

# NOIA NEWS

Safety research  
builds business

Dynamic positioning  
in sea ice

Noia's advocacy  
on marine refuge areas





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**ON THE COVER:** The West White Rose concrete gravity structure construction site in Argentina. See page 13 for details.



Charlene Johnson - Noia CEO

## CEO Corner

At the time of writing this first “catch up” corner with you all I will have been here four months, but truthfully, it feels like years, and I mean that in a very positive sense. One thing that immediately struck me upon taking this role and has never wavered since, is your collective passion for the oil & gas industry – our industry. It is your passion that invigorates me to advocate on your behalf day in and day out. These past few months we have experienced challenges, and no doubt there will be more obstacles to come, but what motivates us at Noia is the incredible opportunities that lie ahead for our industry. The world is excited about the oil & gas prospects in Newfoundland and Labrador and, here at Noia, we are too.

One of the key initiatives we are currently developing is an education and awareness campaign. We hear the stories and some data is available, but a wholesome analysis is required to demonstrate the full value of our industry, not only to Newfoundland and Labrador, but indeed Canada, because the impact from our offshore stretches far beyond our province. We want to create a ground swell of support for our industry and to do that we must first provide residents of the province and the country with facts of the true value of our industry and inform them of the potential that exists. As well, the campaign will be most useful for advocating to decision makers.

It is an exciting time. We have unmatched offshore oil & gas prospectivity and we must ensure that we are positioned to take advantage of the opportunities ahead. The world is watching and they are aware of our vast leads and prospects. They know that just one lead of the 600 leads and prospects off our shores holds the potential to be bigger than our four current producing fields COMBINED. Yes, just one lead alone. I tell this to nearly everyone I encounter, such as taxi drivers, friends and colleagues at networking opportunities, and they all

respond in the same way – this is a game changer for our province. Actually, it is a game changer for our country. BUT, the right conditions must be established to ensure that we can reach our potential. While there are obstacles in our path, Noia is addressing them head on, together with other industry stakeholders.

The federal government is establishing Marine Protected Areas to meet international obligations to protect marine ecosystems. Noia supports efforts to protect marine ecosystems and I believe that environmental stewardship and offshore activity is compatible; our history demonstrates this is the case. I have presented to the National Advisory Panel on Marine Protected Area Standards outlining our position. I have also written Minister Dominic LeBlanc to seek clarity on his government’s approach. Similarly, proposed changes to the Canada Environmental Assessment Agency Act to create the Impact Assessment Agency can have consequences for our offshore industry. Noia has also provided input on these matters through the provided consultation processes and I encourage all our members to do the same and ensure that your views are understood. We need clarity, certainty, and most importantly, we need to be globally competitive.

While our offshore oil & gas industry has been extremely successful and has provided significant benefits, I truly believe we have only experienced a sample of what is yet to come. I look forward to our upcoming work with great anticipation. Let’s work together to move our industry forward and to achieve our full potential. ■

Charlene Johnson  
Chief Executive Officer

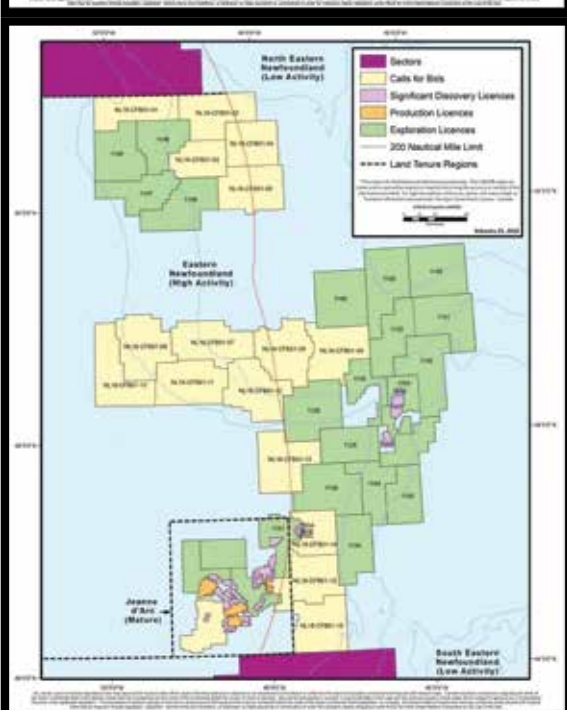
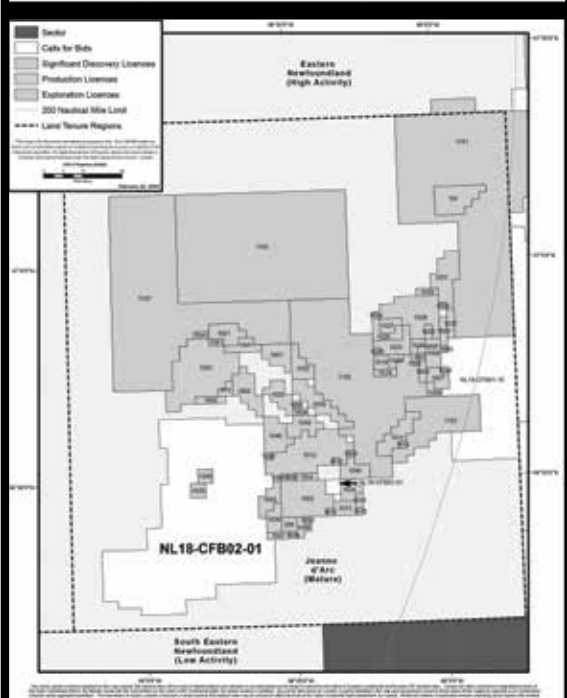
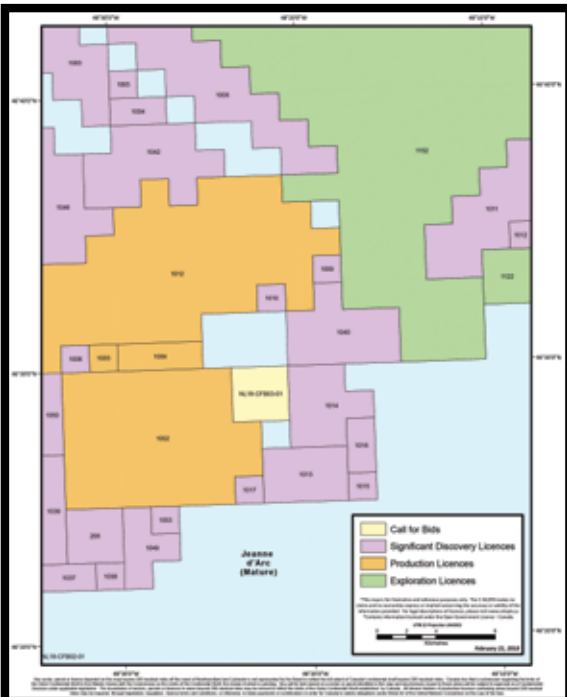
# C-NLOPB announces 2018 offshore land sale

The Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) issued its 2018 Call for Bids April 5. Exploration licences within two regions, plus one production licence, were offered with a bid deadline of November 7, 2018.

Within the high activity Eastern Newfoundland offshore region, 16 parcels of land, encompassing almost 4 million hectares, were made available. Within the Jeanne d'Arc region, a single parcel, 142,448 hectares in size, was offered. The minimum bid for exploration licences in these two regions is \$10,000,000 in work commitments.

In a first for the C-NLOPB, a production licence has been offered to bidders. The 1,423 hectare area is within the Terra Nova production area of the Jeanne d'Arc region and was formerly known as the Terra Nova K-08 Commercial Discovery Area. The Terra Nova co-venturers relinquished the licence in 2014. The sole criterion for awarding this licence will be the highest drilling deposit bid. The minimum acceptable bid is \$25,000,000.

All offerings in this land sale are included in the 2014 Eastern Newfoundland Strategic Environmental Assessment (SEA). ■







The Week's launch event featured keynote speaker, Greg Janes, Team Lead – Environment & Regulatory, Suncor Energy, who spoke about his career in the oil & gas industry.



Scholarship recipient and Memorial University mechanical engineering student, Nathan Hollett, speaks to media at the March 5th launch.



2018 scholarship recipients (L – R) Liam Carter, Nathan Hollett and Karla Brown. Missing from photo are Corey James and Myles Alexander.



At the C-NLOPB's Core Storage and Research Centre, staff exploration geoscientist, Stephen Hicks, shows a core to female junior high and high school students from the Burin Peninsula.



At the C-NLOPB's Core Storage and Research Centre, female junior high and high school students from the Burin Peninsula use a microscope to look at porosity and permeability in rock thin sections.



Exploration technician, Cole Abbott, shows unwashed cuttings to female junior high and high school students from the Burin Peninsula during their tour of the C-NLOPB's Core Storage and Research Centre.

# Oil & Gas Week 2018

Newfoundland and Labrador's 16th annual Oil & Gas Week took place March 5 – 10, 2018. The week was launched at Memorial University's Bruneau Centre in St. John's and brought together industry and academic leaders, representatives from government, students and members of the general public.

"Oil & Gas Week is an opportunity to acknowledge the contributions of the oil & gas industry and to educate young people about the wide range of career possibilities it offers, both right here at home and around the world," said Margaret Allan, chair of the 2018 Oil & Gas Week Steering Committee. "It is also a way for the industry to give back to the community through fundraising efforts in support of the Community Food Sharing Association as well as educational outreach activities and scholarships."

2018 Oil & Gas Week Scholarship winners were announced at the event. Funded through the Oil & Gas Week corporate sponsorship program, the scholarship program provides financial assistance to students from rural Newfoundland and Labrador. The scholarships, each valued at \$1,000, are awarded to students in their second year (or beyond) of full-time study in a program related to the oil & gas industry, at one of the province's public post-secondary educational institutions.

2018 scholarships were presented to Nathan Hollett of Norris Arm (Memorial University – engineering), Corey James of Trepassey (Memorial University – earth sciences), Liam Carter of Port aux Basques (Marine Institute – nautical science) and Karla Brown of St. Anthony (College of the North Atlantic – geomatics/survey engineering technology). In addition to the Oil & Gas Week Scholarships, NSB Energy generously provided funds to



award an additional scholarship which was awarded to Myles Alexander of St. George's (Memorial University – engineering).

A highlight of Oil & Gas Week is Energy Day, which took place March 6 at the Johnson GEO CENTRE. More than 700 students from 11 high schools on the Avalon Peninsula participated and learned about the wide variety of careers in the oil & gas industry at Energy Day.

"Energy Day is a career exploration event for high school students, incorporating speaker panels and a career trade show designed to educate students about the different and varied career opportunities in the industry," said Tiffany Wells, chair of Energy Day 2018. "Providing students with this type of information is an important focus of Oil & Gas Week because students are not always aware of the wide variety of careers related to the industry."

This year, the Oil and Gas Week Steering Committee worked with ESTEEM Women, a non-profit organization aiming to increase the participation of women in science, trades, engineering and math careers, to bring in 30 students from the Burin Peninsula and Clarendville area for the event.

Energy Day provided participating students the opportunity to visit 15 exhibits and participate in panel discussions featuring individuals working in a variety of careers in the industry, including engineering, safety, trades and the marine sector. The panelists spoke to students about how they became interested in their professions and their personal career journeys.

Energy Day Plus provided a first-hand look at oil & gas careers in action for students of two selected schools who visited Cougar Helicopters, Virtual Marine Technology, The Cahill Group and the C-NLOPB Core Lab.

Other events within Oil & Gas Week 2018 included Noia's Industry Achievement Awards luncheon, Geoscience Day and the Oil & Gas Industry Food Drive, which collected food and donations for the Community Food Sharing Association. ■



Safety Advisor Andrew Smith brings high school students through the Cahill Fabrication Mechanical Facility on Southside Road, St. John's



Students attending Energy Day participated in panel sessions where industry representatives told their own career stories. Pictured here, with a group of participating students, is session moderator Lisa Bragg of GJ Cahill.



Industry and academic leaders, representatives from government, students and members of the general public gathered for the official launch and opening reception at Memorial University's Bruneau Centre.



Husky Energy volunteers collect food and donations for the industry food drive at a local Sobeys store.



At the C-NLOPB's Core Storage and Research Centre, female junior high and high school students from the Burin Peninsula use a microscope to look at porosity and permeability in rock thin sections.



High school students at the KCA Deutag booth during Energy Day.



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# Noia seeks clarity and certainty on marine refuge areas

The federal government's lack of clarity regarding permissible activity in a marine refuge area offshore Newfoundland has the potential to stall our local industry – and the province's economy – says Charlene Johnson, Noia CEO.

"The economies of Canada and Newfoundland and Labrador cannot risk leaving tens of billions of dollars on the table, or more specifically, beneath the ocean floor," Johnson wrote in a recent letter to Dominic LeBlanc, federal minister of fisheries and oceans. "Therefore, it is of utmost importance that we receive certainty from you that, as per the *Fisheries Act*, only fishing activities are restricted, and oil & gas activity is permitted in the area."

The letter, written in early April on behalf of Noia members, was in response to ambiguity which had arisen since the federal government's December 2017 announcement of the establishment of seven marine refuge areas off the coasts of Nunavut and Newfoundland and Labrador. One of the refuge areas, the Northeast Avalon Slope, is home to corals and sponges – as well as oil & gas exploration and fishing activities. Within that announcement, the federal government stated that all bottom-contact fishing activities would be prohibited within the area.

The December announcement made no mention that oil & gas activities would be curtailed. While oil & gas activities have dealt with *Fisheries Act* closures for many years, some groups have publicly

stated that there should not be oil & gas activities in these areas. What has somehow been lost in recent discussions is that the Department of Fisheries and Oceans has stated that areas within the refuge where oil & gas activities occur will not be counted towards the federal government's conservation target.

### Canada targeting conservation of 10 per cent of coastal and marine areas

The establishment of offshore refuge areas is a result of Canada's participation in the international "Strategic Plan for Biodiversity."

In 2010, Canada was one of almost 200 member states which signed on to the plan and committed to its "Aichi Targets," a series of 20 biodiversity targets to be achieved by 2020 in order to reverse the global decline of biodiversity. In 2015, Canada adopted its own national targets to support the international plan. One of these stated, "By 2020, at least 17 per cent of terrestrial areas and inland water, and 10 per cent of coastal and marine areas of Canada, are conserved through networks of protected areas and other effective area-based measures."

By the end of 2017, Canada had reached an interim target of protecting five per cent of the country's marine and coastal areas. The seven marine refuges announced in December increased Canada's total protected ocean to 7.75 per cent, though not all of these areas will count toward the Aichi Targets.

Noia understood this protection was being provided to prevent potential damage to the corals and sponges present on the ocean floor by bottom-contact fishing, and these restrictions would have no impact on oil & gas activity.

In her letter to the minister, Johnson also informed him of potential investor uncertainty.

"Noia is certainly supportive of protecting oceans and the organisms within it; however, we become very concerned when there is confusion around what activities can or cannot occur in these areas given that investors are assessing at this time the business case for bidding," she wrote. "These are some of the most prospective areas in our offshore, and in fact the entire world, and it is crucial that investors have clarity that oil & gas activity is indeed permitted in this area. We cannot



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have a cloud of uncertainty lingering as investors are making key investment decisions over the next six to eight weeks.”

The letter also pointed out that offshore oil & gas activity in Newfoundland and Labrador has been monitored by the federal government for the past 25 years; offshore operators follow stringent federal regulations; and long-standing, well known mitigation measures are implemented to reduce risk. No signs of harmful effects to fish have been found, indicating that Newfoundland and Labrador oil & gas activity is compatible with marine conservation.

Specifically in the case of the Northeast Newfoundland Slope, the newly designated marine refuge area was part of a strategic environmental assessment which concluded in 2014 and was scoped by several federal departments, including Natural Resources, Fisheries and Oceans and Environment Canada. Subsequent inclusion of the area into the Canada-Newfoundland and Labrador Offshore Petroleum Board’s land tenure system – a land sale was held in 2016 and another is planned for later this year – was also approved by the federal government.

The Cape Freels prospect, which is located within the Northeast Avalon Slope, demonstrates the potential of this area for oil & gas development. This prospect – often compared to the Marlim field currently producing offshore Brazil – is estimated to hold four to five billion barrels of recoverable oil and is considered one of the largest undrilled prospects in the world. Recent land sale results in the area prove that our province’s deepwater region is a desirable investment area for global oil companies.

“While we support the implementation of marine protected areas and marine conservation in general, as our efforts are compatible, our industry needs clarity and certainty so that we can maintain our momentum and explore the vast areas of prospectivity off our shores,” Johnson summarizes. “Those fields have the potential to make significant impacts on the economies of Newfoundland and Labrador and Canada and we must not let this opportunity slip away. The history of our province is tied to the ocean and so too is our future.” ■



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Photo courtesy of Husky Energy

## West White Rose construction ramping up

Activity is ramping up at the Argentia graving dock where Husky Energy is constructing the concrete gravity structure (CGS) for its West White Rose Project.

This May 8 photo of the 25-metre deep site shows one of five tower cranes which will be constructed; offices, lunchrooms and washroom facilities on the left, with access stairs from the site's parking lot nearby; and rebar preparation for one of the first concrete pours taking place in the center. The piping system visible along the banks is part of the dewatering system, which removes ground water from the dock. When the CGS is ready for tow-out from the graving dock, the berm on the left-hand side, behind the lunchrooms, will be removed.

The SNC-Lavalin, Dragados Canada and Pennecon General Partnership is constructing the CGS, which will require 76,000 cubic metres of concrete and be 145 metres tall with a base diameter of 122 metres when complete. It is anticipated the structure will be completed in 2021 and the topside module installed after the concrete base arrives offshore at the White Rose field.

At peak construction, approximately 700 skilled trade construction personnel will be employed at the Argentia site. Although some hiring took place in 2017, most of the workforce will be hired this year. Once in operation, approximately 250 new permanent platform jobs will be created and an additional 1500 people will be indirectly employed. ■



The scale model of the *Magne Viking* is shown (left) during ice tank trials; the actual vessel (right) completed similar tests in the Baltic Sea.

## Project working to add sea ice to dynamic positioning capability

An \$8.5 million joint industry project led by the Marine Institute's Centre for Marine Simulation (CMS) is researching a module that will enable dynamic positioning (DP) to function in sea ice, with plans to commercialize the technology.

A computer-controlled system that uses propellers and thrusters to maintain position at sea, DP is in wide use across the oil & gas and shipping industries. It takes into account wind speed, wave height and sea currents to keep a vessel or drilling unit safely and precisely on station.

However, up until now, DP has been unable to factor the presence of sea ice into its calculations and that's a major consideration in this part of the world, where petroleum exploration and production in ice-infested waters is expected to increase.

"Current state technology can recognize wind, waves and current but it can't recognize ice force," said Maria Halfyard, manager of applied research and industrial projects with the CMS. "So we are enhancing the technology by adding in that factor, developing an ice numerical model that will feed into the DP system."

CMS and National Research Council (NRC) Canada are the project collaborators, with funding support from Petroleum Research Newfoundland and Labrador, the Atlantic Canada Opportunities Agency and InnovateNL. Kongsberg Digital is the commercial partner.

The research project has focused on first year managed ice up to two meters thick, Halfyard explained.

"First year ice is a good starting point for a proof of concept although multi-year and pack ice inclusion will be necessary for a comprehensive commercial application," she said.

The project team utilized the ice tank at the NRC's Ocean, River and Coastal Engineering facility in St. John's to gather feedback on the forces of managed first year ice on a scale model vessel. The data is being used to develop a numerical model to predict the forces necessary to counteract the ice, using the vessel's propulsion system. Two ship models





Maria Halfyard is the manager of applied research and industrial projects with the Centre for Marine Simulation. Photo by Krista Sweetland

have been used in the tank, a generic drillship and a supply vessel modeled after the *Magne Viking*.

"In addition to the tank tests, we were also very fortunate to get the opportunity to complete full scale DP trials using the *Magne Viking*," Halfyard said. "We went to the Gulf of Bothnia in the Baltic Sea and, using a Kongsberg DP system, we gathered more than 50 hours of ice tests that we plan to use in the future to validate the ice tank tests and numerical model."

"We are very pleased with how this project has progressed," Halfyard said, adding that this phase of research won't be complete until late in 2019. "There is still much work to be done, but we should be seeing some significant results fairly soon. We are confident that a tangible development will come from this research."

The next goal is to develop a DP system that can work in other varieties of sea ice, Halfyard added.

"This is currently a proof of concept. If this work proves positive, then it will be an impetus for additional funding to keep going. I am fairly certain that one numerical model will not work with all ice conditions. Multi-year and pack ice are completely different animals to tame and definitely need to be part of the puzzle before all is said and done. We are hoping to research those ice types in the near future."

If the new DP in ice system is proven feasible, the intellectual property will be licensed to Kongsberg Digital, the world's largest manufacturer of DP systems. While the Marine Institute and NRC will retain the intellectual property rights, Kongsberg, as the commercial partner, will have exclusive rights to sell the new ice-capable DP system to its clients globally. ■



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In the Helicopter Underwater Escape Training (HUET), participants learn how to safely exit from a helicopter fuselage after it has been submersed underwater.

## Ocean Safety Lab: Where researchers are truly immersed in their work

All workers on offshore installations must undergo Helicopter Underwater Escape Training (HUET), which prepares them to exit a helicopter in the unlikely event of ditching at sea.

Training takes place in the pool at the Offshore Safety and Survival Centre (OSSC) of the Marine Institute, where participants must escape from the fuselage of a simulated helicopter body after it has been submerged underwater.

It can be stressful, to be sure, but the immersive exposure to a life-threatening situation can save lives in a real incident.

Training at the OSSC is constantly evolving thanks to contributions of the Ocean Safety Lab, a group of researchers who are housed full-time at the facility.

"This is all very practical, hands-on research rather than typical pen and pencil work," said Dr. Heather Carnahan, dean of Memorial University's School of Human Kinetics and Recreation, with a cross appointment at the OSSC. "Our research happens right in the OSSC facilities, often with volunteers who are there for training, so the feedback we gather is drawn from real human experience."

The Ocean Safety Lab was formed two years ago, Carnahan explained.

"Right now, we have two post-doctoral scholars, two graduate students and a number of under-graduate students who are working on their projects," Carnahan said. "We also have Rob Brown, who has worked at OSSC as a scientist for many years. We all work with each other as necessary, and individually as well."

The projects are focused on enhancing safety by identifying and pursuing practical outcomes. Carnahan cited the work of postdoctoral scholar, Dr. Matthew Ray, in studying the effects of cold water on manual dexterity.

"He has been very productive during his two years at OSSC, with two papers published already and two more submitted for peer review."

The training pool at the OSSC is maintained at about 18 degrees F, Carnahan explained, whereas temperatures in the Newfoundland and Labrador offshore are much colder, usually hovering close to zero degrees.

"Our concern is what happens to hand function when you need to use your hands to perform important tasks, such as putting up a splash hood and putting on gloves, after immersion in cold water," Carnahan said. "How long before that dexterity is lost?"

"Most previous research into this question was performed with water temperatures of 7° to 9° F.



(LEFT) Dr. Matthew Ray demonstrates immersing his hands in a cold-water tank, as part of a manual dexterity experiment. (RIGHT) Dr. Heather Carnahan oversees the Ocean Safety Lab, which is tightly integrated within the Offshore Safety and Survival Centre of the Marine Institute.

Matthew's research has been focused on exposing hands to 2° F water for fixed intervals, then testing for manual dexterity after each exposure. He found that within 90 seconds there is a statistically significant deterioration in both sensation and function. You really don't have a lot of time to do things with your hands before function becomes impaired.

"Perhaps we need to rethink survival equipment; perhaps adding a fine inner glove that buys some time, allowing you to perform critical tasks during and immediately after exiting the helicopter, after which you would don heavier gloves. Or perhaps you could redesign equipment so that it doesn't require any dexterity. These are possibilities that we consider, because our research is focused on outcomes that are relevant to industry. Our goal is to make informed recommendations on policy, practice and design to help save lives."

Research has shown that sudden full-body immersion in very cold water causes extreme and debilitating physical stress. Some have raised the possibility of making HUET

training more realistic by lowering water temperatures to a level similar to the offshore environment.

"Our next experiments will focus on training in very cold water, wearing a survival suit, of course," Carnahan explained. "Will the training in cold water be beneficial? That is, will people learn to perform better in cold water if they are exposed to it during training? Or will the training become so stressful that the participant is focused more on surviving the experience than learning from it? All important questions."

That's just for starters. There are several important safety research projects in various stages of development at the Ocean Safety Lab.

"One of our postdocs, Desmond Mulligan, is researching team communication and what happens to the clarity and integrity of that communication when the going gets tense, during an emergency situation," Carnahan said. "Our newest postdoc, Michael King, is looking at issues of fatigue and



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how people respond in an emergency situation when fatigued.”

Carnahan also outlined projects underway by grad students Brenna McWilliams and Stefanie Martina.

McWilliams is investigating stress and learning and is studying training in rope and pulley hauling systems to determine if people learn better on the ground or at heights, using the OSSC’s High Angle Rescue Facility.

Martina is researching HUET training in the dark. Currently, all flights are scheduled during daylight and all HUET training is in a lit pool. However, visibility underwater is diminished greatly – especially in a submerged helicopter – so we want to determine if trainees will benefit from some training in darkness.

Elizabeth Sanli, who is now an instructor at the Marine Institute, recently finished her postdoctoral fellowship, in which she researched skill retention over long periods of time. That is, when you take HUET training and then go for a number of years without applying those skills, how much knowledge is retained?

“My research program is focused on simulation training and how realistic it can and should be,” Sanli said. “All of my projects fall under that theme. As a scientist, I also feel it is essential that I take the training courses at OSSC myself – for my own safety, yes, but also to know firsthand what the learners are experiencing.”

While plenty of projects are underway and much new knowledge is being gleaned, it could be some time before those findings are adopted by industry, here and elsewhere.

“I would think we’d be in a position to make some recommendations within about two years,” Carnahan said. “It can be a slow process, but we do need to gather sufficient evidence that we feel comfortable making our recommendations.”

What’s unique about the Ocean Safety Lab situation is that the research unit is embedded within the training centre, so training can be incredibly responsive to what researchers are finding.

“There is the ability for immediate knowledge transfer,” said Carnahan. “Changing policy is certainly going to take much longer, but we can modify our own training relatively easily. Our training instructors are included as part of our research team. We also work closely with some of the most highly-regarded experts in cold water exposure in the world.

“There are certainly many excellent training centres out there, but ours is the only one that is embedded within a university. As a scientist, I consider it a living laboratory. I am so fortunate to be able to do our research at our training centres because we have access to the people doing the training on a daily basis, in simulation facilities that are second to none in the world.” ■



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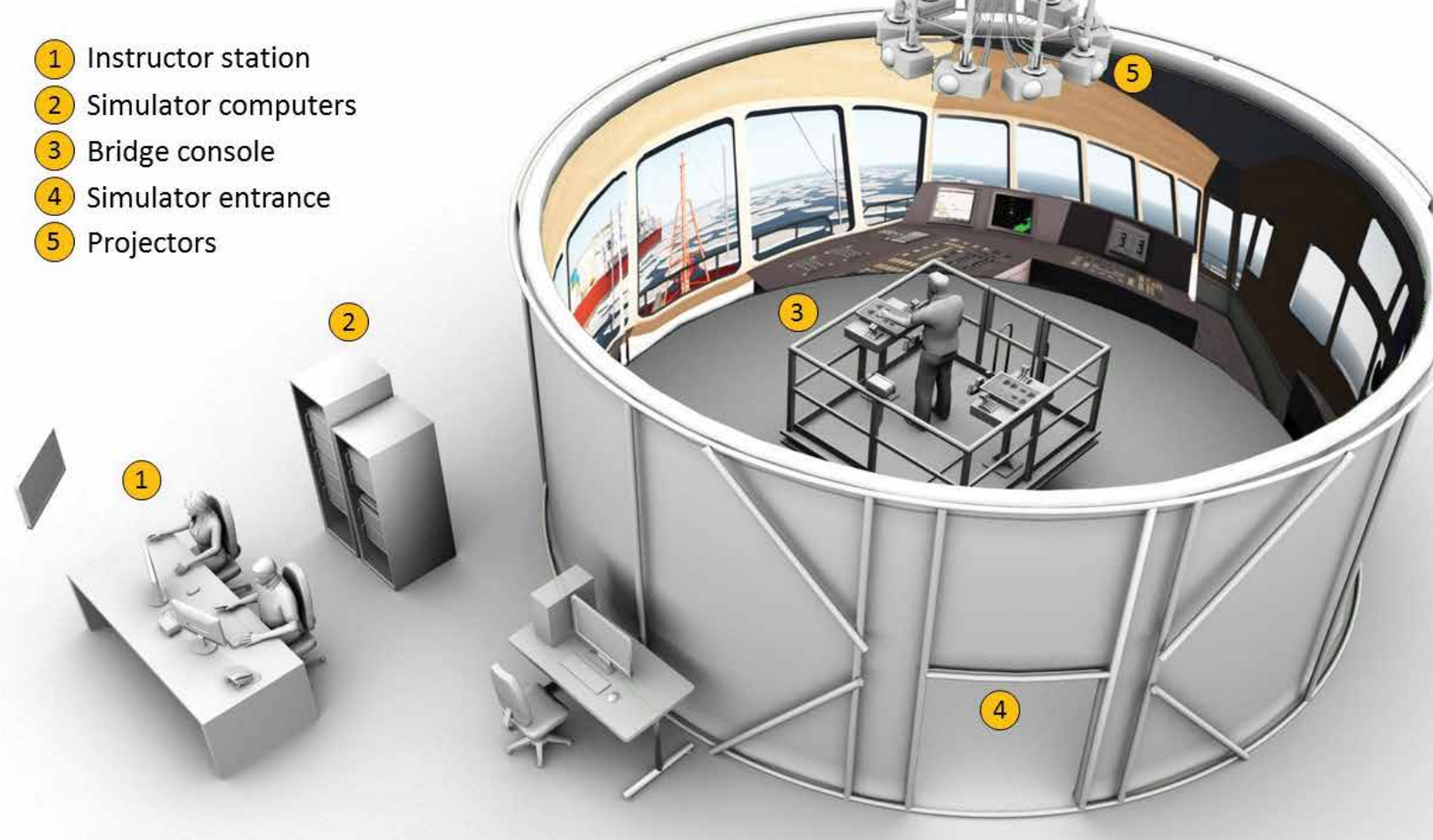
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A graphic representation of the Visualization Lab developed by the Safety at Sea group in the Faculty of Engineering and Applied Sciences.

## Safety at Sea: Where research enhances safety and builds business

When safety research results in innovations that are commercialized and sold around the world, time and time again, you know you are doing something right.

This is the story of the Safety at Sea research team in the Faculty of Engineering and Applied Science at Memorial University, where graduate student research is focused with pinpoint accuracy on safety.

"Our primary consideration is the role that people play in the safe operation of equipment, how they respond in emergency situations, and how training can be improved to reduce incidents in the offshore oil and shipping industries," said Dr. Brian Veitch, the NSERC/Husky Energy Industrial Research Chair in Safety at Sea. "These workplaces are typically remote with challenging weather conditions, the tasks are complex, the facilities are often potentially dangerous and there is no room for error."

For these reasons, Safety at Sea is focused on the development and use of simulators for training and research purposes, working closely with industry partner, Husky Energy, to test and refine new developments.

"It isn't practical to train people at sea in the use of complex equipment or procedures," Veitch said. "Simulators allow you to expose workers to daily routines on a supply vessel, for example, or an emergency situation on an offshore installation, without putting people or equipment at risk."



All simulators developed by Safety at Sea are designed to support safety critical operations, Veitch explained.

"The lifeboat simulator, for example, creates an environment that is lifelike – darkness, snow, rain, fog – and is designed to replicate scenario-based, mission-oriented conditions. This technology improves skills and situation awareness, enhances human performance, reduces the probability of accidents and increases the competence of the individuals that have been trained."

The lifeboat simulator was, in fact, the first prototype simulator that Veitch invented 15 years ago with master's student, Randy Billard, and researchers at the Marine Institute and National Research Council (NRC) Canada.

"It came out of our work at the time, doing model tests for evacuation systems," Veitch said. "The models were operated by remote control with a little camera in the cockpit, and we noticed that the technician operating the remote kept getting better at piloting the model, so we thought: why not use a simulator to train people?"

The simulator they designed was rudimentary by today's standards but worked so well that Billard and Veitch formed a company called Virtual Marine. Billard moved out to manage Virtual Marine as chief technology officer, while Veitch continued at Memorial. The company was first incubated at the Genesis Centre at Memorial, before moving in 2007 to its own facility on Hallett Crescent and taking on Captain Anthony Patterson as president and CEO.

Since 2004, Virtual Marine and MUN have developed several simulators, including the Conventional Davit Launched Lifeboat Simulator, Free Fall Lifeboat Simulator, Fast Rescue Craft Simulator, Ice Management Simulator and All Hands Virtual Emergency Response Trainer (AVERT) Simulator. Prototypes were developed and tested with Veitch and his Safety at Sea students, then further developed, refined and ultimately commercialized by Virtual Marine.

Today, Virtual Marine is a proven partner with customers located all over the world. The company has licensed several technologies from Memorial University and continues to contribute through royalties and ongoing research programs.

"Our simulators are deployed all over the world," said Billard. "Our primary market is oil & gas, and we have a growing market in defence and shipping. We have 18 employees now and still work closely with the engineering faculty on new product development and testing. We hire a lot of work term students out of the Faculty of Engineering, as Virtual Marine is a perfect fit for people studying software, electrical, mechanical or ocean and naval architectural engineering."

Breaking into the oil & gas and other industries several years back was challenging, Billard added, because the lifeboat simulator was new and unknown.

"This was a disruptive technology in that it was a new way to train and was originally not recognized by users and regulators. For the last five years or so, we've had to work



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Jennifer Smith operates the bridge controls in the Visualization Lab.

with one group at a time – all over the world – to get regulations changed. We were approved in Canada first, then Norway, then the Marshall Islands, and so on, to the point that pretty much every jurisdiction in the world can now use lifeboat simulations for training.”

Meanwhile, back at the engineering faculty, graduate students continue to pursue new avenues of research, on projects that work individually as thesis material but feed as well into other research.

“Engineers have great technical skills and knowledge, but the education system that trains them deals very little with human factors,” Veitch said. “There’s plenty of physics, mechanics, hydrodynamics and so on, but not enough consideration of how people and organizations put that into practice. It’s people that make it work, and Safety at Sea is working to bridge the gulf between the engineering design and operating practice. This is why simulators figure so prominently in our work – they duplicate the interface between people and technology.”

The centerpiece of that research is currently the Visualization Lab, which has a motion-capable platform and a screen that surrounds the operator for 360 degrees. Any situation can be projected onto the screen, from calm seas and clear skies to fog, storms and night situations. The human factors research being completed

in the Visualization Lab has provided results that aided in the development of Virtual Marine’s latest product – the Ice Management Simulator – a new product that recently saw its first sale, to the Coast Guard College in Nova Scotia. The Ice Management Simulator can also be adapted to any bridge scenario.

The AVERT simulator, a desktop system that utilizes 3D graphics and fully immersive Oculus Rift technology (or a conventional monitor), was also developed by Safety at Sea. It is used for orientation and safety training on offshore installations using realistic recreations of the interior layout, inside which training participants can move

about freely and respond to various planned and unplanned situations.

The AVERT and Ice Management simulators are also used for research purposes by students in the faculty, including these examples:

### Jennifer Smith

A research coordinator in the faculty who is also working on her PhD, Smith has done several major experimental campaigns in the simulators. One of the things she studied was the relative efficacy of different types of pedagogical approaches. She found that an approach called mastery learning is very well suited to simulation-based training.

Safety at Sea is working to bridge the gulf between engineering design and operating practice.





Dr. Brian Veitch: "Engineers generally don't do research for its own sake. We start with a problem or challenge, then set about solving it."

"We are using this approach in all of our work now," said Veitch.

### Doug Smith

Smith is working on a technique that will help identify the sources of vulnerability and resilience in complex

operations. It is expected that the technique he is working on will be very useful to keep complex systems operating safely.

"We're keen to apply it to new types of operations, such as what we expect to see as more and more automation and digitization occurs in places like shipping and offshore operations," said Veitch.

### Mashrura Musharraf, Allison Moyle

Musharraf and Moyle have developed a human reliability analysis method that captures as data the performance of people in simulated scenarios.

Veitch explained, "We've used this to investigate performance in emergency type situations, which we can do safely in a simulator but would be next to impossible in the actual workplace."

### Erik Veitch

Student Erik Veitch did experiments using a bridge simulator, configured as a standby vessel capable of

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ice management, to investigate the significance of experience in terms of performance in simulated offshore ice management scenarios. He had two groups of volunteers – one group of experienced seafarers (master mariners and mates) and the other nautical science cadets with little or no experience at sea. He was able to quantify the performance of the individual participants and measure the difference between the groups.

### Mashrura Musharraf, Syed Danial

Musharraf and Danial are developing artificially intelligent “agents” that can behave during safety critical scenarios in ways that are representative of real humans. The agents can be used in a range of applications. For example, they’ve implemented agents in the AVERT simulator who can act as in-simulation tutors, or guides, to provide real-time feedback and direction to trainees who are using the simulator for scenario-based training exercises.

Brian Veitch is also proud of the volume of Safety at Sea research papers that are published in international journals.

“The small group that I oversee here is doing very interesting work on an international scale. We frequently publish in high impact international journals. They don’t publish anything that isn’t new and novel so when we do have something published, we know we’ve done something that is both important and unique.”

All of the students’ research work has a focus and an objective, Veitch said.

“Engineers generally don’t do research for its own sake,” he said. “We start with a problem or challenge, then set about solving it. Pretty much all of the research work is incorporated into our simulator work, to make them more effective and bring new innovations in their design and operation. Virtual Marine is there to take our developments, refine them further and move them out into the real world. The company is small enough that they can work with us, and big enough that they can deal with multinational oil companies. It really is an ideal relationship

that enhances safety, builds local business, pays dividends to our public sector partners and stimulates new research.” ■

This (lifeboat simulators) was a disruptive technology in that it was a new way to train and was originally not recognized by users and regulators. For the last five years or so, we’ve had to work with one group at a time – all over the world – to get regulations changed. We were approved in Canada first, then Norway, then the Marshall Islands, and so on, to the point that pretty much every jurisdiction in the world can now use lifeboat simulations for training.”

- Randy Billard, Chief Technology Officer, Virtual Marine

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Carman Mullins

## Meet ExxonMobil Canada's Carman Mullins

Sitting in her office in downtown St. John's, Carman Mullins reflects on the journey from her hometown of Yazoo City, Mississippi to her current role as president of ExxonMobil Canada Ltd.

Growing up in a small farming town, Mullins loved playing sports, as well as math and science. If she hadn't decided to become an engineer, she would have wanted to be a basketball coach.

"I think some of my leadership style translates into what could have been my other career, in that I like to motivate and encourage teamwork," she said.

After graduating with a mechanical engineering degree from Mississippi State University, Mullins was hired by Exxon and has been working in the oil & gas sector ever since.

"I started in New Orleans, Louisiana supporting Exxon's offshore assets and it was just intriguing to me, the concept of being an engineer, flying in a helicopter offshore and the really exciting things that were happening."

Since then, Mullins has held many positions within Exxon and ExxonMobil. She worked in reservoir engineering,

subsurface developments and projects before moving to supervisory and management roles. Her work has included a variety of assignments in safety.

"I'm very passionate about safety and how we lead in that part of our business," Mullins explained. "We have some innovative safety programming, such as Safe Choice and Hibernia's mental health first aid training. These programs are now being exported to ExxonMobil locations globally."

Her career has included postings in Houston, Calgary and Kuala Lumpur, with the opportunity to travel to the Middle East, Europe and Russia.

When asked what she enjoys most about her career, Mullins said it comes down to being able to make a difference.

"I know we are making a difference in safety. The safety culture of our industry is spreading to other industries and our employees and contractors are taking safety home. I am also passionate about mentoring. I get so excited when I get a chance to talk to young professionals and I think back to when I was their age and how the company has helped me to develop and grow."



Mullins also believes that innovation is critical for adding value.

"I don't think there's a day in my almost 22 years with ExxonMobil that I haven't learned something new. It just fires me up and I am excited about the fibre optic cable we have installed offshore Newfoundland and all the possibility that brings in terms of how we can innovate," she said.

Mullins said she heeds the advice of her mentors.

Firstly, "You are not a leader based on your title. You are a leader if you have followers."

"That means creating a culture where the entire team is pulling in the same direction. You will always have challenging times and, to me, success in those challenging times is when, as a leader, you look behind you and the whole team is there," she explained.

Secondly, follow the golden rule: "Treat others as you want to be treated."

"When I'm in various business transactions I make sure to pause and put the hat on of the person I'm working with, to try to understand what they are thinking, to find our common interest," Mullins explained.

Mullins noted there are also challenges. Along with the technical challenges inherent in her work, finding a work-life balance is something she strives for.

"For me, it's about having enough time to be a mom and do everything I want to do at work, because if you want to make a difference, you want to be involved, you want to be active."

Family time includes playing sports and pursuing outdoor activities. Her proudest personal moments revolve around watching her children grow, develop and learn. Professionally, she noted the tow-out and start-up of Hebron were significant career milestones.

"I had the opportunity to be on one of the vessels at Bull Arm as the platform was being towed away. That is a vision and just an amazing engineering accomplishment that I will never forget."

Mullins is enjoying her tenure in Newfoundland and Labrador. In many ways it reminds her of home.

"Mississippi is a small state that has a determination and drive that I also see here," she noted. "Secondly, I always say when you meet someone from Mississippi, if you give me 10 minutes, either we know the same person or we can draw some connection, and that is the same in Newfoundland and Labrador."

As for what the future might hold, Mullins said she loves the opportunity she currently has with ExxonMobil Canada.

"There are a lot of things in this job that I'm excited about. I just want to continue to have roles where I can make a difference." ■



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Oceanex Sanderling departing St. John's on route to Halifax. Photo courtesy of Oceanex

## Oceanex marks 30 years as a Noia member

Oceanex Inc. and its predecessor companies have been providing service to Newfoundland and Labrador for more than 100 years and this year Oceanex is marking 30 years as a Noia member.

With its head office in St. John's and branch offices in Ontario, Quebec and Nova Scotia, Oceanex currently employs about 1000 people, some 400 directly and 600 indirectly.

The company provides full container load intermodal and less than truckload (LTL) transportation services to the province, with pier-to-pier (between marine terminals) and door-to-door (from shipper's warehouse to consignee facility) service.

Matthew Hynes, Executive Vice President of Oceanex, said the company has evolved from a ship service company to a vertically integrated transportation provider.

"Our customers use Oceanex to move freight anywhere in North America to and from Newfoundland and Labrador," Hynes stated. "At the end of the day we control the trucking associated with that on each end in Halifax, Montreal and St. John's, and also the terminal operations, shipping and logistics management."

Oceanex currently moves 40 to 50 per cent of goods to the island and was declared an essential service in 2010 by the Canadian Industrial Relations Board. Hynes said

the company serves a true cross section of the economy, including wholesalers, retailers, building suppliers, new vehicle manufacturers and pharmaceutical companies. It has been very involved with the oil & gas industry, from moving materials for large infrastructure construction projects, to the many supplies needed for operations. As an example, the company has transported drill pipe from Houston over road to either Montreal or Halifax and then on to Newfoundland via ship.

Automobiles are a large part of the business for Oceanex, which moves over 95 per cent of new cars to the island. Oceanex also handles a variety of temperature controlled goods and interlines with all major international shipping lines through the ports of Halifax and Montreal, enabling it to move international containerized freight to and from the province.

The company originated in 1909 when a service to Corner Brook was started and was followed by calls at St. John's in 1949. Oceanex was subsequently formed in 1990 through the merger of Atlantic Container Express Inc. of Montreal and Atlantic Searoute Limited Partnership of Halifax. In 1991, a marine terminal operator in Newfoundland and Labrador merged its operations into Oceanex, creating a major integrated transportation infrastructure provider in Atlantic Canada.

The company was privatized in 2007, with the new ownership being led by managing partner, Captain





The Oceanex Connaigra, special call at the port in Bay Bulls, delivering two 250-tonne transformers. Photo courtesy of Oceanex

Sidney Hynes. Since then, Terminal II & Terminal III opened in St. John's, greatly enhancing the dispatch of cargo from St. John's throughout the province.

Oceanex has operated from its current state-of-the-art terminal building in St. John's since 2001 when it brought its entire operations staff into one facility.

With fixed day weekly service, Oceanex owns and operates three ships with Canadian crews: the *Oceanex Sanderling*, *Oceanex Avalon* and *Oceanex Connaigra*. Custom designed in 2013, the *Oceanex Connaigra* is the largest Canadian flagged ConRo (hybrid roll-on/roll-off container vessel) ship in the country and one of the most environmentally friendly ships in the world. Shorebase operations in St. John's utilize three Liebherr mobile harbour cranes to efficiently carry out vessel loading and discharge.

"It's a harsh weather environment, but with custom built equipment designed specifically for the work we are doing combined with well-trained, experienced people, we can make it happen and we do it year in and year out," Hynes explained.

Hynes said being a Noia member has been very beneficial to the company over the years.

"Noia has been an excellent source of information and new activity across the industry, whether it's overall project

progress or particular opportunities that we've been able to bid on," he said.

Hynes added that Noia also provides great networking opportunities and resources for connecting with industry leaders, as well as being a voice and advocate for the supply and service community.

"As the industry grows and is more successful so is Newfoundland and Labrador and, in turn, so is Oceanex," Hynes said. "We've really noticed that while we've been involved in large project cargos associated with the major oil & gas projects, it's really around bringing in the new cars, the new home building materials or the retail goods that people are buying because of the fact that they're employed on these projects. That's where we can really see the impact."

Honoured as one of Canada's Best Managed Companies since 2011 and having achieved 9001:2008 certification, Oceanex is looking forward to continued growth in the province.

"The key to our business and what customers really count on is our reliability. We have over 98 per cent on-time performance. You can basically set your watch from when the ships go and come," Hynes noted. "We look forward to having the opportunity to serve Newfoundland and Labrador for many years to come." ■

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## Pro-Dive Marine Services: 30-years of Noia membership



Pro-Dive Marine Services has been serving Atlantic Canada for over 35 years and is being recognized this year for 30 years as a Noia member.

President David Squires said the company has grown from a small company that he founded in St. John's in 1983 to perform inshore civil diving work to one that employed close to 100 people during its peak involvement in the offshore oil & gas industry.

"We grew into the oil & gas industry," Squires said. "We hired the right people with the right training, purchased the right gear and bid the projects. We also aligned ourselves with different companies over the years to bring transfer of technology into the company."

Today, Pro-Dive prides itself on continuing to provide the highest quality diving and remotely operated vehicle (ROV) services available. Construction and drill support are provided by ROVs, while its diving services include inshore and offshore air/nitrox diving, as well as offshore saturation diving support for deepwater construction projects.

Squires said the company has provided ROV or diving services at one time or another for all east coast Canada operators. With the current world oil prices and competition from large multinational companies, however, he said Pro-Dive is working hard to maintain its market share. It currently employs 15-20 people from its base in St. John's.

"We're doing very little with the offshore at the moment, so our focus is on the inshore market at this point. We are also working on some new alliances that will help us expand our services to the offshore sector."





Pro-Dive's equipment includes the Seaeye Falcon ROV, a portable, powerful and versatile ROV intended for professional inspection, observation and survey operations in coastal or inshore waters. Pro-Dive's launch and recovery system (LARS) is equipped with a tether management system (TMS). This system dramatically increases the operational capabilities of an ROV system by enhancing the ability to launch and recover the ROV in above normal sea states. It also minimizes the potential for damage to the ROV during the critical air/water interface stage. The compact size and skid mounting of the TMS LARS make it ideal for smaller vessels, as well as supply vessels, where deck space is of the utmost importance.

Pro-Dive also owns a purpose built, highly maneuverable, safe and stable diving support vessel, the *Pro-Dive Attender*. It is designed to serve as a close-range dive support vessel (DSV) in an offshore environment, with the power and maneuverability to access areas that many large DSVs cannot. It is designed to accommodate two divers and one standby diver, with the option to use a fourth diver with fly away panel. Squires said this vessel has seen good utilization by the operators in the region.

Pro-Dive provides project management and logistics support to meet the demands of operating in the North Atlantic. Experienced staff coordinate onshore and offshore projects with safety and quality always top of mind. A Canadian owned and operated company, Pro-Dive is ISO 9001:2008 registered for ROV and diving services and is approved by Lloyd's Register, DNV-GL, the America Bureau of Shipping and Bureau Veritas. Pro-Dive is also proud that it was the first Canadian owned company to become a full contractor member for diving and ROV services of the International Marine Contractors Association (IMCA).

As a member of Noia, Squires has served as a director on the board and attended many educational and networking events. He said Noia was particularly beneficial to Pro-Dive in the early days of his business, as a source of information and an advocate for local suppliers.

When looking to the future, Squires said Pro-Dive will work hard to expand and maximize the value of its services to clients through aligning costs with revenues as it continues to provide top quality diving and ROV services to the region. ■



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Noia CEO Charlene Johnson opens Noia's international opportunities session, held April 29 in Houston.

## Noia expands OTC activity

Noia members were provided with a new learning opportunity at this year's Offshore Technologies Conference (OTC) in Houston, with the addition of a session on international oil & gas opportunities for Atlantic Canadian businesses.

The session, held prior to the yearly Noia poolside reception at the DoubleTree hotel, was an opportunity for member companies to hear about potential opportunities in a number of markets.

Noia President and CEO Charlene Johnson said the idea was conceived as a result of Noia's involvement in the Atlantic Canada Trade and Investment Agreement (ATIGA). This international business development program, established in 2017, aims to expand business activities between Atlantic Canada and international markets.

Ten sector teams were established to plan and oversee international business development initiatives for the region, with Noia and ACOA co-chairing the oil & gas sector team. Other team members include the Maritimes Energy Association (MEA), the provinces of Newfoundland and Labrador, Nova Scotia and New Brunswick, Export Development Canada (EDC) and Global Affairs Canada (GAC).

With the Canadian trade commissioners of many identified regions in attendance at OTC this year, Noia

jumped at the opportunity to organize an information session for members.

"Noia is continually seeking to provide opportunities for our members to expand their knowledge of the international supply and service sector. Having seven trade commissioners present during OTC to provide information about their countries helped us achieve this objective," said Johnson.

Approximately 90 delegates from Newfoundland and Labrador and Nova Scotia attended the session, which opened with greetings from Johnson, Mike Howley of ACOA/Global Affairs and Kathryn Lyons of the Export Development Corporation. Speakers included trade commissioners from Brazil, Colombia, Guyana, Libya, Mexico, Norway and the United States. They showcased some of the oil & gas opportunities available in their home markets and offered insight into local business cultures and market entry considerations.

A review of this year's event will determine whether similar events will be held in future years.

"Initial feedback on the session was positive and we gained some valuable insight on how to improve the session should we choose to offer it again next year. We will seek formal feedback from our members and I encourage them to make suggestions for this event, or any other in the future which may bring additional value and information to our membership," said Johnson. ■



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# Noia's Membership Engagement Committee identifies 2018-2019 priorities

Noia's Membership Engagement Committee (MEC) is working hard to add value by connecting association members and providing relevant services. Committee chair, Karen Winsor, said the committee aims to inform and bring members together to maximize the value of their membership.

"This can mean finding out what events are of interest to them, what issues they might be having or things that are important to them and their membership."

Winsor, along with committee members Christian Somerton, Craig Ralph, Cassidy Dyke and Katie Mercer, met in April to begin identifying priorities for the coming year. Winsor said the committee aims to meet regularly to develop programs that get members more involved in Noia events, recognizing the diverse needs of the supplier community.

"Some companies have people who are completely dedicated to business development and some don't, so they rely on the information that comes from Noia to make some of their decisions."

Winsor said the committee began its first meeting by discussing what they believe is important to members, things that Noia does well to engage members and how the association may be able to further improve current member offerings.

The committee has identified three main priority areas for 2018–2019.

First, there are plans to develop a lunch and learn program around topics that are important to Noia members. The committee intends to poll members for topic and speaker ideas.

"We hope that members will let us know what is important to them and areas they would like to learn more about," Winsor explained. "We will begin these events in July and aim to have one per quarter on different topics."



The committee's second priority is to review current networking events as a continuous improvement exercise to ensure that Noia is reaching the right people in the right way. Winsor said one of the main purposes of these events is to facilitate collaboration and communication between members.

"We will gauge interest in giving each event a theme so that we can focus in on areas of interest in the industry. Additionally, we will be reviewing who normally attends the events and looking at ways to broaden that reach to include more people within each company, as well as increase the number of member companies that attend."

The last major area of focus for MEC this year will be a pilot networking experience event. This "experience based" event will include an interactive experience for attendees, promoting a different kind of communication and teamwork between members.

Winsor said the committee's work will be informed by feedback from Noia members.

"Whether that's through a survey or directly reaching out to them, we want to know what they're trying to achieve and then use that information to develop the committee mandate."

Many past initiatives were implemented in response to member feedback, notably the Hebron and West White Rose supplier information sessions. Winsor said there was a great response to these events.

"In many cases, members who might not be able to get themselves in front of the right organizations or people – or didn't know they wanted to get in front of them –

come to these sessions, find out new information and then have one-on-one sessions afterwards," Winsor explained.

Winsor said the committee also wants to look at ways of facilitating member-to-member engagement. Past programs included a membership mentor program aimed at pairing new Noia members with senior Noia members to help welcome them at events and introduce them around.

"It's about trying to get our new members involved in our events and finding a meaningful way to get them in front of and meeting the right people."

Winsor said she would also like to look at ways to engage young people in the industry.

"You typically see the same faces and positions from organizations attending a lot of our events, so we'd like to get some new people into the mix. Hopefully, as you see more young people coming into the mix you'll see diversity coming with it."

Winsor said it comes down to engaging the right people at the right time.

"The purpose of the membership engagement committee is to serve as Noia's connection to its members and to maintain or increase membership value by ensuring relevant and effective member services," Winsor said. "This committee will serve to create focus groups, representative of Noia membership, on Noia's program and service offerings. There's a lot of value to be had. Noia has a big role to play and it's becoming more and more relevant." ■



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# Nalcor Oil & Gas division to become stand-alone entity

The Government of Newfoundland and Labrador confirmed March 27 that the Oil & Gas division of Nalcor Energy would be separated into its own crown corporation. This was undertaken to help realize the province's potential in offshore oil & gas development and to support The Way Forward on Oil and Gas.

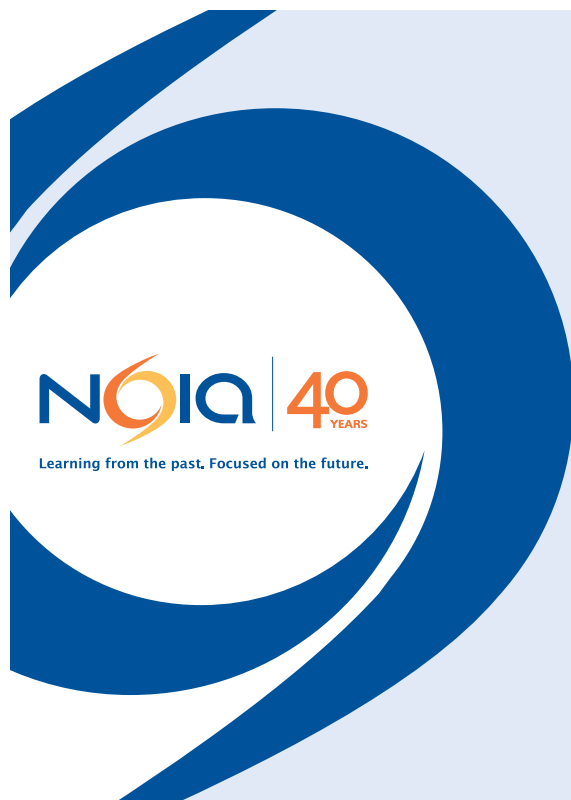
Committed to unlocking the potential of the province's oil & gas reserves, Nalcor Energy Oil & Gas has been contributing to exploration of the province's offshore basins by investing in new geoscience data and analysis to evaluate undiscovered oil & gas potential. The new stand-alone corporation will report directly to the provincial Department of Natural Resources to accelerate growth and opportunity in the petroleum industry, returning significant value to the people and economy of Newfoundland and Labrador.

With a multi-faceted mandate and a business base of electrical power generation and transmission, Nalcor Energy was created in May 2007 as the province's energy corporation, with five lines of business – Newfoundland and Labrador Hydro, Churchill Falls, the Lower Churchill

Project (Muskrat Falls), oil & gas and Bull Arm Fabrication. Nalcor's 2017 annual report shows one additional line of business beyond the original five – Energy Marketing.

During the March 27 news conference, government said the separation will allow a solid focus on the oil industry and maximize growth of the province's offshore industry. Noia believes that separation of the oil & gas division – which contributed \$111 million to Nalcor Energy's \$169 million operating profit in 2017 – will encourage continued interest in the offshore oil & gas industry of Newfoundland and Labrador.

"Allowing the oil & gas division of Nalcor Energy to stand alone is a strategic move which demonstrates the importance of this industry to Newfoundland and Labrador," said Charlene Johnson, Noia CEO. "The oil & gas division of Nalcor Energy has contributed greatly to our knowledge of the offshore through ongoing work to map and analyze prospective basins. I am looking forward to working with this organization on behalf of Noia members to ensure we recognize the true value of our offshore oil & gas potential." ■



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# International competitiveness review of oil, gas industry released

The provincial government released Newfoundland and Labrador Competitiveness in Oil & Gas Investment on April 30. The document is a jurisdictional review, completed by Wood Mackenzie, to assess the international competitiveness of the province's offshore oil & gas industry against a number of competing jurisdictions in attracting investment in oil & gas exploration and development.

The document identified several areas where Newfoundland and Labrador is attractive from an investor perspective, including:

- Recent discoveries and the provision of geological data on prospectivity have resulted in almost \$3 billion of exploration work commitments, despite low oil price environment;
- The potential for future commercial developments is enhanced due to yet-to-find pool size discoveries that are towards the larger end of field sizes considered;
- The fiscal attractiveness of the new generic oil royalty regime;
- Low geopolitical and other above-ground risks relative to many other jurisdictions;
- A skilled and available workforce and existing supply and service capabilities to support offshore exploration, development and operations; and
- The process for industry to access exploration acreage is frequent, transparent and clearly understood.

Wood Mackenzie also identified where Newfoundland and Labrador has challenges.

For example, the high costs in a challenging offshore environment are compounded by the long duration lead-times from discovery to development and production. Other challenges include the number of steps and consultations required to have a development plan approved and the lack of infrastructure required to commercialize discovered natural gas resources.

David Parkinson, Wood Mackenzie's Vice President of Upstream Consulting commented that the study indicated there are a great many areas where Newfoundland and Labrador compares favorably with competing international jurisdictions, and this is borne out by the continued investment and commitments companies are making in the province. However, as in any jurisdiction, there are a number of areas where the province can focus efforts to ensure it remains as competitive as possible.

"Newfoundland and Labrador needs to do everything it can to ensure regulatory requirements from exploration to production do not add unnecessary costs and delays," he said. "Newfoundland and Labrador needs to work alongside companies to not only promote the potential within the province, but also share a joint view on the strategy for the oil & gas industry in the province."

The report is available at [www.nr.gov.nl.ca/nr/publications/energy](http://www.nr.gov.nl.ca/nr/publications/energy). ■



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