centre where students can avail of extra assistance in subjects they find challenging. In addition, we have reduced the class size for mathematics and physics to 30, to help with student retention. (Note that the mathematics and physics classes include students in all programs at MI, not just those in SMS). Students can also avail of the services provided through the Student Affairs Department.

The Student Affairs Department at the Marine Institute is focused on promoting student success and a positive student experience from the first point of contact, as a prospective student, thru to graduation. The distinct areas in the department contribute to fulfilling that overarching goal by forming productive relationships with faculty, staff and students. The unit includes the Student Recruitment Office, Student Support, Health and Wellness as well as the Office of Career Integrated Learning.

Three areas deal directly with the provision of supports once a student is registered in a Marine Institute program. The Student Support area aims to provide a diverse set of services that work to support students studying in the range of programming available through our campus. The unit facilitates the institute's orientation and transition programming and provides targeted supports for students with disabilities and other health challenges. The unit is also responsible for the Student Code of Conduct.

Health and Wellness on campus has the responsibility to provide a suite of recreational programming including intramural, varsity and a suite of general fitness classes.

The Office of Career Integrated Learning (OCIL) coordinates a variety of work term related activities which assist our students in achieving meaningful work term experiences. Their goal being to prepare students for work term and support them as they connect with our partner employers.

Our services for students include:

- work term orientation
- a job postings board
- resume referral
- work term support
- Marine Institute partner employers database

- On-campus employer recruitment
- Graduate support

OCIL has been very successful in placing our cadets in the sea phase component of the program. Details of placement rates for 2015-16 are included in Annex E. Given the economic challenges in this past year with the downturn of the marine transportation and oil and gas industry, 100% success rates were higher than expected. This connection with industry has also led to great success for future employment as well, with several employers offering cadets positions prior to their graduation.

#### 4.3 PROGRAM OUTCOMES

In the summer of 2016 MI undertook a survey of recent graduates (2014 – 2016) from all programs at the Marine Institute. The overall scope of the survey was to determine if our graduates were working in an area related to their program of study and how satisfied they were with their program. The Survey questions and feedback for the SMS programs, for select questions, is included in Annex F.

#### 4.4 SATISFACTION WITH THE UNDERGRADUATE PROGRAM

Satisfaction with programs can be assessed in different ways. While a student is in a program, we ask them to complete a Course Appraisal on each course each semester, with individual reports being provided to the specific instructor and program summaries being provided to the program chairs and the head of school. This information can be used by faculty to improve their delivery of their courses and overall to improve the program. These are also part of an overall KPI for the Institute.

For the school year 2015 – 16, the results of these Course Appraisals, for each program are provided in Annex G (questions and graphs). The targeted result for a given question is 80% on a combination of Agree and Strongly Agree. When a program consistently falls under this number a further investigation is carried out through a meeting with the students to get a better understanding of their concerns with the program or its delivery.

#### 4.5 MOVING FORWARD - STAKEHOLDER STRATEGIC SUGGESTIONS

An important part of the Academic Unit Planning process was the time allocated for strategic discussions with key stakeholders throughout the Marine Institute. The questions posed and strategic discussions regarding Enrolment and Retention and Undergraduate Programs can be found in Annex H.

### 5. GRADUATE PROGRAMS (Post-Graduate Certificates, Advanced Diplomas, and Masters Degrees)

The School of Maritime Studies has a Master of Maritime Management program that was introduced in 2010. The Master of Maritime Management (MMM) is a comprehensive academic program that provides a broad understanding of the structure and operation of organizations and the factors that influence business decisions in the context of maritime-based organizations. It provides a maritime management focus through the development of knowledge and understanding of the nature of technical operations and the factors that have an impact on their success, as well as the ability to apply these concepts within their organizations.

Admission to the program is on a competitive basis. To be considered for admission to the program an applicant will normally possess a second class or better undergraduate degree from a university of recognized standing and will normally have:

- A Memorial University Bachelor of Maritime Studies or Bachelor of Technology, or a comparable undergraduate degree with appropriate maritime sector and business management course work.
- Appropriate technical knowledge and relevant marine-sector employment experience.
- In exceptional cases, applicants who have not completed an undergraduate degree, but who meet all other requirements, may be considered for admission. Preference will be given to those who have at least 10 years of relevant professional and managerial experience, and have successfully completed several years of post-secondary studies. Applicants who do not meet normal admission requirements shall be required to complete, with a high level of achievement, certain undergraduate courses before being considered for admission.

### 5.1 CURRICULUM

The program is offered online and requires successful completion of either (i) 24 credit hours of course work and a comprehensive project and report (6 credit hours), or (ii) 30 credit hours of course work. Candidates will typically register on a part-time basis.

For either option students are required to successfully (minimum grade of a B) complete 2 core courses – Marine Policy and Business of Shipping/Transportation of Goods. For the course based option students must complete another 8 courses (24 credit hours) from this list of electives. For the project based option students must complete 6 electives (18 credit hours) with the other 6 credit hours being tied to the project. The detailed list of electives is included in Annex I.

### 5.2 STUDENT ENROLMENT AND RETENTION

As one of the routes to the MMM is completion of the Bachelor of Maritime Studies enrolment numbers for both are presented here, for the Fall of each year.

	2016	2015	2014	2013	2012	2011
<b><u>Degree</u></b>						
Bachelor of Maritime Studies	54	58	63	45	41	49
Master of Maritime Management	28	36	36	30	16	18
<b>Total Degree</b>	<b>82</b>	<b>94</b>	<b>99</b>	<b>75</b>	<b>57</b>	<b>67</b>

### 5.3 PROGRAM OUTCOMES

The MMM provides students a broad understanding of the structure, operation, and factors that

influence business decisions of maritime-based organizations. The goal is to equip the student with the ability to apply these concepts within your organization. Below is a table of the number of graduates for both programs and it is worth noting that about half of the MMM graduates had completed the BMS.

#### Degree Graduates

	2015-16	2014-15	2013-14	2012-13	2011-12	2010-11
<b>Degree</b>						
Bachelor of Maritime Studies	11	17	10	11	14	7
Master of Maritime Management	14	5	5	2	1	
<b>Total Graduates</b>	25	22	15	13	15	7

#### 5.4 SATISFACTION WITH THE GRADUATE PROGRAM

Specific information on graduate satisfaction is not available, but this is comment below, from the first graduate of the MMM, is worth noting.

*"I had a very positive experience and got a lot out of it. I would recommend it to others involved in the marine industry."*

-Captain Stephen Coady

#### 5.5 MOVING FORWARD - STAKEHOLDER STRATEGIC SUGGESTIONS

An important part of the Academic Unit Planning process was the time allocated for strategic discussions with key stakeholders throughout the Marine Institute. The strategic discussions regarding Graduate Programs can be found in Annex J.

### 6. FACULTY/CENTRE RESEARCH AND SCHOLARSHIP

The scope of research within SMS includes applied research, technology transfer, and industrial assistance and development projects. To date, some of the major research work has been carried out within CMS through Atlantic Innovation Fund (AIF) funded projects such as Modelling and Simulation in Harsh Environments and Dynamic Positioning Operations in Ice Environments. The school has also been involved in a number of other projects that have involved faculty tied to their area of expertise. The following section will outline some of these research activities.

#### Dynamic Positioning Operations in Ice (DP in Ice)

The CMS DP in Ice project is ongoing. The partners for this project are the National Research Council (NRC) and Kongsberg Maritime. Current activities include preparing for the second physical model test in the ice tank of a smaller hull configured as a support/supply vessel. The vessel has been approved by Steering Committee and the test is planned for June 2017. CMS has purchased new cameras for NRC to capture better data. NRC has also improved their ice-making capabilities to develop better ice and make data collection easier. CMS is now able to project, on screen, multiple ice pieces that feed in through NRC'S simulator tool.

## Other CMS Projects

So far, during 2016 & 2017, CMS has carried out the following industrial Projects

- KKC Tow to Field simulation for the Hebron GBS. Simulation services include the build for the GBS models, towing vessels, station keeping system and the Bull Arm- Trinity Bay
- Maneuvering Study for the MODU Henry Goodrich. Simulation services include the build of the semi-submersible Henry Goodrich for undertaking emergency maneuvering operations with various thruster configurations
- Group Ocean Tug requirements for Port Cartier. Simulation services include the build for the 2 bulk carriers and various tugs as well as the terminal at Port Cartier, Quebec
- Transportation Safety Board - study on the grounding of the vessel Monica. Simulation services include the build of a container ship and section of the St. Lawrence seaway where the vessel ran aground.
- RWDI- Motioneering - simulation services include the provision for a bridge for use in a building assessment for Chinese clients
- Group Ocean Tug requirements for Jamaica. Simulation services include the build of various tugs as well as the terminal in Jamaica.

Another project that CMS was involved with along with several partners was the Fishing Vessel Stability Simulator. With funding from Human Resources and Skills Development (HRSD) and through a partnership with the Fisheries and Marine Institute, the Canadian Council of Professional Fish Harvesters (CCPFH) developed a six-module program design, a curriculum for stability training and a promotional video. These outputs were all validated through meetings of the National Steering Committee and further consultations with industry and other stakeholders, including a presentation at Transport Canada's Canadian Marine Advisory Council (CMAC) in 2008.

In August 2008 the CCPFH, in partnership with the Marine Institute, submitted a proposal to the Canadian Search and Rescue – Strategic Initiatives Fund (SAR-NIF) for a total of \$1.2 million to support the full development, production and distribution of the stability e-learning tool. The SAR-NIF rules require that every funding proposal be sponsored by a department of the Government of Canada. The CCPFH/MI proposal was sponsored by Transport Canada.

The final Fishing Vessel Stability Simulator is a distance education tool, produced in French and English, using multi-media materials and electronic simulations of vessel operations and fishing activities in different fleets in different regions of Canada, The program is designed to support the acquisition by program users of knowledge and practical competencies equivalent to the proposed stability content at the Fishing Master IV level.

The final product will be made available for download, to fish harvesters throughout Canada, and will support use by independent learners and by groups in formal training settings with professional facilitators.

Specific to faculty in the programs area who have been involved with research activities, a number of projects have been funded through IAMU. Below are projects where SMS was the lead and the reports are available for review.

- Formal Safety Assessment in Polar Maritime Transportation: As Applied to Routeing, Emergency Procedures and Human Factors (FORSASS.POMARTRA)
- Cross-CULTural Competency for Maritime Professionals through Education and Training (CCUL.COMPET)
- Development of a Common MET Question Repository (Marine Engineering Subjects with Extension in Nautical Science Subjects) – In progress.

Other projects that SMS instructors have been involved with:

- Development of VISTA Training Capability for Civil Applications
  - Marine Institute of Memorial University of Newfoundland (MI) with Lockheed Martin Canada (LMC), Lockheed Martin Aeronautics (LM Aero) will create a partnership to support MI's development of a state of the art facility and simulation based training related to the marine environment. The utilization of VISTA™ by MI will provide with the very latest simulation techniques that are presently in use by the navies of Canada and the USA. (VISTA - Visual Interactive Simulation Training Application)
- SARINOR – Training, studies & Competence Development for SAR- Operations in the High North with the scope of this project being focused on the following issues:
  - Existing standards and competence demands and how it is conform to existing conditions in the Arctic. A special attention has been given to how Arctic environment and climate are counted for and embedded in the competence improvement schemes.
  - Emphasis on cooperation between private and government actors in SAR-operations (private- public and civilian-military collaboration).
  - The defined hazards and accident situations, guidelines and operating procedures included in training and exercises in Arctic waters.
- ARCTRAIN: Arctic Transportation Training for Northern Residents – Funded under NEXTAW, the Arctic transportation training for Northern residents (ARCTRAIN) study sought to clearly define the training needs and associated challenges of Northern communities for the purpose of adapting the Arctic transportation system to climate change. The main goal was a step-by-step target process of identifying and designing specialized courses and training opportunities to a multiple audience (experts and Northern community residents).

## 6.1 MOVING FORWARD - STAKEHOLDER STRATEGIC SUGGESTIONS:

An important part of the Academic Unit Planning process was the time allocated for strategic discussions with key stakeholders throughout the Marine Institute. The questions posed and strategic discussions regarding Research can be found in Annex K.

## 7. PUBIC ENGAGEMENT AND UNIVERSITY COLLABORATION

Community exists at the core of any academic institution and the Marine Institute is no exception. The community supplies both students and business partners for the institute, and it is the community that creates the reputation of the institute both nationally and internationally. SMS are cognizant of this important role played by the public and in turn makes concentrated efforts to engage the public in a variety of manners. The following sections break these efforts down in detail.

### 7.1 COMMUNITY PARTNERSHIP

The community partnerships for SMS are focused in several areas, from programs to industry partners. These partnerships focus on recruitment opportunities, working with industry to meet their specific training needs, providing support to local charitable organizations and speaking to affiliated organizations.

### 7.2 PUBLIC ENGAGEMENT

#### SCHOOL OF MARITIME STUDIES

The school is involved with a number of activities working with young people from schools in the area. Some are organized by external groups, such as Women in Resource Development Corporation (WRDC), which is a provincial non-profit organization committed to increasing women's participation in trades and technology. Two of the activities with this organization are:

**Tech Talk for Girls** which brings junior high girls to the Marine Institute to give them greater interaction with science and engineering. The girls get to carry out a variety technology based activities related to the various programs at the Marine Institute

**Techsploration** where the Marine Institute is mainly a venue, but staff and faculty participate. The two-day event has a number of activities related to tech occupations for young women.

For both of these, the primary engagement objective of these activities is to provide an opportunity to learn about science and explore careers in trades, technical and technology-related occupations.

Techsploration and Tech Talk for Girls both originate with WRDC and as a result, the primary engagement objective of these activities is to provide an opportunity to learn about science and explore careers in trades, technical and technology-related occupations

Another activity is the **Model Boat Race** which is led by the Marine Institute. This involves twelve teams of high school students who participate in a competition to race model boats in the flume tank. The event highlights the naval architecture and marine engineering programs. The Model Boat Race,

however, was created with recruitment as a main objective. It was hoped that the competition would raise awareness of the naval architecture and marine engineering programs. The race has seen a strong uptake since its creation and now has 12 teams participating.

**Machines Boot Camp** Grade 5 students are given a seminar on mechanics that is tied to the Provincial curriculum. Through their personal connection to schools, instructors within MI provide lectures and activities on machines for grade 5 students, which is tied to their curriculum. This type of engagement aims to give younger students more exposure to this aspect of science.

### CENTRE FOR MARINE SIMULATION

The centre has seen some unique uses for their facility, including simulating skyscrapers to determine the effect of damping systems in varying wind events and facilitating a workshop for medical doctors to allow them to experience the challenges to administering first aid in a moving environment. In addition to tours of their facilities and working with industry clients, CMS has also been involved with student groups, in particular the Nautical Skills Competition.

#### **Nautical Skills Competition**

Sixteen high school students have been incorporated into the Nautical Skills Competition alongside the Nautical Science students from the Marine Institute. This allowed them to see a range of activities which form the competition.

The Nautical Skills Competition is an annual project of the Master Mariners of Canada (MMC) NL Division. They view the nautical science students of MI as the future of the marine industry and the competition as being educational and valuable. The MMC anticipates that the inclusion of high school students in the competition will help to develop their interest in the marine profession. Of the sixteen high school students that participated, three were awarded with free tuition for their first semester at the Marine Institute nautical science program. These were funded by MMC NL Division and the MMC Foundation.

For the Marine Institute itself, the incorporation of the high schools has a clear recruitment purpose. The competition is assisted by Student Affairs (Angie Clarke and Jennifer Howell) as they helped to coordinate the students, provide recruitment packages and arrange games for the high school students. The competition has a dinner at the end where students can meet members of industry and receive prizes.

## 7.3 COLLABORATION WITH OTHER UNIVERSITY UNITS OR PROGRAMS

### **Norwegian University of Science and Technology (NTNU)**

This is a partnership between NTNU and Memorial University that lead to the development of a specific project - INTPART: Field Development in Remote and Harsh Environments.

This project focuses on establishing an institutional collaboration between NTNU and Memorial University on integrated operations and maritime operations in remote and harsh environments with emphasis on the following research areas: increased and enhanced oil recovery, drilling, integrated logistics support & emergency preparedness, maritime operations, underwater vehicles, autonomous

operations and safety and risk management. In the summer of 2016 several faculties within MUN held a 6 week workshop for graduate students, with one week of it being delivered by the Marine Institute. Our component included sessions of survival, tanker operations and simulation of navigation in ice, as it might related to operations in remote and harsh environments.

### Canadian Network for Innovative Shipbuilding, Marine Research and Training - CISMaRT

We have participated in 2 successful workshops (one at UBC and the other at MUN – Engineering) regarding the development of the CISMaRT Network and have signed on as members.

The ultimate long-term goal of the **CISMaRT** initiative is to provide a network for stakeholders to exchange information and seek advice with a view to:

- Encourage collaborative and innovative marine research among Canadian Universities/colleges, research institutions, government agencies and the private sector that reflects the needs of the Canadian marine community and supports Canadian competitiveness on the global stage.
- Establish a national shipbuilding/marine network to undertake relevant applied research and contribute to the development of innovative technologies.
- Improve marine-related educational programs to yield highly-qualified graduates for employment in Canadian industry and government.
- Provide contractors with potential areas for investment that could generate long-term economic benefits for the broader marine sector in Canada while helping the contractors meet their obligations under the Industrial and Technological Benefits (ITB) Policy.

There is now an application to ACOA for funding to implement the CISMaRT structure and to support CISMaRT activities over the two-year interim period.

### Engineering Bridging

An important part of extending the impact of the School of Maritime Studies is through collaborative efforts with other University units. A prime example of this is the collaborative proposal regarding how Memorial University's Faculty of Engineering and Applied Science, in partnership with the Marine Institute's School of Maritime Studies and School of Ocean Technology, could develop and implement a bridging program for graduates of diploma based programs.

This joint proposal was designed to address the gap that for engineering technologists who wish to further their education by pursuing their engineering degree at Memorial University. For Memorial University, a bridging program would provide the opportunity for increased enrolment and revenue for the institution. And depending on the success of this proposal the program could serve as a model for the development of future bridging programs for other diploma level graduates to bridge with advanced standing into Memorial University programs including diplomas at the Marine Institute.

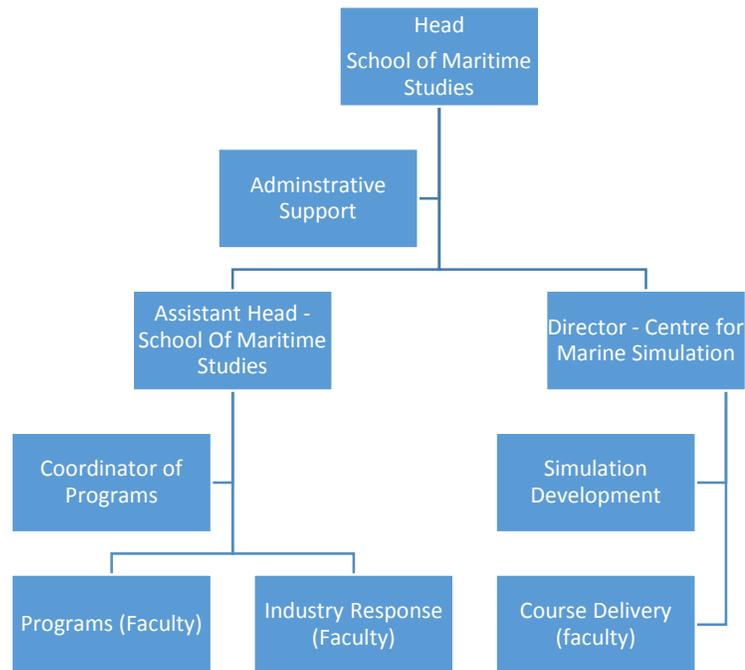
Project such as this one can be beneficial in various manners. The direct benefit being the proposal itself, which in this case involves the formation of additional pathways for students to reach their goals.

While the indirect benefits include the creation of stronger ties between SMS, SOT and the Faculty of Engineering. These ties could pave the way for future projects.

## 8. ORGANIZATIONAL STRUCTURE AND SCHOOL RESOURCES

The three (3) areas of focus for the school are programs, industry response and research (as applied research and projects) with management, faculty and staff in place to support these areas. Below is the organizational chart for the school.

### 8.1 GOVERNANCE AND ORGANIZATIONAL PROCESSES



### 8.2 FINANCIAL RESOURCES

The budget for the school comes from several sources, with the majority coming from the core grant to the university and the remainder through revenue generation. For the various centres within the Marine Institute, they are expected to cover their costs, with any shortfall being made up by the Institute. Below is the budget status for the most recent fiscal year. For programs this is the typical budget scenario, whereas for CMS, with the downturn in the offshore industry, their final position is not consistent with their usual end result, which is usually more in the \$500,000 range.

## Budget Information for SMS (2015-16) – Excluding Head’s Office

	Programs	CMS
<b>REVENUE</b>		
Gross Revenue	1,845,056	2,672,462
Revenue Related Expenses	780,977	2,094,263
<b>Net Revenue</b>	<b>1,136,079</b>	<b>578,199</b>
<b>OPERATING EXPENSES</b>		
Salary (with Benefits)	6,194,291	1,194,737
Operating and Capital	453,000	456,629
<b>Total Operating</b>	<b>6,647,291</b>	<b>1,651,366</b>
<b>Final Budget Position</b>	<b>5,511,211</b>	<b>1,073,166</b>

## 8.3 HUMAN RESOURCES

Within the school, with responsibility for programs, industry response and research, there are 3 management positions (Head, Assistant Head and Director (CMS)), with 2 Administrative Assistants.

Specific to program there are 2 Maintenance Technicians (who have responsibility for the various shop and labs associated with the programs). There are a total of 50 full time faculty and 5 part time faculty.

The scope of the technical faculty complement includes ships officers (master mariners and chief engineers), naval architects and systems designers as well as mechanical engineers. Academic faculty includes mathematics and physics majors as well as English majors. Note that most of the faculty who teach electrotechnology are electrical/electronic engineers and are in the School of Ocean Technology.

The Centre for Marine Simulation is lead by the director, who oversees all of its activities, with the assistance of a Manager, Applied Research and Industrial Projects who is responsible for the various research activities, such as the current DP in Ice project and a number of other projects. There are 5 full time and 2 part time faculty (all senior ships officers, Master Mariners) who are involved with the development and delivery of various industry response courses as well as the research projects that involve use of the simulators. In addition to the faculty there is one research and technical person (a naval architect) who works with the faculty on developing ship models and 10 staff, 2 who specifically carry out maintenance on the simulators and the others are simulation developers/programmers that support the various projects underway within the centre. This simulation group gives the centre the in-house modelling capability that enables it to develop both generic and client-specific ship models and geographic databases for simulation exercises. Currently, over 40 geographic databases reside in CMS' geographic database library including ports, waterways, and channels in Newfoundland and Labrador, other parts of Canada, the US and around the world. The ship model library comprises over 100 different ship models ranging from small fishing trawlers to large crude carriers. The Centre's expert developers combine their talent and the latest technology to provide a true interactive virtual environment. They are extensively involved with the DP in Ice project.

In other parts of Memorial University and typically in other universities, faculty are expected to split their time between teaching, research and engagement. This is not the case for faculty within the Marine Institute. They are hired to teach, with time in classrooms and labs making up about 60% of their

workweek, with the remainder of the time associated with preparation, marking, meeting with students, and committee work. There is little time left to carry out any kind of research on a regular basis. In SMS, in particular, we often find ourselves in a situation where we are not able to free up instructors fully to pursue research opportunities; as it would impact delivery of the required curriculum. With sufficient funding we would be able to free up individuals to carry out the work and provide a backfill for classroom delivery. For several of the project to date (outside of CMS) the success of the project has been due to the instructor's interest and commitment to making it work between teaching and research. This is not the ideal situation.

#### 8.4 FACILITIES

There are two aspects of the facilities that are used by faculty and students within SMS. For the programs there are a variety of labs and shops that support the program, as listed below: Machine Shop; Welding Shop; 3 Diesel Shops; Engine Fitting Shop; Thermodynamics Lab; Fluids Lab; Mechanics Lab; Strength of Materials Lab; Electrotechnology Lab; Motor Control Lab; Instrumentation and Controls Lab; and Rigging Room. Details of the equipment in each lab or shop is included in Annex L.

There are also 2 design classrooms for the NARC and MESD programs each outfitted with the latest computer technology, industry equipment samples, a Vendor Furnished Information (VFI) library, and is ergonomically arranged to mirror industry practices; with student work stations that can be personalized to suit each student's learning preferences. In addition to Microsoft Office and Adobe Acrobat Pro, students have access to the following software: AutoCad 2016, GHS 15.5, Automation Studio 6.1, Rhino, Maxsurf/Hydromax, Architectural Visualization Software\_(Blender and KeyShot) and Virtual Reality Software(HTC Vive and IrisVR: Prospect),

Students also have access to 3 other computer labs in the building and a well-equipped library. The Dr. C. R. Barrett library is part of Memorial University QE2 Library system and is located on the main floor of the Fisheries and Marine Institute. It offers a comprehensive range of research material to students, faculty, and staff at the Fisheries and Marine Institute and to the Newfoundland marine industries.

The library collection supports study and research in Fisheries and aquaculture, marine technologies, nautical science, and the ocean environment. Additionally, the Writing Centre and Learning Resource (tutoring) centre are located in the Library.

The Dr. C.R. Barrett Library homepage <http://www.library.mun.ca/mi> provides access to all in-library and electronic books, journals, media based materials and library research resources and services available to the Memorial University community. Also available are Marine Topics web pages where library staff has aligned library resources to Marine Institute programs of study and research centres.

Library staff are available for consultation either in-person or via the chat feature located on the library home page.

All of these are augmented as needed by the facilities in the Centre for Marine Simulation, such as: Full Mission Bridge Simulator; Simulated Electronic Navigation Simulators; ECDIS; GMDSS; Propulsion Plant Simulator; and Liquid Cargo Handling. A full overview of the simulation facilities, and all areas of the Institute, will be included in the on-site tour.

## 9. OVERALL SCHOOL ASSESSMENT

The mission of the Marine Institute’s strategic plan, Vision 2020, states the goal of the Marine Institute is **to be a world oceans institute, setting the standards for education, training, innovation, and research**. At the crux of this goal are the schools and centres within the institute, the continued development, growth, and success of these units will be the ultimate indicator of whether the goal outlined in Vision 2020 is achieved.

Assessing these schools and centres, in this case the School of Maritime Studies, can be broken down into three main categories: where has SMS been successful, where SMS has faced challenges, and what areas of SMS could be developed or enhanced to promote growth. Analysis of these three categories can be an effective way to view the school from a high level and in turn develop strategies to move the school forward.

### 9.1 SCHOOL SUCCESSES

Success within a school can often vary depending on the mandate of the specific school along with the program offerings by said school. As follows are notable areas where SMS has been successful:

- The School of Maritime Studies has been proficient in graduating well-prepared students through the delivery of rigorous and comprehensive programming. This can be attributed to factors such as quality educators in conjunction with programming that delivers a greater amount of practical experience relative to competing programs.
- Responsiveness to trends in industry continues to be a strength of SMS. Throughout the annual planning cycle the school engages key stakeholders to determine how industry trends are changing and how SMS can make opportunities from said changes.
- SMS has forged strong relationships and partnerships with both the public and private sector.
- SMS has found success in the online offerings it provides to students. Feedback from students has been continually positive and faculty feels they are continuing to improve the quality of course delivery as they become more comfortable with the technology. The addition of online offerings has been particularly useful to SMS given many students take course while they are working offshore.

### 9.2 SCHOOL CHALLENGES

In a similar manner to the variances in success from one school to another, the challenges can vary widely by school as well. The schools of MI were formed in different manners; some were created to deliver a specific set of skills through their programming while others were created with the goal of developing world-class research. The School of Maritime Studies was formed in the mould of the former and with this in mind as follows are some of the most prominent challenges faced by SMS:

- The School of Maritime Studies is world renowned for the capabilities of its technology infrastructure, an example being the motion simulator in the Centre for Marine Simulation

within SMS. This technological infrastructure requires extensive capital investment in order to stay on the cutting edge and given economic challenges in the local market this investment could be a challenge moving forward.

- SMS has a long history of focusing its resources on the education of students (SMS) and clients (CMS). This focus has historically meant a comparatively small amount of time and capital has remained for research endeavors.
- Changing dynamics within SMS include the development of graduate programs; this has created personnel challenges within the school. Given the specialized nature of the graduate programs there is a relatively small global cohort of qualified individuals to teach within these programs. As such finding these individuals has presented a challenge to SMS and with forecasted growth in these graduate programs the need to find a solution to this challenge will only increase.
- On the global scene, programs similar to those in SMS in terms of number of courses and length, would be considered degrees versus a diploma of technology, and it is often discussed on whether or not we move to making the programs degrees. There are several challenges with this within the university context ranging from admissions to credits to graduation. The questions posed strategic discussion regarding **Degrees** is included in Annex M.

### 9.3 AREAS FOR DEVELOPMENT AND ENHANCEMENT

In evaluating the areas for development the School of Maritime Studies analysed the current mandate and structure of both the school and the Marine Institute as a whole. In addition SMS accounted for the aforementioned successes and challenges along with the feedback acquired from key stakeholders throughout the AUP process. The following points identify some areas that have been targeted by SMS as key in the progression of the school:

- As noted in the challenges section, research within the School of Maritime Studies has historically faced challenges for the previously mentioned reasons. Despite these challenges SMS, specifically the Centre for Marine Simulation, has experienced varying levels of success with research endeavors. SMS recognizes the importance of research within the academic and respect and funding that accompanies impactful research.
- To stay ahead of its competitors SMS is continually looking to emerging areas of the marine industry to guide to development of new training and programming. A current example of this includes the plan to offer high voltage training to external clients and within existing programs of SMS. High voltage training is currently a niche market within Canada due to the small number vessels where this is required. However, it is predicted that vessels will be moving in this direction as technology advances and SMS are aiming to be early adopters as a means of capturing market share.
- The mindset of the modern seafarer has changed over the past decade and SMS will look to adapt its offerings accordingly. Most notably of the changes of the modern seafarer is the desire to create a pathway to eventually transition to from sea-based employment to shore-based employment. The school must continue to find ways in which seafarers can make this desire a reality.

- SMS is aiming to continue its growth in the area of online programming. As previously mentioned, online delivery can be considered a strength for SMS and some initiatives the school is looking to pursue to bolster this area includes:
  - Further training for faculty relating to online programming
  - Pursuit of further online offerings. This could include Transport Canada certified programs, which would be the first of its class.
  - Greater offerings of online graduate programming.