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Maritime Engineering Journal

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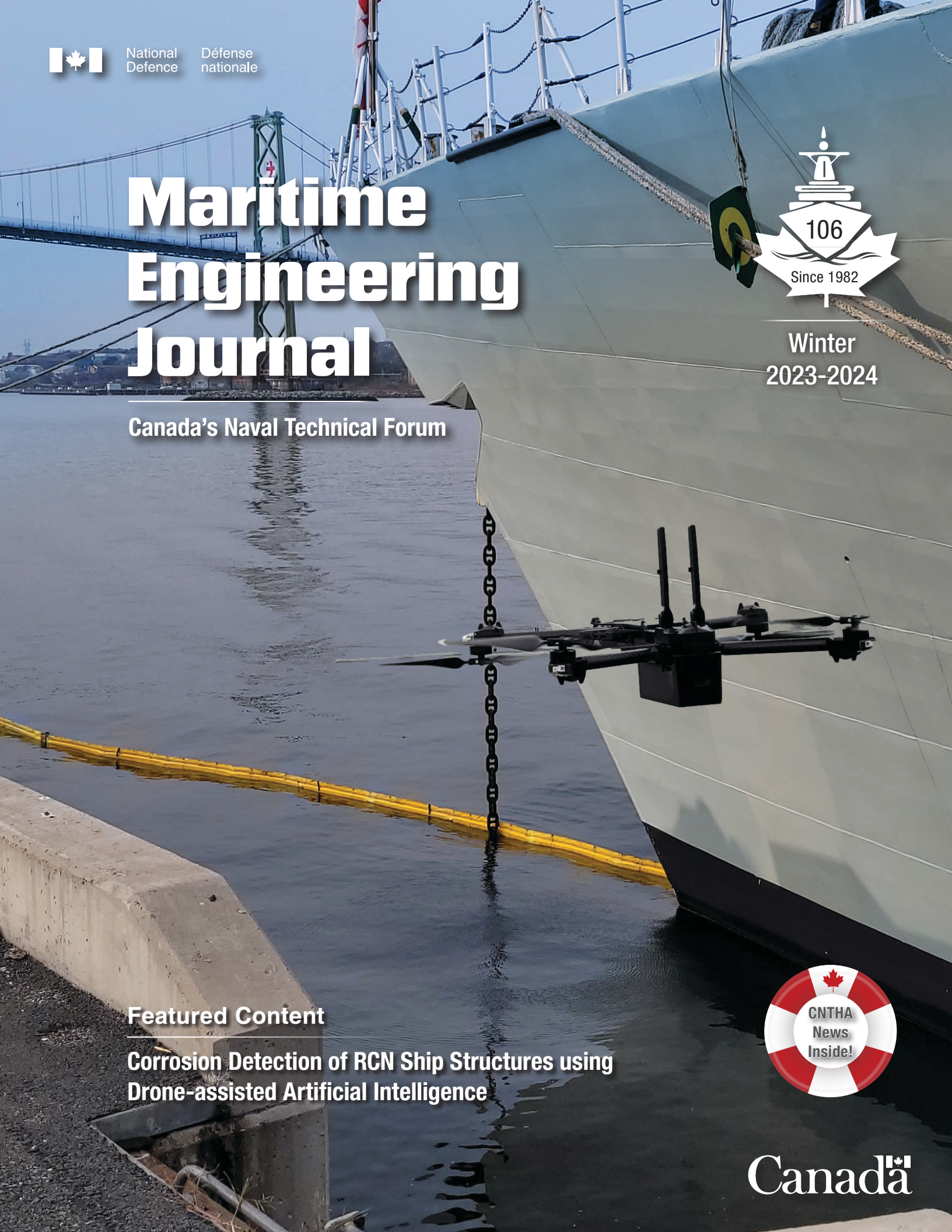

Featured Content

Corrosion Detection of RCN Ship Structures using Drone-assisted Artificial Intelligence

CNTHA News Inside!

Canada

FMF Cape Breton photo by Brodie Gibbon

Fleet Maintenance Facility Cape Breton demonstrated its submarine docking capability during HMCS *Corner Brook*'s current docking work period.

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Director General Maritime Equipment Program Management

Commodore Keith Coffen, CD

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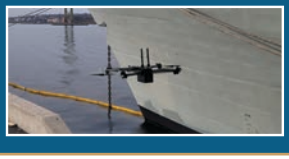

Composite image of NETE testing its new drone-assisted technology for detecting ship corrosion. (See p. 12.)

Photos by Michael Legge, NETE Combat & Control Systems Section

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COMMODORE'S CORNER

The Indomitable Rolfe Monteith — an Inspiration to us all

By Commodore Keith Coffen, CD

As I lead off this last issue of the year, it gives me great pleasure to be joining naval communities on both sides of the Atlantic in congratulating **Captain Rolfe G. Monteith, CVSM, CD, RCN (Ret'd)** on the occasion of his 100th birthday, which took place October 30. Attaining such a significant milestone is remarkable enough on its own, but knowing that the "person behind the years" has distinguished his life through keen devotion to service, and through unflagging volunteer support for organizations looking to improve the lives of others — well, there's a valuable takeaway in that for the rest of us.

Rolfe Monteith became "one of our own" when he left Clinton, Ontario at the age of 17 to join the Royal Canadian Navy as an engineering cadet in 1941. The personal account of his wartime service as a young officer under training at Royal Naval Engineering College (RNEC) Manadon, and then aboard the Royal Navy destroyer HMS *Hardy* (R08) on escort duties from Gibraltar to the Arctic during the Second World War, made for fascinating reading as part of our special 2020 coverage commemorating the 75th anniversary of the Battle of the Atlantic (MEJ 93).

Rolfe remained in uniform for another 25 years after the war, serving in engineering positions primarily affiliated with the technical support of our naval aviation capability. He served aboard the aircraft carrier HMCS *Magnificent*, and as Project Manager for the Canadian Hydrofoil Project. In 1970, he retired to serve the wider Naval Technical community through a second career with British marine industry. Today, he lives in Plymouth, not far from the RNEC Manadon site that closed in 1995.

Among his many initiatives, Rolfe was the founder of the association whose primary aim is the preservation of Canada's naval technical heritage (see *CNTHA News* – page 24). In 2020, he was awarded the Admirals' Medal in recognition of his tireless efforts for the advancement of maritime affairs in Canada; specifically, "...his many activities on behalf of Canadian naval veterans, in particular the formation of the Canadian Naval Air Group (CNAG) and Canadian Naval Technical History Association (CNTHA), and continuing promotion of the Canadian Veterans Association (UK) and the Arctic Convoys to Russia Association."

Photo by Don Wilson

The furious pace of activity and travel that Rolfe has maintained during his retirement could easily bring a much younger person to their knees, and I find his fiery determination to get things done to be downright inspirational. If we could each take just one page from his Book of Life, the seemingly insurmountable challenges we face from time to time might not seem so daunting after all.

The strength of our Naval Technical community most assuredly lies in the character of our people — military members, public servants, and industry colleagues alike — and Rolfe Monteith, *centenarian extraordinaire*, exemplifies like few others how the strength of one person's character can become a keystone upon which a robust community is built. On behalf of all of us, I offer Rolfe our best wishes, and our thanks for his service to Canada and to a free world sustained by an international rules-based order.

In closing, I wish everyone a safe and restful holiday, and all the very best for an exciting and productive new year ahead.

FORUM

Naval Engineering Common Course 2023 Industry Tour

By Lt(N) David Costigane

The West Coast-based Naval Engineering Common (NEC) course for junior Naval Technical Officers (NTOs) resumed its program of industrial visits in August 2023. Cancelled during COVID, the tours form an integral part of common technical officer training for both Marine Systems Engineers and Combat Systems Engineers by providing students with a breadth of exposure to engineering and technical industries inside and outside the RCN. The busy five-day tour began in Vancouver, BC, and included stops in Ottawa, ON and Montréal, QC.

Vancouver Area

The first stop was the **BC Ferries Fleet Maintenance Unit** in Richmond, BC. BC Ferries has more vessels, more types of vessels, and older vessels than the RCN, which makes it an interesting comparator from an engineering and maintenance perspective. They face similar challenges as the RCN does in terms of personnel, maintenance planning, sailing schedules, balancing planned and corrective maintenance, and supporting legacy systems across many classes and types of ships.

The BC Ferries maintenance team spoke to the students about how they plan their work periods, and about a new facilities project. Much like what the RCN's FMF Cape Breton has just completed, BC Ferries is embarking on a major capital project to consolidate many smaller buildings and shops into a larger single facility, without interruption to their normal operations.

Thanks to an industry connection made through the Canadian Leaders at Sea program, the students had an opportunity to visit **Cellula Robotics Burnaby**, a technology company that is involved in the design, testing and development of advanced autonomous underwater vehicles (AUVs). They received a presentation on the autonomous Solus submarine: Marine Systems students learned more about the fuel-cell technology and propulsion system, and the Combat Systems students learned about the sensor suite and associated programming that is required to deploy the submarines on autonomous missions.

Across the harbour in North Vancouver, the class toured **Seaspan Shipyards**, and the yet-to-be-commissioned

Photo courtesy Cellula Robotics, Burnaby, BC https://www.cellula.com/

Naval engineering students received excellent presentations from their hosts during the 2023 Naval Engineering Common course industry tour. Here, the technical experts at Cellula Robotics in Burnaby, BC explain the workings of the Solus-LR autonomous underwater surveillance vehicle.

HMCS *Protecteur*, the first-of-class Joint Support Ship currently under construction. The students were amazed at the staggering size of the bulbous bow, hangar, and flight deck of the 20,000-tonne naval vessel, and appreciated the complexity and extensiveness of the metalwork and fabrication being done by Seaspan. Overall, the students gained a great sense of the Navy's future beyond the current fleet.

Ottawa's National Capital Region (NCR)

The tour then shifted to the nation's capital. For many NTOs, once they reach what is known as their operationally functional point, the National Capital Region will be one of their early career postings.

This portion of the trip started with a visit to the Carling Campus of National Defence Headquarters (NDHQ) in the west end of Ottawa. Here, the NTO career manager and

(Continues next page...)

NETE photo by André Gauvreau

NETE Commanding Officer Cdr Christian Nadeau welcomed the Naval Technical Officers on their industrial facility tour of the Government-owned, Contractor-operated (GoCo) Naval Engineering Test Establishment in Montréal.

occupation advisor from the Directorate of Naval Personnel gave the students valuable tips on how to make the most of their naval careers. They then met with a team from 3 Canadian Space Division, a Royal Canadian Air Force unit that was stood up in 2022 to focus on protecting Canada's interests in space. Interestingly, one senior officer shared how his training and experience as a naval Combat Systems Engineer helped him lead and manage aspects of Canada's military contribution to the space domain.

The students also visited the main NDHQ building downtown, where they met with representatives from the Minister of National Defence's office, and with people from Major Project Delivery (Sea) — a division within the Assistant Deputy Minister (Materiel) organization — to learn how personnel including NTOs are involved in building and delivering the Navy's future fleet.

In addition, the students spent a morning at the Quality Engineering Testing Establishment (QETE), where they saw an impressive selection of laboratory testing, engineering verification, and scientific research activities that directly support the Canadian Armed Forces (CAF) and its technical needs. The junior NTOs were very impressed with the scope and scale of QETE's technical capabilities, and many asked about the possibility of being posted there following their phase VI training.

For a naval engineer, no visit to the NCR is complete without a visit to 455 Boulevard de la Carrière in Gatineau, QC. Here, the students met with ADM (Mat)'s **Cmdre Keith Coffen** – Director General Maritime Equipment Program Management, and Chief Engineer of the RCN, who spoke about his career, and discussed the things that can and will happen as NTOs progress from the most junior engineering trainees to the most senior engineering officers within the RCN. Cmdre Coffen then talked about the challenges he faces with the current fleet, as well as the bright future that is being planned and developed with the new fleet.

The day concluded with a tour of the Canadian War Museum, where students were able to learn more about the history and traditions of the CAF, and reflect on the role of engineering within the Navy, and how the military supports Canadian values both domestically and abroad.

Montréal

The last day of the industry tours included two visits — to 25 Canadian Forces Supply Depot at Canadian Forces Base Montréal, and to the nearby Naval Engineering Test Establishment (NETE) in LaSalle.

The warehouse installation at 25 CFSD is the hub where the majority of the CAF's materiel and equipment is stored, and from where it is distributed. The NTOs gained a greater understanding of how complex and expansive the CAF logistics system is after seeing the monumental size of the warehouses, and the amount of equipment, spare parts, and supplies that are stored and dispatched from there.

Their same-day visit to NETE was the final stop on the 2023 serial of the NEC industry tour. Following a briefing on the roles, purpose and unique business model of this government-owned, contractor-operated (GoCo) facility, the students enjoyed tours of the on-site labs and various test equipment setups that NETE's engineering and technical professionals use to support the Navy's engineering needs. The presenters and guides were very enthusiastic in explaining the current endeavours being undertaken by NETE, along with the opportunities and capabilities these offer to the RCN.

Sincere thanks go out to all of our industry and DND hosts who made the 2023 NEC tour such a resounding success. The students benefited greatly from the information they received, and from speaking to the people they met. There is no doubt they came away even more motivated toward pursuing engineering careers in the Royal Canadian Navy. As the training structure at HMCS *Venture* continues to grow and improve, the hugely beneficial NEC industry field trip will continue to be a key element of the NTO training program.

Lt(N) David Costigane is the Deputy Division Commander for Naval Technical Officers at HMCS Venture, Esquimalt, BC.

FORUM

In Their Own Words

During the 2022 Naval Technical Seminar in Halifax, participants were given a blank index card, and a few minutes to share a memorable technical challenge from their career. These "mini-essays" have provided us with some very interesting perspectives of life in the RCN's technical branch, and we hope you have enjoyed reading them.

HMCS *Protecteur* (AOR-509) fire

Protecteur caught on fire at sea on Thursday night into Friday morning (Feb 27-28, 2014). I spent Friday and Saturday at FMF Cape Breton, trying to understand the extent of damage with only limited comms to the ship, and on Sunday morning was on a flight to Pearl Harbor, Hawaii. I spent the next three to four days working with the marine engineering chief, and chief electrician, sorting and sourcing any possible equipment and services to support *Protecteur* when they came in, and to help make them "safe alongside." The ship was in significantly bad shape, having suffered catastrophic damage to critical propulsion, and power generation & distribution systems. I would spend the next three weeks helping ensure safety on board, and conducting an initial damage assessment. My confirmation that repair timelines would be greater than three months supported the course of action to have *Protecteur* towed to Victoria, and then paid off in 2015.

— Cdr Iain Meredith

HMCS *Algonquin* 2012

RIMPAC sail. DWUPS (work-ups) on the way to Hawaii. Sea Training Pacific staff throw a flashbang over the side. Roundsman goes down in case of flooding (pipes had a habit of bursting after flashbangs were used). He calls up: Engineering emergency, oil is black! At the same time, alarms go off. CERA and I fly down to the MMR, the sight glass was bad.

Ship is stopped, we investigate. Over next 14 days we conducted two trial sails, and nine oil flushes and refills. Cleaned centrifuges countless times, ended up returning to Victoria with a locked shaft. We had a point in the Pacific where we had to make it on the one cruise engine. If we did not make it there on cruise we had to turn around as not enough fuel to reach Esquimalt. Our only cruise engine already had 8800 hours…

— Cdr D. Roberge

Photo by Brian McCullough

HMCS *Algonquin* alongside the much larger HMCS *Protecteur* at Esquimalt in October 2014.

Food for thought

I would have to say the most satisfying technical challenge in my career was in the fourth year of my ROTP studies. Along with three other engineering students, I designed a device capable of analyzing an image of food on a plate to identify the type of food and its location on the plate, and then communicating this information back to the user. We were required to put together our different backgrounds and interests to create this device in a limited amount of time, and in the end successfully created a device capable of assisting the visually impaired gain back some self-autonomy when eating meals.

— A/Slt Matthew Forgie

Learning from the experts

Haven't been here long. RMC + one year NFS(A). Technical stuff here extends to troubleshooting hydraulics, and control system labs. It's our first day back from COVID, and I have no idea what the course is going to be like. We go down to the lab and start using oscilloscopes, plug boards and try to get smooth gain. We fiddle with wires for an hour, peek over at the CFR (commissioned from the ranks) guys who are already done, snap a pic of their configuration, set it up, and magically it works!

— Iain Myatt

(Continues next page...)

Capstone Project

My most satisfying technical challenge yet was configuring two stepper motors to operate smoothly along an x and y axis by using programming interrupts borrowed from my university Capstone model project for an autonomous fire suppression system. The satisfying part was being able to apply theory I had learned to a "real world problem," as opposed to randomly attempting to write code to set it to work. Although not a significant task, it did motivate me in my passion for electrical engineering.

— SLt Mohamed Kurani

Technical tools management plan

Working for PMO Canadian Surface Combatant as a new A/SLt, I created a database to support the Technical Tools Management Plan portion of the contract. Demonstrating that such a database was possible supported the project in negotiations with the contractor.

Another technical challenge that I enjoyed was at university as part of my engineering degree. We had to create an anemometer, and our team created one that used a completely different way of measuring wind direction and speed from all the other teams, had greater accuracy, and no need to calibrate the unit. Having been told it would not work, it was very satisfying to see it not only work, but win.

— Lt(N) Rod Naugler

Multiple refits

Managing multiple ship refits simultaneously, successfully completing a 3.5-month docking work period (DWP) on HMCS *Vancouver*, and an 11-month extended docking work period (EDWP) refit on HMCS *Algonquin*. Hundreds of hours and equally as many technical challenges threatened to delay undocking and duration of both refits. Through teamwork with industry, and collaboration (not without some spirited discussions), both ships completed their respective refits.

— Kris Hildebrandt

HMCS *Preserver* collision

As the liquid cargo officer (LCO) aboard *Preserver*: Following the ship's 2011 collision with the Irving Shipbuilding Inc. (ISI) dock inside Halifax Harbour, the ship went alongside to repair hull-bow damage, but timeframes were tight as the ship was required back to sea. Repairs were not contracted out, as FMF Cape Scott was keen to take on the challenge. The FMF work was amazing, but progress was impeded each day by having to complete the paperwork for fire sentries. I came up with a plan to have the firefighters come into work before 0700, so that all documents were ready for FMF when they arrived. Work progressed well, and the FMF plater presented me with a piece of the ripped-away hull. Great work by FMF!

— LCdr Cindy Hawkins

Corrosion sandbox

I attended the IDeAS Corrosion Sandbox challenge at the Centre for Ocean Ventures and Entrepreneurship (COVE) facility in Dartmouth, an activity sponsored by Major Surface Combatant and Director Naval Platform Systems to find innovative ways to detect corrosion on naval vessels. The sandbox challenge was coordinated by QETE and DRDC, with MSC personnel, and it was amazing to see industry's ideas adapted to our unique environment. Technologies from UAVs to IR systems were all possibilities, and it will be fascinating to see which will be further developed to improve non-destructive detection of corrosion.

— Capt(N) Andrew Forbes, DMEPM MSC

Most satisfying technical challenge of my career

In March 2020 we saw the world come to a standstill due to COVID. During this time, I was with the CLO, under BIS, trying to get key personnel connected via VTC methods. At the time, this was Op Laser. By April 2020, we were continuing this objective but I was contacted at the same time for a possible AHOD deployment on HMCS *Toronto*. I was interviewed at the end of April, and by May I found out I was selected for the position. I managed to throw some refresher training together and was on board June 14, 2020. All briefs were done via VTC, isolation rotations were in effect for trials staff for kit, and Sea Training for training. I completed the full deployment and was back alongside on Dec 22, 2020. I was qualified in the new year and posted to NFS(A) in Aug 2021.

— Lt(N) Ryan Penney

FEATURE ARTICLE

The Importance of Business Architecture in Achieving Digital Transformation

By LCdr Samuel Poulin

Most members within the Department of National Defence (DND) will, at one time or another, find themselves duplicating data across disjointed information systems, and having to keep different sets of credentials for various applications on the same network that don't talk to one another. Not surprisingly, it leaves many people wondering why this is even necessary in the 21st century when the technological possibilities seem almost endless.

Most people assume that our digital transformation strategy documents — notably the Digital Navy Strategy [1], and the Canadian Armed Forces (CAF) Digital Campaign Plan [2] — will solve our issues, and result in "science fiction-like" integrated technologies for DND. The reality, however, is that it is quite difficult to integrate digital solutions that are designed to automate and seek efficiency in processes if the processes themselves are not defined anywhere, are not owned by anyone, and continue to be a hodgepodge of bits and pieces managed independently.

The path to digital transformation (Figure 1) requires a well-defined and well-integrated **business architecture** as one of the foundational steps in achieving digitalization. Defining, managing, and sustaining a business architecture is an iterative process that can be challenging, but it does not have to be overly complex.

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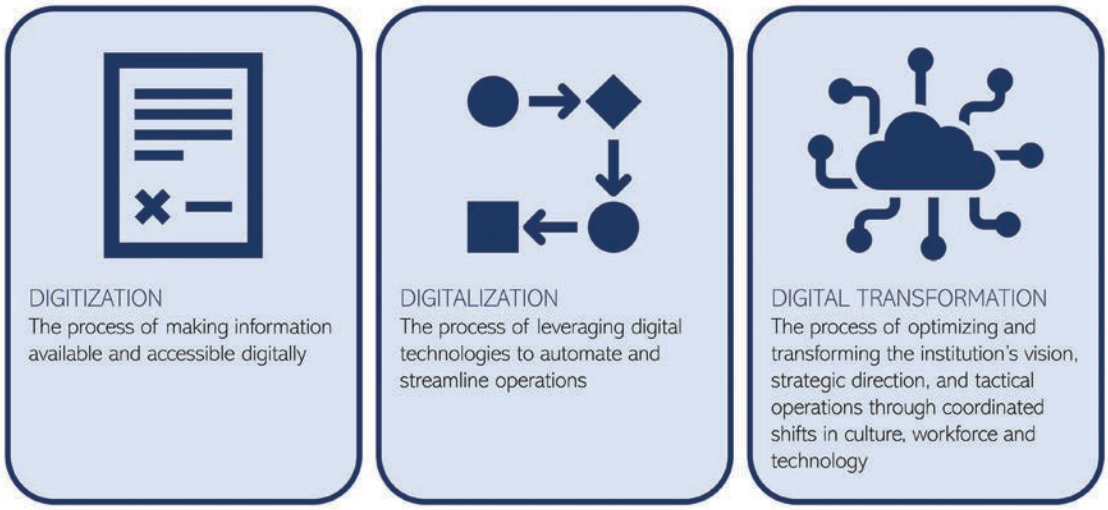
The Path to Digital Transformation

There are three stages widely adopted by industry on the path to digital transformation. This starts with digitization, focusing on making information available in a digital format, digitalization which enables the improvement of workflows and processes through digital applications, and, finally, digital transformation integrating all digitized data and applications.



Digitalization is, by its nature, a bolder ambition than digitization. It is meant to "*improve business performance (not just business processes) and build a digital culture whereby digital information is at the core.*" It is the application of knowledge of information rather than "just data." [3]

Figure 1. Digitization, Digitalization, and Digital Transformation.

Business Architecture (the What)

Business architecture is a foundational element that, when put together with the information, application, technology and security architectures, forms the greater enterprise architecture. The business component serves to identify who does what and how to achieve the organization's objectives and outcomes. It is the core of our business execution, of our operations.

Defining a business architecture does not necessarily mean producing a library of policies, directives, and standard operating procedures. It can be done, for the most part, through architecture "views" as defined in the DND Architecture Framework published by the Director of Enterprise Architecture within the Vice Chief of Defence Staff (VCDS) group. More concretely, the following three architectural views should be considered as basic foundational blocks:

Strategic View 1 – Business Strategy and Motivation (Figure 2): Also referred to as the "logic model," this view identifies and links inputs with key business functions, outputs, and desired outcomes (the "why"). Ultimately, the higher-level outcomes of a program should be linked to one of the Program Segments of the Departmental Result Framework, established by the Director Departmental Delivery, Results and Reporting within the VCDS group.

Operational View 5a – Functional Model (Figure 3): The functional model describes the functions and their relationships that are required to achieve the objective (or business outcome). This describes the "what must be done."

Operational View 5b – Operational Process Model (Figure 4): This is a key component describing the "how" in achieving the functions described in the Functional Model. Note that the "how" does not have to be at the procedural, "button-ology" level. For the purpose of business architecture, this view should focus on the process itself (who does what and when) rather than the tactical detailed procedure to accomplish it, as this last part is highly dependent on the digital solution enabling it.

Each business process (represented in Figure 4) should be linked to one of the business functions in Figure 3. In turn, the business functions should all have key inputs and outputs leading to one of the strategic outcomes, as represented in Figure 2.

Benefits of Business Architecture (the Why)

When done properly, a well-defined business architecture can hugely contribute to an organization's ability to achieve its objectives and desired outcomes. Notably, it enables:

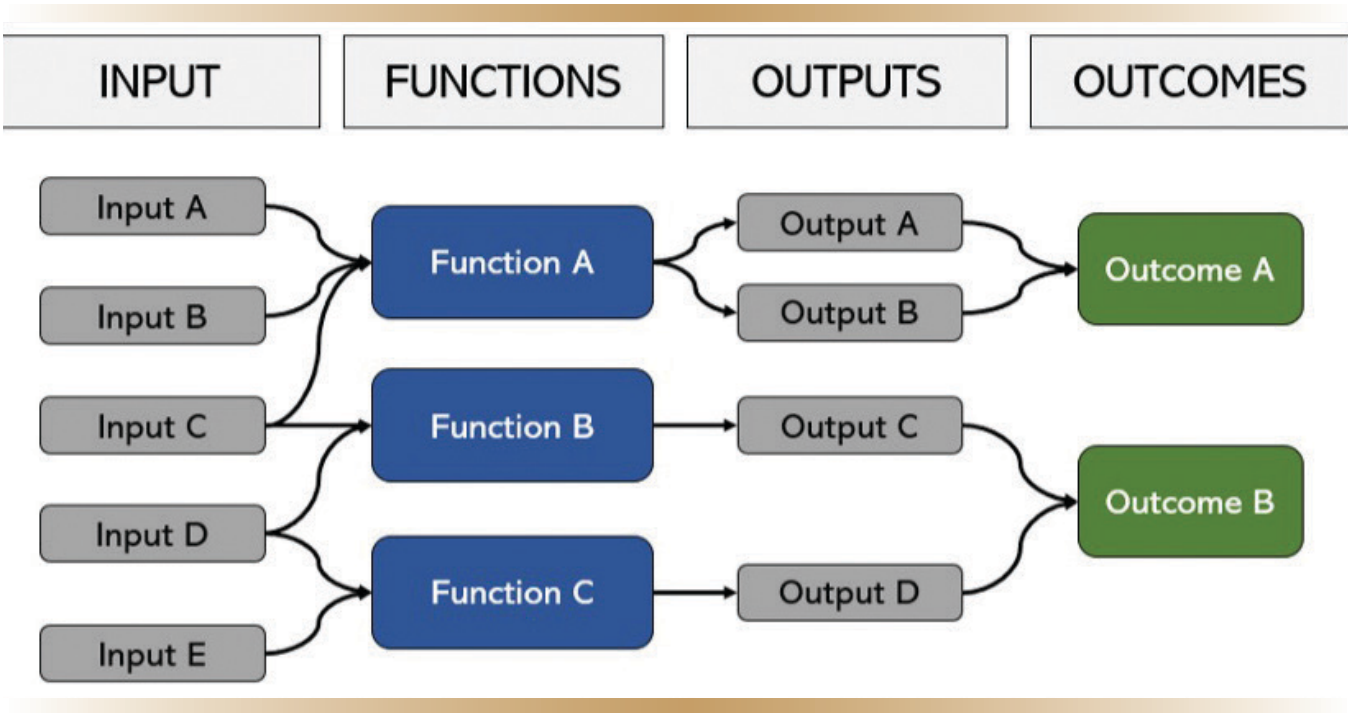


Figure 2. Generic Example of Strategic View 1.

- A clear and common understanding of the business objectives and outcomes by all stakeholders, thus improving everyone's understanding of their role, and consequently their motivation to work toward a common goal;
- A clear assignment of ownership (accountability and responsibility) for the different functions and processes, thus improving the development and sustainment of quality, standardized and efficient processes to execute the business;
- Clearly defined integration points between different functions and processes managed by different organizations, thus improving interoperability;
- The capture and communication of corporate knowledge of the business functions and processes, especially in an organization with high turnover rate due to constant postings of military personnel, and lateral moves by public servants. This improves the onboarding of newcomers and helps them contribute faster to the organization.

According to the principles of Enterprise Architecture, the information system is always an infrastructure of the business system. Therefore, its features should be primarily derived from the essential features of the business system [4]. In other words, the functionalities and objectives of a digital solution must be aligned with those of the business or, from a different angle, silo processes will lead to silo digital solutions.

It is foolish for any organization, including DND, to ask for new, attractive and innovative technologies without understanding how they would contribute to the achievement of business outcomes. One must understand what the business is to understand what information is required and how it is used, and it is this that drives the technology to make it happen.

This concept has been suggested by various articles and frameworks. The Harvard Business Review identified four pillars of successful digital transformation, one of which is related to digitizing operations. This pillar aims to optimize existing business, for which one needs to have deep knowledge of business processes [5]. Enoch Andrade, a digital transformation advisor for Microsoft, identified six core components of a successful digital transformation, two of which are interrelated to business architecture: Business Design and Management, and Process Excellence [6]. Deloitte states that "business architecture should be set as a founding pillar for the journey of digital transformation. And not only that – it also needs to be immersed into all activities focused on developing a digital business model" [7].

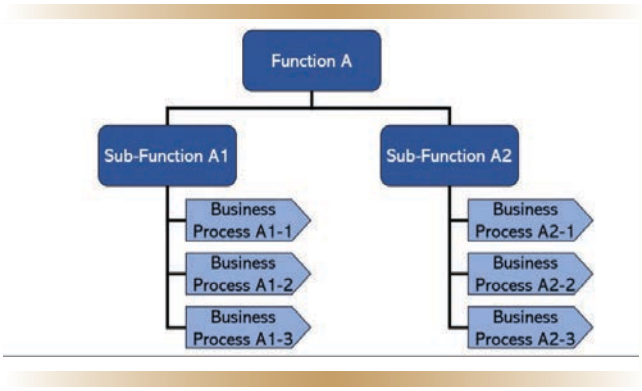


Figure 3. Generic Example of Operational View 5a.

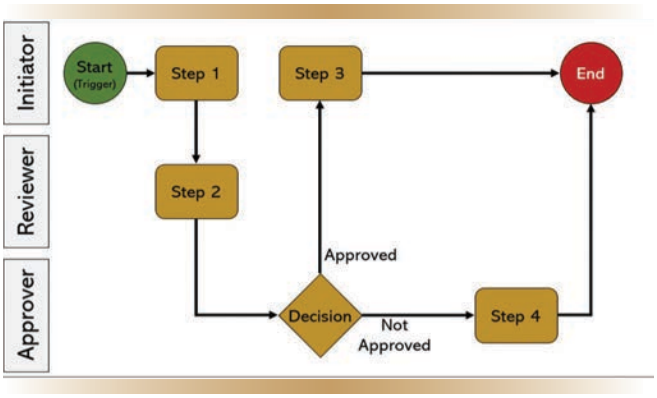


Figure 4. Generic Example of Operational View 5b.

Developing a Business Architecture (the How)

Developing a useful, well-integrated, and sustainable business architecture can certainly be challenging for any organization, and the following recommendations based on best practices are meant to serve as a guide:

Formally assign ownership. Each business function and process must have ownership (accountability and responsibility) assigned to positions holding the appropriate functional authority. This assignment must be done formally via policy or directives (e.g., Naval Materiel Policy, Naval Orders, unit directives, and standing orders) and must include clear expectations of the owner's role as it pertains to business architecture.

Avoid organizational silos when assigning ownership. The business architecture must be defined from a set of holistic, integrated functions spread across various organizations to achieve common outcomes. A given function

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might be composed of various business processes involving multiple organizations working together to achieve a result. Business functions and processes should not be defined solely based on a single organization's structure or mandate. We must see beyond these invisible vertical walls and seek horizontal integrations. For example, whereas some aspects of key business processes may naturally differ by ship class (such as the Engineering Change process), a common "naval" business process should exist, and be managed centrally to ensure as much commonality as possible.

Mandate the use of a common tool to capture business architecture. A Microsoft Visio file full of boxes with cryptic acronyms, stored in the abyss of a Records, Document and Information Management System (RDIMS) library, or in an obscure SharePoint subsite library with controlled access is not useful to the larger community. The architecture must be captured in a proper enterprise architecture management (EAM) tool, accessible by all persons within the organization.

QualiWare is currently the mandated EAM application within DND. It provides a user-friendly interface enabling the creation, integration, publishing, and distribution of enterprise architecture views. It can integrate the various architectural components from the highest departmental level down to the lowest procedure, allowing for traceability throughout. Furthermore, in the fall of 2022, dynamically published architecture views were made accessible by everyone via the Defence Wide Area Network web browser without requiring a QualiWare license or the installation of a dedicated software.

Challenge the status quo. A business process should not be performed in a certain manner simply because it's always been done that way. It is important to keep in mind that most business processes were developed over many years in an analogue age, when physical paper-based files were passed between employees. In the modern age, digital solutions give us the ability to execute steps instantly and simultaneously, allowing us to automate and expedite entire processes. Digitalization also necessitates a move toward the input and management of data over the digitization (and replication) of paper forms in a digital format.

Maintain agility to avoid customization. Software customization (which is distinct from software configuration) can be very expensive, both from a procurement and a sustainment perspective. Although we may attempt to procure digital solutions that meet our business needs, we must also be flexible, and adapt our business to the available solutions. Observing industry best practices will ensure that the organization does not spend time and resources reinventing the wheel. Customization of commercial software must be avoided unless it is absolutely necessary. A key factor to our success in digitalization is being agile in our ability to, where possible, change our business processes to adopt commercial-off-the-shelf (COTS) software, including its capabilities and limitations. This will help ensure solutions that are the best value for Canada can be procured, while keeping the procurement and sustainment costs to a minimum.

Delegate authorities wherever possible. Agility starts with an adequate level of delegation of responsibility for each aspect of the business architecture (more concretely, for each type of business architecture view). For example, while the modification of a Strategic View might be controlled at the director level, an Operational View 5b (Operational Process Model) could be delegated to the section head, or even subsection head responsible for that specific business process depending on its scope. Not everything has to go through some sort of governance board.

Start small and continuously improve. Starting with the definition and integration of the business architecture via the three main architecture views described earlier in this article makes an excellent starting point. This allows an organization to quickly define the basis of the business architecture, while concurrently establishing a steady state when it comes to everyone understanding their role in its management and sustainment. This is not an endeavour that can be achieved by temporarily assigning a high number of resources to "get it done and over with." Managing business architecture, just like managing financial and human resources, is an ongoing activity as the nature of the business evolves over time.

Lead by example. Developing these business architecture views, and keeping them up to date, might be seen like a waste of time and effort, or as competing with other priorities while adding no immediate value to one's ongoing work. However, one should think of the greater picture, including the efficiency and usefulness of a digital workflow for the organization, and for new personnel joining the team.

Consider, for example, the process to publish a new technical manual with an assigned National Defence Index of Documentation (NDID) number. While this might be

trivial for an experienced life-cycle materiel manager (LCMM), this would not be the case for a new LCMM who is unfamiliar with the overarching organization, as this process involves at least three separate directorates. Leaving instructions for the new person to *"talk to person X,"* or *"consult the how-to guide stored on SharePoint I made a few years ago,"* should not be the default answers, nor should it be considered acceptable in an organization with as many information and knowledge management tools at its disposal as DND has. What if person X retires or gets posted? What if one piece of this process that is managed by another organization has changed? The what-ifs are endless, and are not merely theoretical thought experiments; they are our day-to-day reality in an organization as large and complex as DND.

Conclusion

In summary, defining, managing, and sustaining a business architecture is an iterative process that does not have to be overly complex. If we are serious about moving toward eventual digital transformation, there needs to be a clearly defined and well-integrated business architecture with assigned ownership of business functions and processes. Without this, our efforts will continue to lead to silo solutions within silo organizations that will hamper our achieving the degree of digitalization we require.

LCdr Samuel Poulin is the Digital Program Coordinator in the DGMEPM Directorate of Maritime Management and Support.

Acknowledgment

Special thanks to LCdr Ryan Woodford for assistance in reviewing this article.

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FEATURE ARTICLE

Artificial Intelligence for Corrosion Detection of RCN Ship Structures

By David Bernier, Cory Venturini, and Augusto Resera

Since 2016, the Naval Engineering Test Establishment (NETE) in Montréal has been developing its Uncrewed Vehicles (UxV) Centre of Excellence for the Royal Canadian Navy (RCN). This initiative has been providing the NETE team with expertise in operating, maintaining, and upgrading its expanding fleet of UxVs across all underwater, surface and air domains.

Most recently, NETE has collaborated with Qii.AI, a service provider of artificial intelligence and computer-vision software, to help build a safe, remote, rapid, and effective inspection system for RCN ships using drones to gather data (Figure 1), and artificial intelligence to automatically inspect and analyze the results. To enable Qii.AI's capabilities, NETE has added the Skydio X2D Remotely Piloted Aerial System (RPAS) to its fleet of drones.

After its successful demonstration during the Innovation for Defence Excellence and Security (IDEaS) Corrosion Technology Sandbox in May 2022, the Qii.AI solution was acquired in support of the Director Maritime Equipment Program Management – Major Surface Combatant (DMEPM MSC 8) corrosion initiative. The Skydio X2D drone was acquired as it is an ideal tool when paired with Qii's technology. Due to its unprecedented UxV autonomy, and other features like automated object avoidance and 3D data mapping capabilities, this drone allows operators to survey complex structures at close range for excellent resolution, without compromising the safety of the aircraft, the vessel being inspected, or personnel.

The program will see the development of advanced computer-vision-powered, remote external inspection of RCN ship structures, enabling drones and artificial intelligence to rapidly identify and quantify problems such as corrosion, pitting, buckling, and other causes for concern in steel and other materials. The program will reduce the time required for inspections and remediation, allowing for better deployment-to-out-of-service ratios, while also improving safety to personnel conducting the work.

Photos by Michael Legge, NETE Combat & Control Systems Section.

Figure 1. The Skydio X2D Remotely Piloted Aerial System (at centre of image) actively taking high-resolution 2D ship structure photos of HMCS *Winnipeg* last October.

Technological Innovation

Qii.AI's groundbreaking computer-vision technology is presented via a 3D digital twin model of the ship (Figure 2) that allows virtual inspectors to easily navigate high-fidelity, 2D imagery that might otherwise be confusing. A combination of semi-automatic and automatic detection tools and algorithms then feed into Qii's system to create 3D data mapping for the RCN's unique needs within its ship inspection program.

The AI component of this work is still in its initial stages, but is quickly evolving. As more inspections are completed, the learning algorithm becomes more intelligent at analyzing corrosion and other problems (Figure 3). With the Skydio X2D's inherent photogrammetric capability able to be rapidly deployed to provide hull-based corrosion detection at scale, and with the data able to be seamlessly injected into the Qii system's fully remote virtual inspection software, significant improvements and savings in ship inspections and remediation costs could be realized.

Figure 2. This 3D ship model of HMCS *Fredericton* was produced using more than 2,000 high-resolution 2D photos acquired by the Skydio X2D drone.

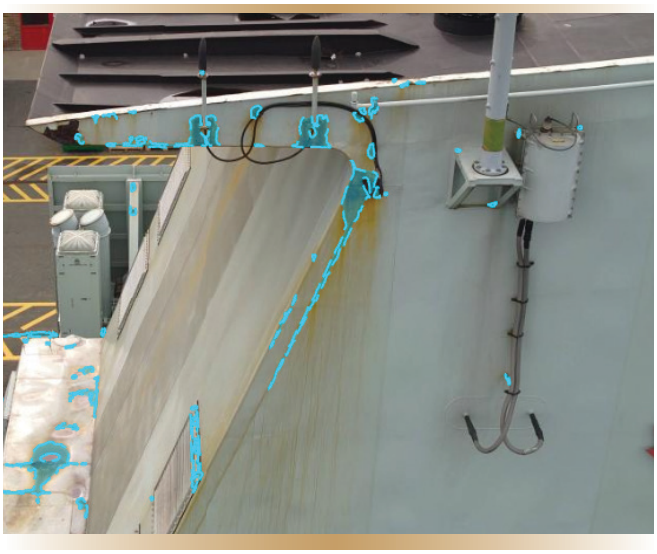

Figure 3. Top of a ship's funnel, with corrosion highlighted by blue mapping.

Initial Developments

This past summer, the NETE team successfully conducted surveys on two RCN frigates while the ships were alongside at HMC Dockyard Halifax — HMCS *Ville de Québec* (FFH-332) in July, and HMCS *Fredericton* (FFH-337) in September. Because the dockyard is located within a controlled airspace, and due to the complex environment, the operators require an array of certifications and permissions. Transport Canada requires that each pilot obtain an Advanced Drone Pilot Certification, and a Special Flight Operation Certificate. The operators also require ground approval from HMC Dockyard Base Operations, air approval from 12 Wing Operations, environmental approval from Formation Environment, and equipment approval from the Frequency Spectrum Management Unit. With these issues and initial data collection challenges now better understood, the program is moving forward quickly.

Challenges/Lessons Learned

The NETE team has faced a number of new UxV challenges due to the unprecedented amount of autonomy and smaller size of the 1,300-g Skydio RPAS, which measures 66 x 56 x 20 cm in flight. Rather than fielding the usual two-person team of a pilot and spotter/ground manager, the team now requires three spotters who are tasked with maintaining line of sight visual contact with the drone, and communicating the RPAS' position to the pilot.

Safety has been a major topic of conversation with the introduction of aerial corrosion surveys. The Skydio is renowned for its highly advanced object avoidance (Figure 4), and while the optimal standoff distance for the drone is still being determined, it does have the capability to fly within one metre of a hull or other structure, providing excellent input data for Qii's algorithms. Additional safety analysis and management are required, and the level of communication between all stakeholders has been vital to the success of these surveys. During these missions, DND, the RCN, NETE, and third-party personnel must all be aware of the RPAS's location and position relative to the ship and any surrounding structures, and it is up to the pilot to take overriding corrective action as necessary regarding the drone's flight path to ensure safety based on input from the spotters.

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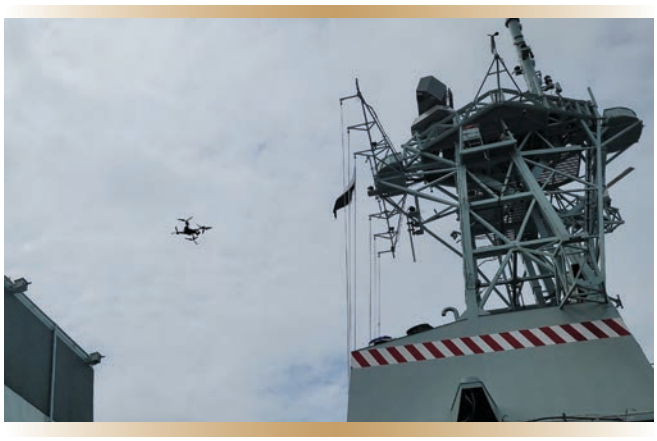


Figure 4. The hazards around a ship's structure are many, making the Skydio X2D drone's autonomous object avoidance capability a key feature of the system.

Way Forward

With support from Qii.AI, NETE is quickly moving ahead to build the team's knowledge and capabilities. The program has clear potential for expansion, which will follow rapidly as the expertise of personnel, and the accuracy and ability of the Qii.AI algorithm improve with more and more data.

Having now completed two ship surveys in Halifax, and most recently a survey of HMCS *Winnipeg* (FFH-338) in Victoria at the end of October (Figure 5), the team is fine-tuning technical details of the program, such as determining the optimal standoff distance for data collection during RPAS-based corrosion detection surveys. The combination of advanced technology, and highly trained and motivated personnel allows NETE to deliver leading-edge capabilities in rapid corrosion assessment to the RCN.

David Bernier is the Senior Technical Advisor for Marine Systems at the Naval Engineering Test Establishment (NETE) in Montréal, Corey Venturini is the Team Leader for Engineering Applications in NETE's Combat & Control Systems section, and Augusto Resera is the NETE Manager for Marine Systems.

Acknowledgments

Technical input by Qii.AI is gratefully acknowledged.

Figure 5. The Naval Engineering Test Establishment's advances using drone technology and artificial intelligence for corrosion detection could show significant improvements and savings in ship inspections and remediation costs.

Titles of Interest

"The Gates" at Our Gates: F.R. (Hamish) Berchem and the Role of the Eastern Based Porte-class Gate Vessels after Canadian Armed Forces Unification

An article by George L. Zimmerman and Duff W. Crerar

The Northern Mariner / Le marin du nord 32, no. 3 (Autumn 2022), pp. 315-340
Canadian Nautical Research Society
ISSN No. 1183-112X (paper), 2561-5467 (electronic)
https://www.cnrs-scrn.org/northern_mariner/vol32/tnm_32_3_315-340.pdf

Impact of the Seagoing Training and Operations of the Porte-class Gate Vessels Post-Unification

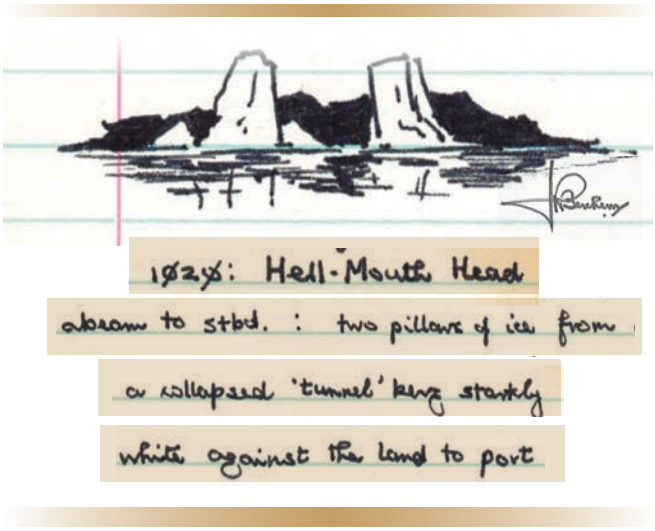
Book reviews by Brian McCullough

As the Naval Reserve centennial year draws to a close, it is fitting that we point you to a historical article from *The Northern Mariner / Le marin du nord* that highlights a significant turning point in the training and employment of naval reservists at sea. Although the events described in the piece occurred half a century ago, they would prove critical in shaping the Naval Reserve into the operationally focused organization it is today.

The catalyst behind the story was **F.R. (Hamish) Berchem** (1931-2018), a seasoned Royal Navy submarine commander who was something of a Renaissance man, being "an artist, trained historian, professional teacher, and a meticulous chronicler of his work at sea." The article shows several examples of his detailed *plein air* nautical sketches.

In the 1970s, Berchem showed what could be done with a small fleet of "antiquated and poorly maintained" training platforms — the ungainly, 1950s-vintage Porte-class gate vessels — when crewed by properly trained officers and sailors who were motivated by being given meaningful naval taskings. His determination would inspire a new generation of more professionally focused reservists, and in so doing, "Berchem played an important role in the preservation of the basic seagoing capabilities of the Naval Reserve."

It wasn't always smooth sailing, of course. Mariners of all stripes will appreciate some of the obstacles that Berchem and the other gate vessel captains and crews had to deal with, from forces both ashore and at sea. While personnel discipline issues were thankfully few, the article describes some of the unique circumstances Berchem had to navigate with the naval powers-that-be to get his ships tasked and ready for sea,



Friday, 9 August, 1974. (Leaving Twillingate, NL) "1020: Hell-mouth Head abeam to stbd: two pillars of ice from a collapsed 'tunnel' berg starkly white against the land to port."

actually get them away from the sea wall, and then keep them repaired, often on the fly.

Breakdowns of these 426-ton diesel-powered vessels were frequent. Significant equipment failures with generators, radars, lube oil pumps, freshwater systems — you name it — kept the ships' engineers busy, and the upper deck people constantly looking for workarounds. The experience would develop a cadre of motivated, self-starting reservists who would go on to serve long careers with the Reserve and Regular forces. By the time these small ships were retired in 1995, the Naval Reserve was in a position to form the primary crews for the Navy's 12 *Kingston*-class maritime coastal defence vessels.

The authors, historian Duff Crear and retired naval Captain George Zimmerman, have done a wonderful job of capturing the details and essence of this amazing period. Having access

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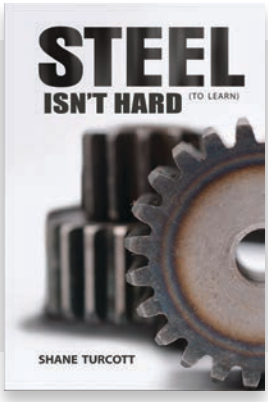
to Berchem's extensive fonds that were curated by Zimmerman (a former naval reservist who sailed with Berchem aboard the gate vessels), they have unpacked an important part of Naval Reserve history by chronicling the seagoing training and operations of the gate vessels on the East Coast and Great Lakes from 1971 to 1975, and all of the great good that came of it.

Acknowledgment

The Northern Mariner / Le marin du nord is a fully refereed, quarterly journal published by the the Canadian Nautical Research Society and the North American Society for Oceanic History. It is devoted to the study of maritime affairs and the inland waterways of the nations that touch the seas of the northern hemisphere. Their kind assistance in sharing images from the original article is gratefully acknowledged.

HMCS *Porte-St. Louis* (YMG-183) and
HMCS *Porte-St. Jean* (YMG-180) in 1971

Titles of Interest



Steel Isn't Hard (To Learn)

By Shane Turcott, P.Eng., M.A.Sc.
Published (2023) by Steel Image Inc., 2023
www.steelimage.com Dundas, ON
ISBN: 978-1-7771576-1-6
Soft cover, 171 pages, colour photos, illustrations, and tables.

"Steel is beautiful."

So says metallurgy guru **Shane Turcott**, company owner and principal metallurgist at Steel Image Inc. in Dundas, ON. With his latest book, Steel Isn't Hard (To Learn), Turcott has moved the educational yardsticks downfield in supporting his company's target services in failure analysis, field metallography, and related training.

Steel is beautiful, he says, "not because of its appearance, but rather for what it has allowed mankind to build, from the world's tallest buildings, massive bridges, and monstrous ships, to the everyday things such as cars, appliances, kitchen knives and nails. The more humanity has learned about steel, the more incredible and common our creations have become."

As he tells us in this exceptionally well-illustrated and practical introduction to steel, the ability to design, manufacture and repair things requires an understanding of the materials being used. He concludes that since steel is the most commonly

used metal in the world, those striving to become capable engineers, welders, machinists or maintenance personnel will greatly benefit from building a practical foundation in steel.

"If one masters steel, other metals will become easier to learn," he writes.

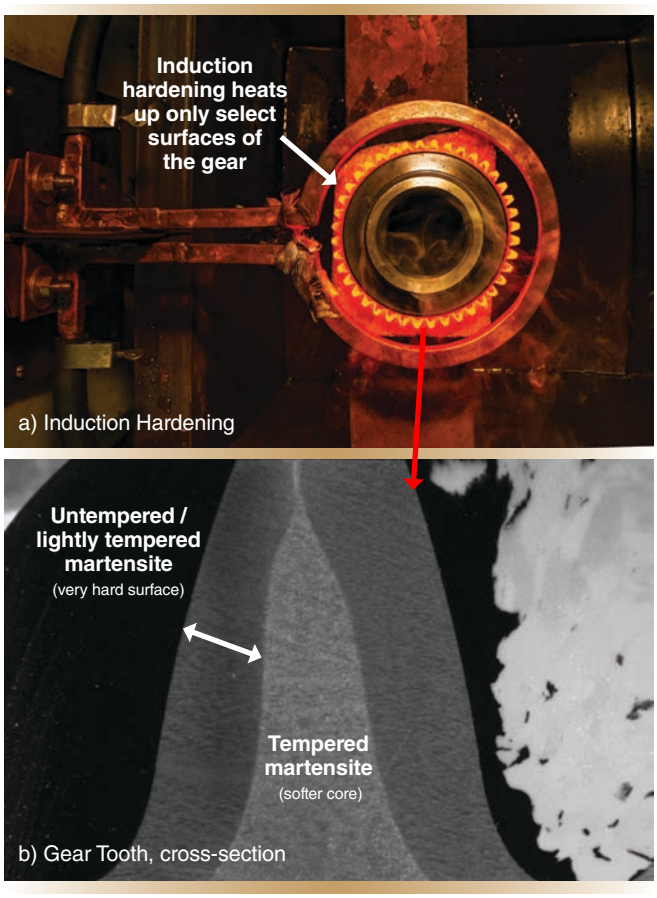
Turcott draws on his experience as a metallurgist to describe the many different types of steel, each grade of which is designed to balance attributes such as strength, cost, durability, corrosion resistance, and the ease with which it can be manufactured into things. As some traits are optimized, others may become diminished. For example, he writes, some additives that increase the steel strength can make it difficult to weld — affecting how a part can be both fabricated and repaired. Knowing the basics of steel will help to ensure that the proper steel is used, that the optimized manufacturing steps are employed, and when needed, the appropriate repairs can be made.

As he did with his previous book, *Decoding Mechanical Failures — The Definitive Guide to Interpreting Fractures* (see MEJ 96), Turcott employs a clear and methodical approach to his writing, amply illustrating his text with tables, diagrams, and high-resolution photography and microscopy images. It is a delight to read.

The present edition covers topics such as alloying, steel properties, processing, welding, water corrosion and stainless steels, and focuses on the most critical, most pragmatic concepts relevant to its use. He demonstrates these concepts to show how they work, and to provide context of their importance. The book even includes a number of appendices that he says offer optional "technical discussion" on the science behind steel behaviour, including one fascinating section on the atomic arrangements of steel and their association with microstructure.

The author's enthusiasm for his subject comes through loud and clear on every page. Although few might consider steel an exciting subject before studying it, he tells us, from the right perspective it can be fascinating, intellectually gratifying and highly useful.

"Steel can be quite strong and hard," Turcott writes. "However, steel is not hard to learn and understand. Understanding steel's fundamental behaviours allows for the intelligent use of one of the most critical engineering materials ever discovered."



Images courtesy Steel Image Inc.

Dundas, ON metallurgist and author Shane Turcott (pictured) uses clear illustrations to introduce readers to various aspects of working with steel. The images at right show how low-alloy steel gear teeth can be induction hardened through rapid heating and quenching, followed by light tempering, to produce a fresh layer of martensite over a softer, well-tempered core of martensite. The combination provides a gear tooth with high surface strength without embrittlement.

NEWS BRIEFS

First dry-docking for HMCS *Corner Brook* at FMF Cape Breton

By Gabrielle Brunette

Last July, His Majesty's Canadian Submarine (HMCS) *Corner Brook* (SSK-878) was dry-docked for the first time at Fleet Maintenance Facility Cape Breton (FMFCB) for a scheduled work period. The last time the Navy's West Coast maintenance facility had docked a submarine was HMCS *Victoria* (SSK-876) in 2016.

Various shops within FMFCB are involved in the docking evolution of vessels, including riggers, shipwrights, crane operators, and plant maintenance. For some people, like **Trevor Patrick** who works in the FMF rigging shop, this was their first time docking a submarine.

"This truly highlights FMF Cape Breton's capabilities," he said. "Many apprenticeships were completed without ever doing a docking or undocking of a submarine, but the skillset has still been passed on successfully."

The docking processes for submarines and ships are similar, with the exception of the dry dock shoring method – the way a vessel is kept upright on the keel blocks. **Anita White**, the FMF docking officer, explained that while the *Halifax*-class frigates are held up using breast and bilge shores, sliding side blocks are used for submarines.

"Once the submarine is moved into the dry dock and placed over the keel blocks, the side blocks will be pulled into place. As water is pumped out of the dry dock, the submarine will land on the keel and side blocks at the same time," she said.

The method used to dock a vessel also differs depending on the type of dock that is used. FMF Cape Scott in Halifax Dockyard uses a Syncrolift system to take vessels out of the water, whereas FMF Cape Breton employs a basin-type dry dock.

The docking process begins long before the submarine enters the dry dock, and involves extensive planning, meetings, and verifications to ensure the dock is ready to receive the vessel. The docking team completes a number of checks, from environmental inspections of the dry dock to ensuring the condition of the submarine meets the docking criteria. Once these are complete, the submarine's commanding officer and marine systems engineering

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HMCS *Corner Brook* was carefully centred over the submerged keel blocks for the *Victoria*-class submarine's first dry-docking at FMF Cape Breton in July 2023.

FMF Cape Breton photos by Brodie Gibbon

officer, along with the FMF docking officer and dock master all sign off on the Docking Certificate.

The dry dock is then flooded, the caisson lock gate is removed, and the submarine is manoeuvred into the dock.

"Once the submarine is aligned over the keel blocks, the sliding side blocks are pulled into place using the cranes," White said. "At this point the dry dock will begin to be pumped out; this includes various stops for the divers to check clearances and alignment of the submarine until it is fully in contact with the blocks."

After a final diving inspection and the complete draining of the dry dock, the docking officer and dock master complete a final inspection to confirm proper contact of the submarine with the blocks. The entire physical docking evolution for HMCS *Corner Brook*, from the moment the stern crossed the entrance of the dock to the final inspection, lasted 10 hours.

"Docking and undocking evolutions involve many stakeholders," White said. "A lot of good communication is required to achieve a successful docking."

Gabrielle Brunette is the Communications Coordinator Student at Fleet Maintenance Facility Cape Scott in Halifax, NS.

Special sliding side blocks were used to shore the submarine laterally to keep the vessel safely upright.

NEWS BRIEFS

FMF Cape Breton supports DCTF Galiano

By Ashley Evans

Damage Control Training Facility (DCTF) Galiano, located in Esquimalt, B.C., and its sister facility DCTF Kootenay in Halifax, N.S., are state-of-the-art training centres for teaching flood control, helicopter and shipboard firefighting, and chemical, biological, radiological and nuclear (CBRN) defence to Royal Canadian Navy (RCN) sailors and other service personnel. When one of these facilities is forced to shut down due to mechanical issues, the effects can be far-reaching.

In early 2022, DCTF Galiano found itself no longer able to repair the air-handling units (AHUs) that are used to safely exhaust the smoke and gases produced during damage control training, and maintain safe air quality throughout the facility. With no replacement parts available for the electronic actuator controls that control the pitch of the fan blades, and only a single spare in stock for a damaged pneumatic diaphragm, the DCTF reached out to Fleet Maintenance Facility Cape Breton (FMFCB) in the Esquimalt naval dockyard for assistance.

"The AHUs are obsolete, and no longer supported," explained **Challis Eacott**, the DCTF maintenance administrator in Esquimalt. "Only four units were produced for the Department of National Defence 25 years ago, and we have had to reverse-engineer the controls on the units due to the obsolescence of the actuating control system."

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DCTF Galiano hosts up to 6,000 students a year, providing training within a 15-burn-room firefighting trainer, a liquid propane helicopter fire trainer, two flood-simulation tanks, and a CBRN training area. The facility supports force generation through many phases of initial cadre training, annual fire and flood recertification training, and other courses, without which ships would be unable to deploy individual personnel, or even certain pieces of equipment. For example, without helicopter crash/rescue training certifications in place, a ship would not be authorized to operate a helicopter from its flight deck.

Due to the wide degree of training delivered at DCTF Galiano, when a shutdown of this facility occurs, it affects a schedule booked two years in advance. This was an unfortunate reality Eacott was facing early in 2022 when the AHUs were found to be operating below standard.

Eacott explained that DCTF came up with a makeshift solution to modernize the electronic controls through use of the building's Direct Digital Control (DDC) system to bypass the control card, and added new solenoid valves to control the air supply to the pneumatic linkage. This fix lasted six months before the next failure, and it was at this point that Fleet Maintenance Facility Cape Breton (FMFCB) was called in for assistance.

In addition to the control issue, a worn bearing surface in fan unit A had created a metal-on-metal condition, which in turn damaged the molded-rubber pneumatic diaphragm, causing it to bind. FMFCB was able to manufacture repairs to the specially coated bearings that were no longer available through industry, and prior to installing the last available replacement diaphragm, completely overhauled the unit to remove any sharp edges to prevent the same issue from happening in the future. In addition, repairs were made to the rollers for the variable-pitch fan blades, and to install a new air supply hose fitting.

According to an FMFCB Group 3 (Mechanical Fitters) spokesperson, test runs indicated there were other issues. A full tear-down and rebuild was conducted on fan unit B to check the diaphragm, pitch rollers, air supply, and fittings. The diaphragm looked good, and the same adjustments were made to the housing. With these mechanical issues corrected, the job was handed off to FMFCB electricians to deal with the electronic control problem.

The electricians noted through testing that the system was still not balancing air distribution equally between the fans, and believed the earlier control card bypass repair to allow for manual control simply could not provide the variable adjustments that the main control computer program required. An industry controls technician called in from Cougar Pacific Controls was able to resolve the programming issue by reacquiring a feedback signal that had been modified as part of the DDC temporary fix. After multiple days on site, FMF Cape Breton had the AHUs operating and controlling correctly, and an engineer was able to recertify the facility.

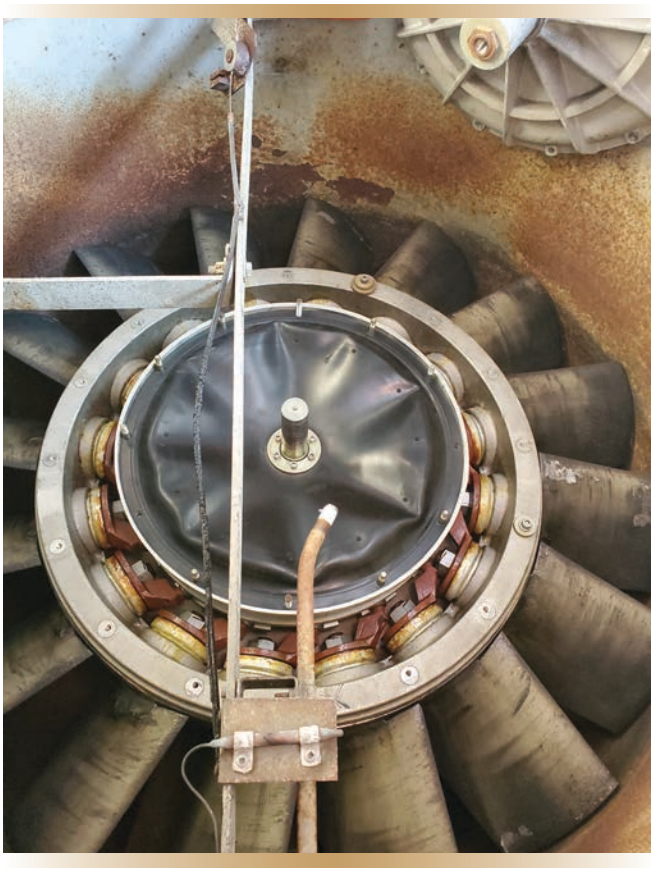

Image courtesy DCTF Galiano and FMF Cape Breton, Esquimalt.

FMF Cape Breton was able to effect repairs on some of the older exhaust fan equipment at Damage Control Training Facility Galiano for which parts were no longer available. In addition to reestablishing the electronic control system, FMF technicians repaired and overhauled the two fan units, one of which required replacement of a damaged pneumatic diaphragm (shown at centre of the photo).

Ashley Evans is a Communications Officer with CFB Esquimalt, BC.

NEWS BRIEFS

Canadian Forces Leadership and Recruit School opens training division at Canadian Forces Base Borden

By Christine Geoffrion

Following the pandemic and the recruitment difficulties encountered, Chief of the Defence Staff **Gen Wayne Eyre** implemented a directive for the regeneration of the Canadian Armed Forces. It is in this context that the Canadian Forces Leadership and Recruit School (CFLRS) has developed a detachment located at CFB Borden that will be responsible for training candidates to Basic Military Qualification. The opening ceremony took place on July 18.

The CFLRS is the unit responsible for the basic training of all candidates enrolled for the Regular Force, whether as a non-commissioned member or an officer. Given the operational and recruitment needs, the chain of command deemed it appropriate to open a detachment in Borden to increase its capacity and maintain the high standard of training. This new division will therefore be able to train nearly 480 additional people annually. As a bonus, it will be possible to train candidates for the Primary Reserve.

CFLRS is responsible for overseeing the quality of training so that all candidates achieve the same level of training. Members of the Saint-Jean unit were assigned to the Borden detachment to start the program on solid foundations.

Photo by Sailor 3rd Class Filip Opacic.

LCol Chung Wong (right) formalizes the commissioning of CFLRS Detachment Borden. He is accompanied by Col Jonathan Michaud, Commander CFB Borden and Military Personnel Generation Training Group (seated at left), and CFLRS Chief Warrant Officer CWO Marc Boucher.

Christine Geoffrion is the CFLRS Public Affairs Coordinator at CFB Borden, Ontario.

Naval Experience Program a "huge win" for S3 Kevin Hassa

(From RCN Public Affairs, Oct. 11, 2023)

The first sailor to successfully join the RCN's new Naval Experience Program (NEP) says the concept is a "huge win" for those who decide to apply.

The NEP, which got under way in April, provides prospective sailors with enough exposure to life in the Navy to decide if it's right for them.

After one year, participants can either choose to continue to serve with the Navy or leave if it isn't a good fit for them. The program also allows the Navy to assess the suitability of new recruits with the Canadian Armed Forces Ethos and Code of Conduct.

Following an eight-week basic military training and four weeks of naval training, they will join the fleet on either the East or West Coast. Over the course of several months, they will learn the ropes of being a sailor by shadowing a variety of jobs and gaining exposure to a number of skills. The program culminates with a going-to-sea portion, so they can get a sense of the adventure found in a naval career.

"With the program you get to see every trade the Navy has to offer. It's great to see what the sailors in the ship are doing and get some hands-on experience."
— S3 Kevin Hassa

NEWS BRIEFS

Naval Reserve Centennial — A glorious end to a wonderful year!

Her Excellency the **Right Honourable Mary Simon**, Governor General and Commander-in-Chief of Canada, rededicated the National Naval Reserve Monument during a ceremony held on October 14th, 2023 at HMCS *Carleton*, Ottawa, to mark the centennial of the Canadian Naval Reserve.

'We must dare, and dare again, and go on daring'

Photo by Peter Reed

Photo by Peter Reed

Photo by HMCS *Carleton*

Photo by HMCS *Carleton*

NTO AWARDS

2021 MacDonald Dettwiler & Associates Award

Photo by Lt(N) Sarah Dawe

Lt(N) Amiraslan Eskandari
Top NTO candidate to achieve
Head of Department qualification

Presented by Cdr Collin Forsberg,
CO HMCS Max Bernays

2022 MacDonald Dettwiler & Associates Award

Photo by Brian McCullough

Lt(N) Xing Dai
Top NTO candidate to achieve
Head of Department qualification

Presented by Curtis Coates
Senior Program Manager, MDA
With Cmdre Keith Coffen, DGMEPM

2022 Weir Canada Award

Photo by Brian McCullough

Lt(N) Andy Lee
Top Marine Systems Engineering Phase VI candidate

Presented by Joël Parent
Executive Director, Weir Canada, Inc.
Naval Engineering Test Establishment (NETE) Montréal
With Cmdre Keith Coffen, DGMEPM

Naval Association of Canada Shield

Photo by Brian McCullough

SLt Jean-Pierre de Villiers
Highest standing, professional achievement and officer-like qualities during Naval Engineering Indoctrination

Presented by Cdr (Ret'd) George Godwin, NAC
With Cmdre Keith Coffen, DGMEPM

CNTHA NEWS (WINTER 2023-2024)

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Happy 100th birthday, Rolfe Monteith!

By Tony Thatcher, Executive Director, CNTHA

Photo courtesy Captain(N) Chris Peschke, CDLS London

Rolfe Monteith out for "Century Birthday" luncheon in London, England, with CAF Naval Adviser Capt(N) Chris Peschke and his spouse Vivienne.

It is Happy Birthday, and congratulations all around, from the Royal Canadian Navy's technical community to one of our dearest members — **Captain Rolfe Monteith, RCN (Ret'd)** — who chalked up his "century" milestone on Oct. 30, 2023.

As an active founding member of both the Canadian Naval Technical History Association, and a subcommittee to investigate the defence industrial base's involvement in post-Second World War Canadian naval projects, Rolfe has brought much to the table over the years. Through his extensive work career, first with the Royal Canadian Navy, and later with industry, he has enjoyed the "best of both worlds" as both a certified Marine Engineer and an Air Engineer. He was the driving force behind, "*Certified Serviceable*," a comprehensive history of naval air engineering. In recent years, he has travelled the world to advance the interests of Canadian-related maritime affairs (see the Commodore's Corner on page 2 of this edition of the *Maritime Engineering Journal*).

Following his war service (see MEJ 93), Rolfe served in Canada, the United States, and the United Kingdom, and influenced such important undertakings as the establishment of the HMS *Sultan* training project for British and international marine systems engineering officers in the UK; the insertion of shock testing into the DDE-205 *St. Laurent*-class build program; and gas-turbine propulsion for the DDH-280 Tribal-class destroyers. As a naval captain, he was appointed Project Manager of Canada's joint project office for the Canadian Hydrofoil Project, which resulted in the construction and trials of HMCS *Bras d'Or* (FHE-400) —at the time, the world's fastest unarmed warship (63 knots top speed). Rolfe once said he felt he had reached a pinnacle when he was Director of Air Engineering one day, and Director of Marine Engineering the next.

With such broad experience, Rolfe was just the right person to help define and assemble the CNTHA, and to focus its efforts. He brought together people from all parts of the naval-industrial spectrum to produce a historical timeline, and generate new material for the "CNTHA Collection" of documents and interview transcripts, sourced or generated, in support of DND's Directorate of History and Heritage. His own primary focus remains with his investigations in support of the CNTHA's Canadian Naval Defence Industrial Base (CANDIB) subcommittee project covering the "marvelous story" of the development of Canada's post-war navy.

Rolfe Monteith continues to mentor and inspire the people who have taken it upon themselves to "preserve Canada's naval technical heritage" through the CNTHA and other initiatives, and until 2018 made it his habit to visit us from his home in the UK to discuss our progress, and offer his encouragement to the members of the team.

Happy Birthday, Rolfe. And thank you.