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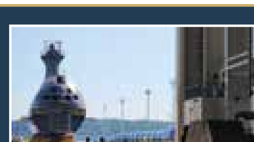

HMCS *Windsor*'s (SSK-877) replacement of the legacy cylindrical bow sonar array

Photo courtesy Nicholas Dubasouf

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COMMODORE'S CORNER

Adapting the Naval Engineering and Maintenence Enterprise to Increase RCN Readiness

By Commodore Michel Thibault, CD

On 3 July, **Cmdre Keith Coffen** and I completed a change of appointment ceremony presided over by the Assistant Deputy Minister for Materiel, **Ms. Nancy Tremblay**. During the ceremony we recognized Cmdre Coffen's leadership and his many accomplishments over his tenure as DGMEPM and Chief Engineer of the Royal Canadian Navy. We thank Cmdre Coffen for his contribution and wish him well in his future endeavours.

As I step into this new role and I reflect on those who have come before me, I am incredibly grateful and proud to be part of Canada's Naval Engineering and Maintenance (NEM) Enterprise whose main objective is to deliver materiel readiness to the Royal Canadian Navy. This Enterprise, comprised of thousands of dedicated Canadians and allies in uniform, as public servants, or as part of the defence industrial base, has, over its existence adapted to meet the needs of the RCN which in turn is dictated by the global security environment and level of ambition from our own government.

Today, we find ourselves at a pivotal moment in our history: the current geopolitical environment is marked by increased threats to our sovereignty in Canada's Arctic, escalating regional conflicts around the world, strategic competition between major powers, and growing systemic risks like trade fragmentation and protectionism. The balance of power is shifting towards a multi-polar order, heightening the risk of miscalculation and major-power conflict, and threatening the rules-based international order from which Canada benefitted since the Second World War. This rapidly shifting environment is acknowledged by both the government and our allies, and has triggered a series of historic multi-year investments in Defence to increase the readiness for the Canadian Armed Forces.

Delivering on the government's ambition will require us to rethink how we do our business, because status quo will not work in this new paradigm. In his inaugural message on 7 July 2025, **Michael Sabia**, newly appointed Clerk of the Privy Council and Secretary to the Cabinet of Canada, referred to three words essential to achieving the

Photo by Brian McCullough

government's goal: Focus, Simplify, and Accountability. These three words provide us with a meaningful starting point to reflect and determine how best to apply them in the context of Materiel Acquisition and Sustainment, the core business of our Enterprise.

As I am writing this article, I am in the midst of visiting some of our key NEM stakeholders, including our strategic industrial partners, to see how we can collectively accelerate the delivery of our program to increase the RCN's materiel readiness. Already I am hearing great observations and recommendations from you on how, for example, to conduct *Halifax*-class ships' Docking Work Periods more rapidly and efficiently, or how to accelerate the implementation of Engineering Changes onboard AOPVs. Therefore, I know that you're all engaged, committed, and share the same objective.

To deliver the materiel readiness required by the RCN, the NEM Enterprise must adapt and persevere: this is our single-most consequential priority. I look forward to meeting more of you in the coming months and listening to how we can further accelerate your portion of the program, so that together we seize this window of opportunity.

Change of Appointment of the Director General of Maritime Equipment Program Management

On July 3, 2025 Commodore J.R.M. Thibault was appointed the Director General of Maritime Equipment Program Management (DGMEPM) relieving Commodore K.H. Coffen during a Change of Appointment ceremony held in Gatineau, Québec. Nancy Tremblay, Assistant Deputy Minister (Materiel), presided over the proceedings.

Photo by Brian McCullough

IN MEMORIAM

Captain(N) (Ret'd) Marc Garneau, O.C., CD
February 23, 1949 – June 4, 2025

When the U.S. space shuttle *Challenger* lifted off from the Kennedy Space Center in Florida on Oct. 5, 1984, the hopes and dreams of many Canadians went along for the ride. For the first time, one of our own was strapped into a seat on the shuttle's mid-deck. Less than nine minutes after Mission STS-41-G cleared the launch tower, 35-year-old payload specialist Marc Garneau — a serving Canadian Armed Forces (CAF) naval engineer — made history by becoming Canada's first astronaut in space.

Marc Garneau's passing at age 76 came as a shock to many, and the Naval Technical Community offers its sincere condolences to his family, friends and colleagues. He was a respected engineer, astronaut, politician and family man.

(Continues next page...)

ISC 84-638

Cdr Marc Garneau briefing the media on his 1984 *Challenger* mission.

Garneau's literal rise to fame as an astronaut, and his later career as a Liberal member of Parliament and Cabinet minister are well documented. In 1983, he was among the first intake of six candidates selected for the fledgling Canadian Astronaut Program, created by the National Research Council (NRC). In February 1984, he was seconded to the NRC from DND for astronaut training at the Johnson Space Center in Houston, Texas, and would eventually fly three missions in space before taking the reins of the Canadian Space Agency as president (2001-2005). In 2008 the Québec City native was elected to Parliament, serving in two Cabinet positions, and as MP for a Montréal riding until he retired from politics in 2023.

What is less widely known are the details of Garneau's professional training and service as a combat systems engineer (CSE) with the Canadian Navy.

Garneau was a 1970 engineering physics graduate of the Royal Military College of Canada; and in 1973, successfully defended a PhD thesis in electrical engineering at the Imperial College of Science and Technology in London, U.K. In his engaging 2024 autobiography, *A Most Extraordinary Ride: Space, Politics, and the Pursuit of a Canadian Dream*[1], Garneau wrote that his two years at Imperial College were a deeply creative period for him. The subject of his PhD thesis, "The Perception of Facial Images," would have direct application in his work to develop a space vision system for the space shuttle's robotic Canadarm.

Garneau was clearly well prepared for a career as a CSE, which he described as "a perfect fit" for himself. For good measure, he even had a spot of sail training under his belt (see sidebar).

During the 10 years of his active service as a qualified CSE, Garneau was involved in a broad range of computer and weapons related activities. He conducted at-sea missile trials, taught naval weapon systems at the Canadian Forces Fleet School in Halifax, and even personally "designed, debugged, and set to work" a small missile simulator for training naval weapons officers in shipboard anti-air defence. As an engineer with Naval Engineering Unit Atlantic, he supported shock trials in HMCS *Iroquois* (DDG-280), and conducted key trials on the 5"/54-calibre gun system for the Tribal-class destroyers.

At National Defence Headquarters (NDHQ) in Ottawa, Garneau served as a naval weapons acquisition project engineer, where he helped design an air target system for assessing the accuracy of naval gunnery. In 1982, Garneau underwent staff training at the Canadian Forces College in Toronto. Afterward, as a newly promoted commander, he returned to NDHQ to head up the Communications and Electronic Warfare section of the Directorate of Maritime Combat Systems, before being seconded to the astronaut program. He was promoted Captain(Navy) in January 1986.

In a paper he presented to the 1980 Maritime Engineering Seminar, Garneau wrote how he much preferred hands-on engineering work in the fleet, to the tedium and frustration of driving a desk as a manager. His was the voice of experience. While working at NDHQ in the late 1970s, he felt stung when a project he had been working on to investigate the placement of anti-ship missiles aboard the 265-class destroyer escorts was suddenly cancelled. Without warning, the funding had been withdrawn. It was a hard, but useful lesson for him.

In 1975, Garneau had faced a much more serious technical frustration while serving as the CSE aboard HMCS *Algonquin* (DDG-283), but this was one he was able to help resolve. During a high-profile Sea Sparrow test firing on the US Navy's missile range at Roosevelt Roads, Puerto Rico, the missile repeatedly failed to launch. Garneau and his ship's team worked closely with project leader **Cdr Norm Smyth** to remove the missile from the launcher so that it could be examined at the Roosevelt Roads naval ammunition depot. With a second team working in parallel at the Canadian Forces Ammunition Depot (CFAD) in Halifax, the failure was traced to a circuit that had been damaged by a defective test station at CFAD. *Algonquin* would go on to conduct successful test firings, but had the team not persevered in opening the missile up immediately, CFAD would have unwittingly continued damaging perfectly good missiles for some time longer.

Smyth, who worked closely with Garneau during this period, and again later at NDHQ, retired as a Captain(Navy). In 1983, he wrote a letter of reference in support of Garneau's 1983 application to join the Canadian Astronaut Program.

"Needless to say," Smyth said, "I was very comfortable doing this as I knew what an exceptional person he was. Little did I know how important that reference letter was to be for Marc, and for Canada."

Garneau retired from the Navy in January 1989, having successfully parlayed his naval engineering-technical

1. Garneau, Marc, *A Most Extraordinary Ride: Space, Politics, and the Pursuit of a Canadian Dream*, Signal, an imprint of McClelland & Stewart, a division of Penguin Random House Canada, Ltd., 2024.

Sail Training Aboard CNAV *Pickle*

Many people only dream about crossing an ocean under sail, but Marc Garneau did it twice aboard the Canadian Navy's auxiliary sail training vessel *Pickle* (QW-7).

In the spring of 1969, and again the following summer, the young Royal Military College student helped crew the 59-foot wooden-hulled yawl across the Atlantic Ocean, first on the Transatlantic International Race from Newport, Rhode Island to Cork, Ireland, and then from Edinburgh back to Canada via the Azores.

In his autobiography, *A Most Extraordinary Ride*, Garneau describes how the "mentally demanding" experience of working a small boat under sail on long ocean voyages taught him lessons he would come to rely on throughout his career with the Navy, and later as an astronaut.

"We were constantly living in close quarters," he wrote. "There was no privacy at all."

Pickle was built in Germany in the late 1930s as the *Helgoland*, and served with the Kriegsmarine during the war, after which it was taken as a prize by the Royal Navy. As military historian Harold A. Skaarup explains, the yacht was gifted to the RCN in 1953, and used primarily as a naval auxiliary training vessel. The sailboat also had a successful racing career, and in 1972 had the distinction of representing

RCN photo 69-1154, courtesy Naval Museum of Halifax Collection

Canada at the Summer Olympics in Kiel, Germany. *Pickle* remained in Canadian service until it was sold in 1979.

Garneau wrote in his memoir that the most important lesson from his time aboard *Pickle* was learning to not allow himself to get irritated by his crewmates' personal habits as they coped with life aboard the small vessel in their various ways.

"Understanding this would turn out to be a valuable experience for me later in a wholly different environment—space," Garneau wrote. "It gave me confidence that I could work with others and achieve my objectives, even in challenging conditions."

background into a new career path involving the development of space technology projects as part of Canada's participation in the peaceful exploration of space. As former Navy colleagues noted on his passing, he was smart, eloquent, thoughtful, and humble — certainly the right choice to be Canada's first astronaut.

In 1994, on the tenth anniversary of his inaugural mission aboard *Challenger*, Garneau spoke to the *Maritime Engineering Journal* about how important it was to have a Canadian presence in space.

"I'm very proud of Canada's technical input," he said.

The Canadian Naval Technical Community is proud to call Captain(N) Marc Garneau "one of our own."

Submissions to the *Journal*

The *Journal* welcomes unclassified submissions in English or French. To avoid duplication of effort and ensure suitability of subject matter, contributors are asked to first contact the production editor at MEJ.Submissions@gmail.com.

FORUM

Improving Training Aid For the Helo Haul Down Course

By MS Jonathan Lafleur-Blais

Editor's Note: From time to time the *Journal* features articles adapted from student Technical Service Papers such as this one, which expresses important challenges, opinions and potential solutions. These articles are intended to showcase the breadth of innovative thinking that exists within the naval technical community, which in turn enable conversations beyond the traditional boundaries of academic settings.

Canadian frigates are fitted with the Canadian Rapid Securing Device (CRSD), to allow for the safe recovery of helicopters. This is part of the Canadian Recovery Assist, Securing and Traversing system (CRAST), colloquially known as the "bear trap", and its main purpose is to secure and traverse the helicopter when it is a requirement to maintain flying operations on His Majesty's Canadian ships (HMCS). The Avionic Support Technician (AST) and the Avionic Support Technician Electrical (ASTE) are responsible for conducting the first line maintenance as well as corrective maintenance on the CRSD to maintain air operations of the ship and the helicopter.

Prior to becoming a qualified AST, the technicians are required to attend the Helo Haul Down (HHD) course at either Naval Fleet School Atlantic or Naval Fleet School Pacific where they learn about a series of systems to support the Air Detachment onboard ship, including the CRSD. The HHD course is a specialty course designed to train technicians to independently operate, troubleshoot, repair, and provide recommendations to the Helicopter Air Detachments (HELAIRDET) chain of command in order to maintain the CRAST equipment.

It had been noted that while on the HHD course the topic of the CRSD was covered in-depth, however, the instruction at Naval Fleet School Pacific (NFS(P)) was not complete as the CRSD utilized was an old version previously used for the Sea King (CH-124). Therefore, the technical skills were not demonstrated nor properly taught to the students attending the course using the current equipment for the Cyclone (CH-148). At the time of writing this paper, the author was the HHD instructor at NFS(P) and noticed that there has been no change to the school (on either coast) to provide the correct CRSD. It should also be noted that the Helo Haul Down Qualification Standard and Plan (QSP) states that a Rapid Securing Device must be used as a static training aid (Figure 1).

For the purposes of satisfying Fleet School course requirements, three possible solutions to this problem were investigated. The aim was to propose a solution to improve the quality of training material for the Helo Haul Down course.

Photo by MS Jonathan Lafleur-Blais

Figure 1. Current CRSD in NFS(P)

Cost estimates for the three options were prepared for the original Technical Service Paper and will be detailed here.

Operational Impact

Deep knowledge of the CRSD system is key to a successful mission:

a. field serviceability: teaching the HHD course with a correct and updated CRSD as a training aid would significantly boost the technician's confidence in conducting repairs while on operations. This hands-on experience would also deepen their overall knowledge of the CRSD;
b. not possible to practice onboard a ship: while on course, the students are attending ships tours, however, they are not able to practice their new skills on the ships' fitted CRSDs as it is in an operational state and tampering with it could render it unserviceable;
c. ability to make mistakes: Access to a static CRSD training aid at a NFS would allow technicians to make mistakes

and learn from them in a controlled environment. This practice would help reduce and mitigate the number of errors that would occur during operations; and

d. efficient work: when a ship has a helicopter onboard, maintenance on the CRSD can only be conducted when the helicopter is flying. Technicians must conduct the work quickly and accurately prior to the aircraft returning to the ship, ensuring the helicopter is able to safely return.

Technical Background

While onboard HMCS *Ottawa* (FFH-341) the author had difficulty finding the appropriate greasing points on the CRSD as part of preventative maintenance, such as conducting the greasing routine on the CRSD wheels. This statement was also supported by the current AST of HMCS *Ottawa*. Having a static CRSD display for the HHD course would enable the technicians to accurately identify all the greasing points on the CRSD, therefore, this preventative maintenance would be conducted in accordance with the Canadian Forces Technical Orders (CFTOs) (Figure 2).

As mentioned previously, when the ship is deployed with an Air Detachment, the maintenance required for the CRSD has to occur while the helicopter is in flight due to the lack of space between the helicopter and the CRSD. In order to conduct preventive maintenance, the helicopter also must be in flight with the longest sorties being three hours. Within this three-hour window, the AST and ASTE must remove the armour off the CRSD, conduct the preventative maintenance, replace the armour and then test the equipment to ensure the helicopter can land safely (Figure 3).

While onboard HMCS *Ottawa* during Intermediate Multi-Ship Readiness Training (IMSRT) in 2023, the author was trouble shooting a CRSD issue on HMCS *Vancouver* (FFH-331) via email. The hydraulic cylinder for the arresting beams was leaking hydraulic fluid, which in turn caused it not to operate as designed. This caused a delay in air operations of HMCS *Vancouver* as the aircraft could not be traversed onto the flight deck. An assessment was conducted, and it was found that a bracket for the CRSD brake cam actuator switch was not lock-wired correctly, leading to a malfunction of the equipment. In discussion with the AST, it was noted that troubleshooting the above-mentioned issues would have been much faster if they had the appropriate training on a static display of the CRSD while on course (Figure 4).

(Continues next page...)

NFS(P)

Figure 2. A CRSD with Armour Removed

NFS(P)

Figure 3. Aircraft Trapped in a CRSD

Photo by MS Jolene Wahlstrom

Figure 4. A CRSD Cam Brake Switch

Also, it has been found by FMF workers that the CRSD is often overfilled with hydraulic oil. This can cause the CRSD to leak oil on the deck and be a potential slipping and fire hazard. The FMF subject matter expert (SME) has found that most ASTs are not bleeding the arresting beam reservoir in accordance with the CFTO. The correct way of bleeding the hydraulic system of the CRSD is delicate as the operator must attach a special tool to the equipment while having another person observe the nitrogen gauge. If done incorrectly, the arresting beams may actuate and be a potential risk for personnel. Properly teaching this action would enhance safety onboard ships. (Ref. C and G). To further emphasize the safety factor of the CRSD, the unit is commonly called the "Bear Trap", referring to the arresting beam being hydraulically charged at 3200 psi. This high pressure may cause serious injury to personnel if not operated properly (Figures 5 and 6).

NFS(P)

Figure 5. Manual Actuator of the Arresting Beam

NFS(P)

Figure 6. Pressure Gauge to be Monitored

Options

There are three options to consider to improve the training of technicians on CRSD maintenance:

Option A – Learning Support Centre to build 3D imagery of the CRSD

The Learning Support Centre (LSC) could build a functional, detailed 3D imagery of the CRSD. Though this option would be attractive due to its low cost, the technicians still would not be able to increase their hands-on skills, which could lead to deficits once the member is working on a ship (Figure 7).

Advantages:

a. no cost associated to the Naval Fleet Schools.

Disadvantages:

a. the product may not be 100% accurate; and
b. the process would take time to develop due to competing priorities.

Option B – NFS(P) to purchase a CRSD

This option would allow NFS(P) to have a permanent CRSD within the school. In discussion with the appropriate Life Cycle Material Manager (LCMM) (Ref. A), the author found that a new CRSD would cost around $1.5 Million.

Advantages:

a. NFS(P) would always have the CRSD in-house.

Source: William Quilty, Lead Multimedia Developer, Naval, Training Group Headquarters/ Naval Training Group

Figure 7. 3D Imaging of the CRSD

Table 1 – Decision Matrix

		Option A		Option B		Option C	
Criteria	**Importance**	**Score**	**Value**	**Score**	**Value**	**Score**	**Value**
Cost	2	4	8	1	2	4	8
Implementation	4	3	12	3	12	3	12
Safety	4	1	4	4	16	4	16
Ease of Use	3	2	6	4	12	4	12
Totals			30		42		48

Importance Factors:
Very Low
Low
Medium
High

Scoring:
1. Does not satisfy
2. Partially Satisfies
3. Mostly Satisfies
4. Fully Satisfies

Formula: Weight x Score = Value. Value + Value = Total

Disadvantages:

a. the purchase cost is approximately $1.5 million each, with an additional amount required for the other coast.
b. it would take a long time for the CRSD to be delivered; and
c. the CRSD would be subject to a Transfer Requisition (TRANREQ) to a ship, resulting on the school no longer having its CRSD.

Option C – NFS(P) to have a CRSD as part of a rotation

Following a discussion with the LCMM, it was found that there are only 16 CRSDs available for the fleet of which 12 are onboard ships, and the remaining four are at the contractor's, Curtiss-Wright, for 30 to 34 months between Docking Work Periods (DWP). When a ship goes into DWP, the FMF forwards the CRSD to Curtiss-Wright for overhaul maintenance. The LCMM has confirmed that they have ordered two CRSDs as back up for the fleet. Therefore, the proposition of this option is to utilize the stand-by CRSDs as training aids within the Naval Fleet Schools. These CRSDs would be part of a rotation, so that when a ship goes into refit, their CRSD is transferred to the NFS and the CRSD from the NFS goes to FMF and Curtiss-Wright for overhaul maintenance.

Advantages:

a. this process could occur immediately once the LCMM receives the ordered CRSDs;
b. in the event of an unforeseen urgent requirement, the school located CRSD would 100% be brought back into service; and
c. low cost to the school.

Disadvantages:

a. Additional logistics are necessary to coordinate CRSD transfers among ships, schools, and FMF/Curtiss-Wright.

Comparison

When evaluating the three options, the following criteria were considered:

a. cost: The financial impact by the Naval Fleet Schools for each option;
b. implementation: the ease with which each option could be put into place;
c. safety: the extent to which each option improves the safe operation of the equipment; and
d. ease of use: how easy it will be for students and instructors to use and train on the equipment.

Conclusion

To summarize, there are three viable options to enhance the skill development for the future Avionic Support Technicians: the Learning Support Centre builds 3D imaging of the Canadian Rapid Securing Device, the Naval Fleet schools purchase their own CRSD, and finally, use the future fleet spare CRSDs as training aids and thus having them as part of the overhaul maintenance rotation ensuring they are always brought back to an operational state. Option C is recommended as the most viable choice. NFS(P) having a CRSD as part of a rotation between the ship, NFS, and FMF offers a cost-effective and sustainable solution, while remaining managed and maintained by the LCMM.

MS Jonathan Lafleur-Blais is a Gas Turbine and CRAST Instructor at the Naval Fleet School (Pacific).

FORUM

On Success

By Dhilip Kanagarajah

Success is like a rainbow – vivid from afar but vanishing into mist as you near it. It is elusive because it escapes definition. If we define success using impossibly high standards, nothing could qualify as successful, rendering the concept useless. But if the bar is set too low, then everything becomes a success, and the idea loses all meaning. Like a fish that seems large in a pond but small in a vast ocean, the arbitrariness of the points of reference we use to judge success makes it difficult, if not impossible, to define in any conclusive way.

The shifting of reference points is also at the heart of what is known as '*moving the goalpost*.' This occurs when a project falls short of its original objectives but then adjusts those targets to more attainable ones – thereby achieving success. For example, if a project fails to meet a technical requirement, simply lowering the requirement retroactively to something achievable can transmute failure into success.

Another complication that arises involves the trade-offs between competing criteria of success. Achieving success in one domain often comes at the cost of failure in another, a dynamic captured by the idea of a "Pyrrhic victory"[1]. For instance, if a project successfully meets its target for schedule and scope but fails to stay under budget, can it still be considered a success? Despite its widespread use and appeal, *success* remains an elusive concept—difficult to define, and even harder to measure.

Time adds another layer of ambiguity: what's seen as a failure today may be regarded as a success in the future, or vice versa. For example, the Dieppe Raid was widely considered a failure at the time, but it later came to be seen as a strategic success because the lessons learned played a crucial role in the success of D-Day. In a similar way, Vincent van Gogh was largely an unrecognized and obscure figure during his lifetime, yet today he is celebrated as a renowned artist.

We often judge success based solely on the path taken, without considering the other paths we could have taken, some of which might have led to even greater results. Consider a tech startup: imagine you've launched a wildly successful product only to learn later that a simpler idea might have been even more profitable. Does that realization

Photo courtesy Library & Archives Canada

Petty Officer Shipwright R. Abernethy repairing mine damage to a Landing Craft of HMCS *Prince Henry* on D-Day, France, 6 June 1944. Lessons learned from earlier operations were key to D-Day's success.

diminish your success? From a systems-thinking perspective, perhaps it does – because a comprehensive evaluation should consider not just what did happen, but also what could have happened. So, even when a project has succeeded, the existence of better untaken paths can cast a long shadow over that success.

Fortunately, there's a practical limit: unless you're Dr. Strange, the Marvel character who can explore infinite futures in moments, it's impossible to know whether better outcomes were truly within reach. Therefore, we can never know in advance the best choice, nor can we know in hindsight; a limitation that can be strangely comforting.

Success becomes hard to grasp when organizations spotlight and advertise their achievements while remaining silent about their failures. The impulse to maintain a curated narrative often stems understandably from a desire to preserve morale, momentum, brand, and pride. But this

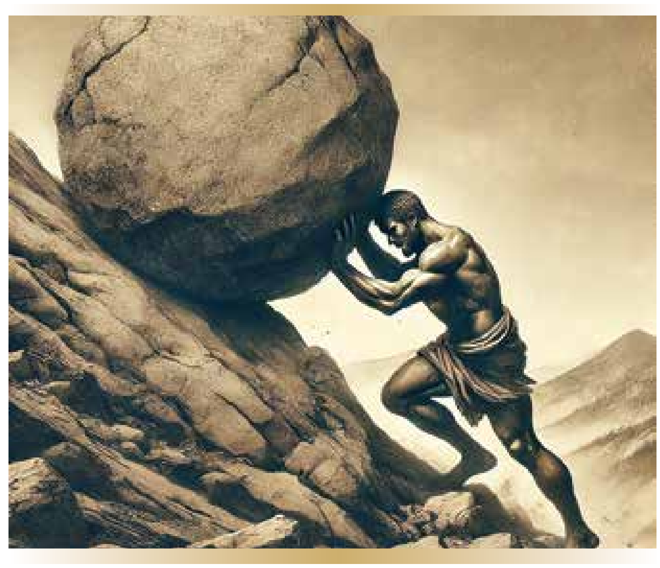
1. The phrase originates from a quote from Pyrrhus of Epirus, whose triumph against the Romans in the Battle of Asculum in 279 BC destroyed much of his forces, forcing the end of his campaign (Wikipedia).

comes at a steep cost. Misrepresenting reality not only undermines ethics, it also inevitably erodes trust and, just as critically, it stifles growth. When the story we tell is one of unbroken success, we create a culture where failure is hidden, criticism is discouraged, and honest reflection is avoided. In such an environment, meaningful improvement becomes nearly impossible. Progress demands more than simply recognizing shortcomings. It requires a culture of deep curiosity – a strong desire to understand why things fail, to look beyond immediate causes, and to transform those insights into action. Advertising achievements alone can quickly become stale and uninspiring. Failure, by contrast, crackles with energy. It sparks curiosity, fuels the exploration of root causes, inspires creative solutions, and offers the exhilaration of meaningful progress.

We like to believe that success is earned, that it flows naturally from talent, effort, and determination. This appealing belief rests on a deeper faith in free will: the belief that we control our actions and shape our own paths. When we look a little closer, these convictions may not be quite what they seem. Robert Sapolsky, the neuroscientist and primatologist, explains, in an episode of the *Lives Well Lived* podcast with Peter Singer, that although we may think we choose what we do, the only relevant question to ask is how we became the sort of organism who would have that intent at that point. What he's getting at is this: if you trace the chain of causality that brought you to the shores of success (or failure), you may find that you had no hand in creating the conditions that led to your success and therefore, no real claim to the merit that follows.

Take, for example, success in athletics or academia. Unearned biological gifts like intelligence, body proportions, reflexes, or muscle-fiber composition, can pave the way to achievement without any real claim to merit. You might rebut with the popular quote by Zig Ziglar: "*success occurs when opportunity meets preparation*", to suggest that despite serendipity, we retain agency through effort and preparation.

However, if we consider how someone comes to hold the intent for diligent preparation and hard work in the first place, we might see that beyond any biological factors (nature), the culture in which one is immersed completes the picture in shaping intent (nurture). Our intent is forged by the cultural objects we're steeped in, such as the families we're raised in, schools we attend, organizations we serve, peers we engage with and media we consume. Since we didn't create these cultural objects ourselves, any beneficial traits or behaviours they instill – such as discipline or the capacity for sustained effort – are no more "earned" than the



https://pixabay.com/illustrations/ai-generated-sisyphus-mythology-8968054/

Sisyphean struggle: lasting success comes from fixing root causes, not soothing symptoms.

advantages conferred by biology or genetics. If our choices, identity, and achievements are shaped by forces beyond our control – from nature to nurture – this challenges the orthodoxy that we're deserving of our successes and responsible for our failures. In turn, this further complicates the already fraught task of defining and assessing success.

Greek mythology tells the story of Sisyphus, who was condemned by the gods for his deceitfulness. His punishment was to roll a heavy boulder up a hill with great effort, only to have it tumble back down just as he neared the summit – forcing him to repeat the task for eternity. By most accounts, such fate would be seen as a failure. In his essay *The Myth of Sisyphus* (1942), philosopher Albert Camus offers a different perspective. He concludes that "the struggle itself toward the heights is enough to fill a man's heart. One must imagine Sisyphus happy." Camus might contend that it is our struggle against adversity that imbues life with purpose and meaning, fostering growth and transformation, and ultimately making it a success. His interpretation reminds us just how subjective the notion of success can be.

While Camus' insight offers a powerful perspective, applying it too literally in everyday life can be problematic. Imagine a manager, inspired by Camus, piling more work onto already overwhelmed staff – to enrich their souls. In reality, many of us often feel like Sisyphus: pouring time, energy, and resources into problems that never quite go away because we only ever treat the symptoms, not the cause. It's like sailors constantly bailing water to keep the

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boat afloat, without ever repairing the hole that's causing the flood. The tragedy isn't the Sisyphean struggle itself, but our refusal, or inability, to address and resolve the deeper issues – which always keeps success just out of reach.

If success defies definition, perhaps the better question is how we might approach it despite its ambiguity. One answer comes from an unexpected place: Integrated Logistics Support (ILS). ILS offers a different way to think about success, one that captures the essence of minimalism: an approach to life that focuses on what's essential, eliminates the rest, and seeks to achieve those goals with the least effort necessary. This philosophy is mirrored in ILS, which aims to deliver the required level of equipment availability at the lowest possible cost.

If you've walked the hallways of the organization long enough, you've likely heard the phrase '*good enough for government work*' tossed around in light-hearted banter. At first glance, the phrase might understandably invite your distaste, as it seemingly mocks the ethos of excellence. However, a closer look suggests the opposite. Within a conventional definition of success, it might be dismissed as a sign of underachievement or complacency – a failure to strive for more. Yet from another perspective, it wittily conveys a practical truth: that it's inefficient to expend more resources than necessary to achieve one's requirements. This view not only aligns with the principles of ILS but also echoes the intent behind Section 32 of the Financial Administration Act. The doctrine of minimalism espoused by ILS is by no means anti-excellence. The conventional view of success advocates the ethos of '*more is better*' and strives towards continually raising the bar. In contrast, ILS embraces the ethos of '*less is more*', setting the bar to what's necessary (vice desired), and strives to achieve those goals with less and less. Both approaches to success strive for excellence – but just from different directions.

ILS aims to solve a problem similar to the one we face in our own lives: given the finitude of existence, the brevity of life, and the limits of our abilities, finances, and opportunities, how do we make the most of what we have in the pursuit of happiness and well-being? In a similar way, ILS seeks to extract the greatest value from limited resources in the pursuit of equipment availability. But it doesn't merely aim to maximize that availability, it asks whether such availability is worth the cost. Even if improvements are possible, through increased maintenance, or additional training for personnel, or by procuring more spare parts, ILS would advise against them if the benefits don't justify the trade-offs. Likewise, we might ask whether the goals we aim for in life truly merit the resources we invest, and how we can best optimize our well-being within life's inevitable constraints.

Our conception of success directly shapes the life decisions we make, what to pursue, when, where, how much of it, and with whom. Take, for example, the decision to purchase a home or upgrade to a larger one. Such choices are often motivated by the belief that they'll lead to a meaningful

Our notion of success rests on a deeper faith in free will.

increase in well-being. While this might be true in the short term, research suggests that the effect is fleeting. Due to hedonic adaptation, we tend to return to our emotional baseline shortly after the initial excitement wears off. In this light, buying a house may be a poor decision because it offers no lasting gain in well-being to justify the substantial financial investment. Psychologists and economists alike have shown that while major life events, like purchasing a home, can bring a brief increase in satisfaction, they seldom lead to lasting improvements in well-being, as people quickly acclimate to new circumstances and revert to their previous levels of contentment.

The playwright and poet Oscar Wilde, in *Lady Windermere's Fan (1892)*, writes: "There are only two tragedies. One is not getting what one wants, and the other is getting it." This captures a paradox of success: we are often misled by intuition into pursuing goals that ultimately fail to satisfy. Similarly, intuitive decision-making in material management can also be deceptively costly. To help avoid such missteps, ILS advocates for a structured and critical approach to decision-making – one that carefully weighs our wants against the true cost of pursuing them.

Decades of research suggest that the conventional view of success, driven by relentless ambition and fueled by extrinsic rewards like wealth, status, or the urge to outshine others, often does little to enhance our well-being. While the pursuit of ever-rising standards may yield impressive achievements, it can also erode genuine contentment. The ecologist Patrick Albert Moore captured this idea, noting that while a hungry person has only one problem, a well-fed person has hundreds. In contrast, ILS and minimalism offer a compelling alternative: one that calls for a critical examination of our goals, distinguishing needs from wants, and pursuing them with only the resources truly necessary. This principle of optimization – of doing what matters with less – presents an alternative to the orthodoxy of maximization.

Yet even with this approach, defining success remains elusive. It shifts with time, context, perspective, and with the frames and points of reference we choose. It can appear as solid as a block of marble yet dissolve like the morning mist. We chase it, sacrifice for it, and bear its weight, and sometimes, we discover it's not what we imagined at all. And so, the question endures, but not to be answered once and for all, but to be revisited, re-examined, and reimagined as we go.

Dhilip Kanagarajah is the Integrated Logistics Support Engineer for the Arctic and Offshore Patrol Ship (AOPS) Project in Ottawa.

FEATURE ARTICLE

The New *Victoria*-class Bow Array

By LCdr Kevin Hunt

HMCS *Windsor* (SSK-877) is currently undergoing an Extended Docking Work Period (EDWP), a scheduled maintenance and modernization phase intended to extend the submarine's operational life and enhance its capabilities. A central element of this work period is the replacement of the legacy cylindrical bow sonar array; with the newly developed *Victoria*-class Bow Array (VCBA) – a spherical array designed to significantly improve acoustic detection and tracking performance. This article outlines the technical rationale for replacing the original array, describes the design and development process of the VCBA, and provides an update on its integration onboard HMCS *Windsor*. It also highlights the pending work for implementation and the projected milestones ahead.

Background

The bow array is a passive acoustic sensor that captures underwater sound for processing by the submarine's sonar suite, with data displayed on four operator consoles in the Control Room. Since their original service in the Royal Navy as the *Upholder*-class, *Victoria*-class submarines have been equipped with a cylindrical bow array. Now several decades old, this array operates in a single horizontal plane, limiting

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its ability to resolve vertical contact information, an increasingly critical capability in modern undersea warfare.

While the sonar suite has been progressively modernized, most notably through the Bow Sonar System Upgrade (BSSU), which introduced the AN/BQQ-10 system for passive broadband detection, active intercept and ranging, and obstacle avoidance—many of the original outboard sensors, including the bow array, were retained. These components are now facing obsolescence. The cylindrical array's aging staves have degraded in performance and show increased maintenance demands, while the TI-10 consoles are no longer supported. Additionally, the original domes, designed for the 2040 array, are not acoustically optimized for modern sonar processing.

Several upgrade options were considered, including retrofitting new transducers onto the existing cylindrical cassette. However, the cassette lacked the structural stiffness to support the required number of modern hydrophones, and its geometry was incompatible with the performance goals of the new system. A new array structure was therefore required, one that could accommodate advanced transducers while minimizing changes to the submarine platform to facilitate installation. To reduce integration risk, the new array was designed to match the height and interface of the 2040 cassette and remain within a strict weight budget.

Canada ultimately partnered with the U.S. Navy through a Foreign Military Sales (FMS) case to procure a fully integrated solution: a truncated-sphere bow array, acoustically optimized dome, and modern TI-18 consoles. These three engineering changes form a cohesive upgrade package that will restore and enhance the *Victoria*-class's underwater sensing capabilities, ensuring operational effectiveness and sustainability into the next decade.

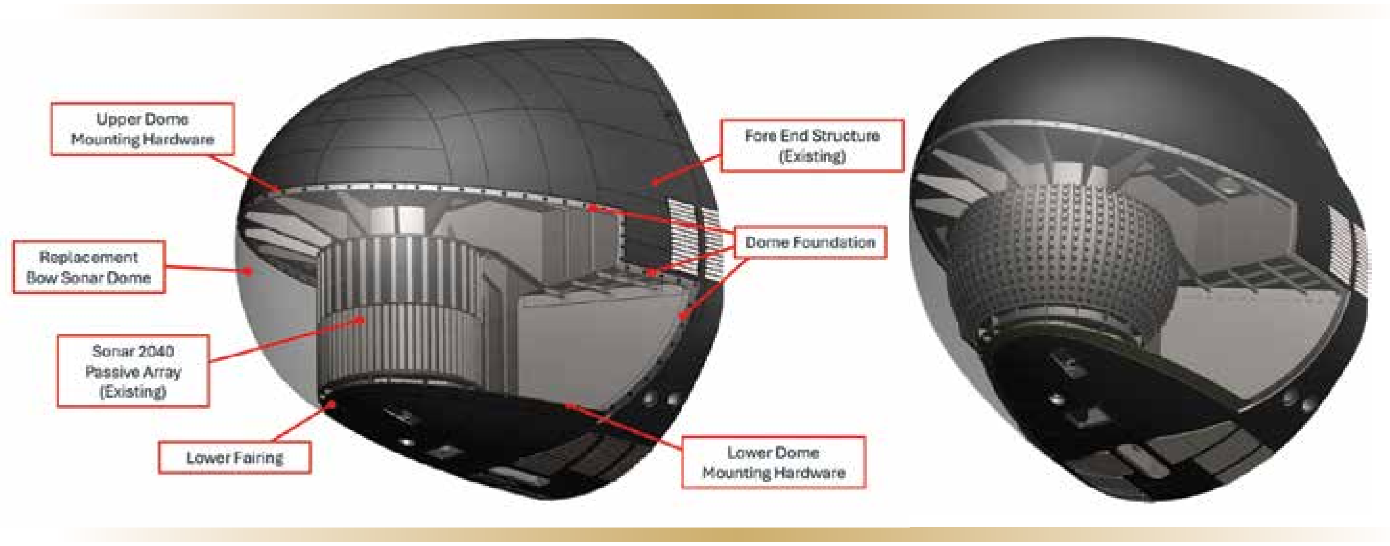
The Three Engineering Changes

The resultant sonar upgrade package is comprised of three main elements, each with its own Engineering Change (EC):

1. Truncated-Sphere Array: a new spherical bow array will be introduced, replacing the legacy cylindrical design. Unlike cylindrical arrays, which provide only bearing information, the spherical geometry enables detection in both bearing and elevation, significantly enhancing sonar operator situational awareness.

The array design was constrained by the available volume within the sonar flat, bounded by the torpedo tubes above and the chin below. While a larger array

Photo by Doug Anderson



Comparison of the legacy 2040 array (left) to the new VCBA (right).

improves low-frequency reception, the final dimensions had to balance acoustic performance with spatial and structural limitations.

Weight was a critical constraint. Despite the presence of the chin below, the array is primarily held from above. The total weight budget had to account not only for the steel structure, but also the hydrophones, electronics, cabling, and acoustic damping tiles. To minimize mass and acoustic interference, the array includes no hardpoints, handrails, or external hardware that would facilitate transport, installation, and maintenance.

Partnering with the U.S. Navy to adapt a proven U.S. Navy array design reduced technical risk. Delphinus Engineering was contracted to deliver the modified system. Leveraging U.S. experience in submarine acoustics helped mitigate schedule and integration risks.

Modern sonar arrays rely on reflected rather than direct acoustic energy. This necessitates a dense backing plate to maximize reflectivity. Acoustic modeling determined the optimal standoff distance between the hydrophones and the backplate to ensure optimal performance across all angles of incidence. Internally, damping tiles line the array and surrounding structure to optimize reflection gain and transmission loss, ensuring clean signal reception.

Early design iterations explored a composite-backed spherical array supported by a steel backbone. While lighter, the composite design lacked sufficient acoustic reflectivity and technical readiness to be implemented on the *Victoria*-class submarine. The final design features a curved steel structure eliminating the need for internal support, which performs better in structural simulations and acoustic analysis.

The outside of the array will be covered by over 600 individual hydrophones, the same used onboard U.S. Navy submarines, which will deliver substantial improvement over the legacy sensors. Arranged in vertical stave assemblies of 11 to 13 hydrophones, each stave connects to cable assemblies routed to 11 Outboard Bottle Electronics (OBEs), which condition the signals for processing by the AN/BQQ-10 sonar suite. Modular staves and corrosion-resistant connectors will simplify maintenance, and the reduced cabling compared to the 2040 will lower the risk of connection errors.

At the time of this writing, the design is undergoing fluid dynamic simulations and shock testing to finalize its concept.

With the AN/BQQ-10 sonar suite already integrated, the new array will bring the *Victoria*-class submarines' acoustic sensing capabilities in line with modern U.S. platforms, significantly enhancing their operational effectiveness.

2. Acoustically Optimized Domes: To complement the enhanced performance of the new bow array, the *Victoria*-class submarines will be fitted with new sonar domes which are more acoustically transparent than the

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originals. These domes are critical to system effectiveness, as they influence the fidelity and frequency range of acoustic signals reaching the hydrophones. Constructed from a more homogeneous glass-reinforced plastic (GRP) using an improved curing process, the new domes offer superior acoustic transmissibility, extending the submarine's detection range.

A total of four domes were fabricated—three for installation on HMCS *Windsor* (SSK-877), *Corner Brook* (SSK-878), and *Victoria* (SSK-876), and one will be retained as a spare. Each dome is stored and transported in a custom-built Shipping and Installation Fixture (SIF), which protects the dome and maintains its shape during transit and storage.

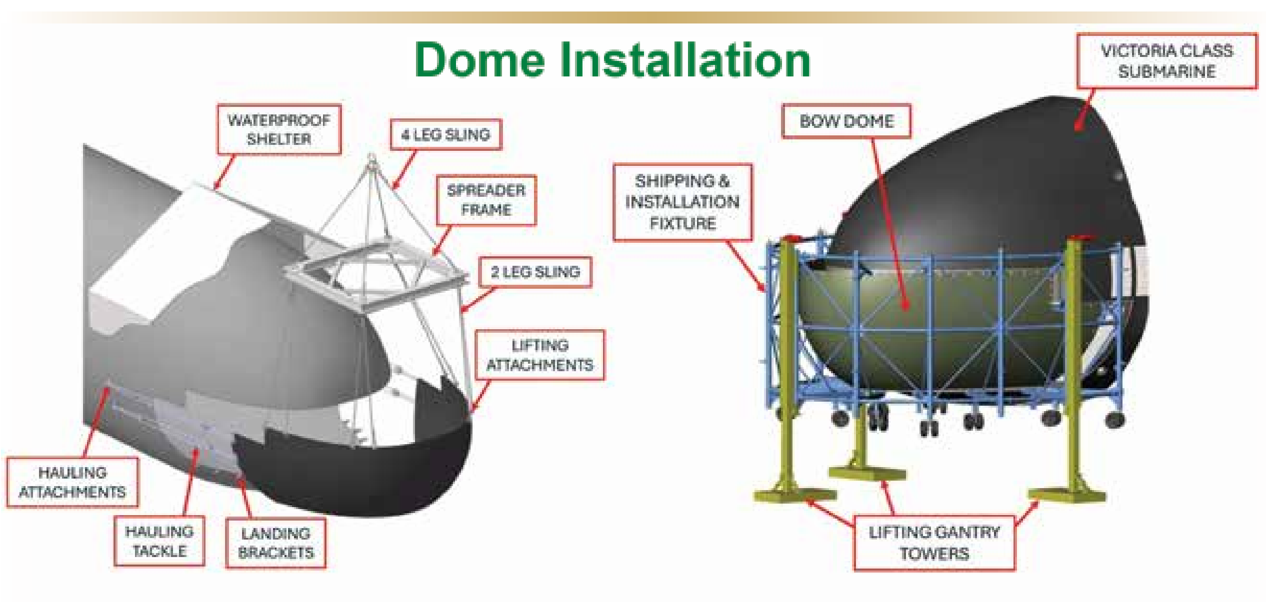
Due to structural differences between U.S. and Canadian submarines, a new installation method was developed. The *Victoria*-class bow configuration, particularly the placement of torpedo tubes above the array, prevents traditional crane-based installation from inside the dome. Additionally, the absence of lifting points, omitted to preserve acoustic integrity and reduce weight, necessitated a bottom-up installation approach. The SIF enables a lift-and-slide installation motion using a computer-controlled system of three electric gantries mounted on air pallet bases. These gantries lift the dome in unison and can adjust independently to align the dome precisely with the hull. The air pallets allow fine positioning and can also be used for dome removal. This method is safer for personnel and less dependent on weather conditions than the legacy crane approach.

The new domes are designed to flex and fit more precisely than the originals. The dome is mounted via a welded frame and upper/lower fairings, designed to streamline the bow and minimize hydrodynamic turbulence. A rubber gap trim between the dome and hull mitigates vibration and turbulence while underway.

3. New Sonar Consoles: The final component of the upgrade is the installation of TI-18 SONAR operator consoles in the Control Room, replacing the legacy TI-10 units. The TI-18 is a proven system, already in service aboard U.S. Navy submarines and operating with the new hydrophones. The consoles represent a significant leap forward in processing power, display clarity, and operator interface.

Each *Victoria*-class submarine will receive four new consoles, offering enhanced capabilities in detection, tracking, and acoustic analysis. TI-18 consoles will also be introduced to the Naval Fleet School (Atlantic) for integration testing and training. The first console deliveries are expected in 2026.

All three upgrades: the truncated-sphere bow array, acoustically optimized domes, and TI-18 consoles, are being delivered through an FMS case with the United States. While each element is managed under its own Engineering Change, they are interdependent and must be implemented as a complete system. The new array cannot interface with the existing TI-10 consoles, and the TI-18 consoles are configured specifically for the geometry and signal



Unclassified image by Delphinus Engineering and the U.S. Navy

Comparison of the current dome installation process (left) versus the proposed installation process of the VCBA (right).

characteristics of the new array. Additionally, installation of the new array requires removal of the existing dome, making the dome replacement a prerequisite.

Implementation Path and Strategic Outlook

The integrated sonar upgrade represents a major milestone for the *Victoria*-class submarine enterprise. HMCS *Windsor* was selected as the lead platform, with implementation beginning during its Extended Docking Work Period (EDWP). The Critical Design Review (CDR) for the new bow array was held in Halifax in summer 2025, with HMCS *Windsor* on the synchrolift providing a fitting backdrop. At the time of writing, HMCS *Windsor*'s original dome has been removed—enabling the extraction of the 2040 array and providing rare, unobstructed access to the sonar flat for structural assessment and preparation. Meanwhile, HMCS *Windsor*'s TI-10 consoles will be removed, refurbished, and made available to support the remaining submarines until their own upgrades are completed.

With the contract to be awarded in early 2026, the new array will be delivered in summer 2027. While awaiting array delivery, the focus will be on finalizing documentation, refining work estimates, and procuring the necessary hardware, cabling, and support equipment. The year 2026 will also see the first TI-18 consoles being delivered to the Naval Fleet School (Atlantic) for configuration testing and initial training, and HMCS *Windsor*'s consoles will then follow.

Fleet Maintenance Facility Cape Scott (FMFCS) will lead the installation on HMCS *Windsor*. Once the array is in place, the new dome, already delivered to Halifax dockyard, will be installed using the SIF and electric lift system near the end of the EDWP.

The plan is to upgrade HMCS *Windsor*, *Victoria*, and *Corner Brook* during their respective docking work periods. HMCS *Windsor*'s implementation will serve as a pathfinder, generating valuable lessons to reduce risk and improve efficiency for subsequent installations. Beyond restoring and enhancing current capability, this program also builds domestic expertise in advanced sonar systems—laying the foundation for Canada's future submarine fleet.

Conclusion

The new *Victoria*-class Bow Array (VCBA) marks a pivotal modernization effort for Canada's submarine fleet, addressing the growing limitations of the aging 2040 sonar system. After decades of service, the 2040's cylindrical array and legacy transducers, along with the TI-10 consoles, have become increasingly difficult to support, both technically and logistically. Material degradation, limited vertical resolution, and obsolete processing hardware were constraining the Royal Canadian Navy's ability to operate effectively in today's complex undersea environment.

In response, the VCBA initiative delivers a fully integrated solution comprising three interdependent engineering changes: a truncated-sphere bow array, acoustically optimized sonar domes, and modern TI-18 SONAR consoles. Together, these upgrades significantly enhance the submarine's passive detection capabilities, improve contact resolution in both bearing and elevation, and streamline maintenance through modular design and reduced cabling.

HMCS *Windsor* is leading the implementation during its current Extended Docking Work Period. The new system not only restores full operational capability but also brings the *Victoria* -class more in line with allied platforms, leveraging proven U.S. Navy technologies and integration practices. The result is a more capable, maintainable, and future-ready submarine—one that will remain a vital asset in Canada's maritime defence strategy through the 2030s.

As the Royal Canadian Navy looks ahead to the next generation of submarines, the VCBA project serves as both a technological bridge and a critical investment in domestic undersea warfare expertise.

Acknowledgements

I would like to acknowledge the long-term efforts of the teams involved in bringing this initiative towards implementation, including but not limited to those at Assistant Deputy Minister (Materiel) and specifically the Directorate Maritime Equipment Program Management (Submarines), Directorate of Maritime Procurement, Public Services and Procurement Canada, Fleet Maintenance Facility Cape Scott, Babcock Canada, Delphinus Engineering, and the U.S. Navy.

LCdr Kevin Hunt is the Sub-Section Head for submarine sonars within the Directorate Maritime Equipment Program Management (Submarines).

FEATURE ARTICLE

Crossing the Pacific: A Royal New Zealand Navy Perspective on Maritime Sustainment

By LTCDR Shaun Taylor, RNZN, CEng, CMarEng, MIMarEST

Photo courtesy of Beechwood Cemetery

Members of the New Zealand Defence Force posted to Ottawa visited Beechwood Cemetery for a ceremony in recognition of New Zealand's contribution to the British Commonwealth Air Training Plan. From left to right: Leading Electronic Warfare Specialist (LEWS) Daniel Lord, CDR Mark Tapsell (NZDF Defence Advisor), Lieutenant-General Eric Kenny (Commander of the RCAF), Her Excellency Cecile Hillyer (New Zealand High Commissioner), CPL Callum Dudson, LTCDR Shaun Taylor, LTCDR Sarah Taylor

"You don't sound like someone from New Zealand, but I don't think I've ever met someone from there before."

This was one of the more imaginative comments I have received since being seconded to the Major Surface Combatants (MSC) section of Director General Maritime Equipment Program Management (DGMEPM). Since 2023, I have had the unique privilege of being embedded with Canada's naval sustainment organization, working alongside Canadian Armed Forces (CAF) counterparts in support of the *Halifax*-class frigates. This opportunity was born from an interest from within the Royal New Zealand Navy (RNZN) to better understand how to sustain a critical warfighting capability on our respective surface combatant fleet; the Combat Management System (CMS).

As a Weapon Engineering Officer, or as colloquially termed here Combat Systems Engineer, I was posted into MSC 5-2, the subsection responsible for overseeing the sustainment of the Command and Control (C2) and Information, Surveillance, and Reconnaissance (ISR) systems onboard *Halifax*-class ships. My discussion here is not deeply technical but rather reflective; it offers a lens on how two nations, each with a deep maritime history, approach the challenge of naval sustainment.

RCN and RNZN Shared Technologies

The RNZN's interest in Canadian sustainment practices is not coincidental. Between 2014 and 2022, the RNZN undertook the Frigate Systems Upgrade (FSU) project for its *Anzac*-class frigates, HMNZS *Te Kaha* (F77) and HMNZS *Te Mana* (F111). Lockheed Martin Canada was selected as the Prime Systems Integrator, providing a modernized CMS and a suite of integrated sensors and effectors which largely mirrored the capabilities delivered during the RCN's *Halifax*-class Moderinzation/Frigate Equipment Life Extension (HCM/FELEX) project.

Both *Te Kaha* and *Te Mana* underwent major refits at Seaspan's Victoria Shipyards in British Columbia. Following the refits, I served as the Weapon Engineering Officer onboard *Te Kaha*. During this period, the challenge of bringing upgraded systems into operational service quickly became clear. One light-hearted yet telling moment involved my Commanding Officer asking while conducting a multilateral exercise, which HMCS *Winnipeg* (FFH-338) was in company, "Weps , can you explain why the system is telling me that the aircraft carrier is at 30,000 feet?" This comment perfectly sums up our reality. A powerful new capability, but we had some major teething issues.

The New Zealand Defence Force and Strategic Sphere

It is worth understanding New Zealand's context as a maritime nation. Our Defence Force comprises roughly 15,000 personnel across the Navy, Army, Air Force, Joint Forces, and Defence Services. The RNZN consists of approximately 2,150 Regular Force personnel who support a fleet of eight ships.

Despite New Zealand's size, the maritime responsibilities are significant. The Exclusive Economic Zone (EEZ) is among the largest in the world, and our search and rescue zone spans roughly seven percent of the earth's surface. New Zealand is responsible for coordinating one of the largest maritime search and rescue zones in the world at approximately 30 million square kilometres stretching from the Ross Sea in Antarctica to Niue and Tokelau in the north.

While New Zealand does maintain a coast guard, its structure and role differs significantly from what exists here in Canada. The New Zealand Coastguard is a volunteer-based organization focused on coastal search and rescue, primarily within coastal waters, rivers, and lakes. In contrast, the responsibility for enforcing maritime security and safeguarding the wider Exclusive Economic Zone falls to the Royal New Zealand Navy, with support from the Royal New Zealand Air Force and other government agencies.

Despite having one of the largest maritime jurisdictions globally, the RNZN operates a relatively small fleet, consisting of two offshore patrol vessels and two inshore patrol vessels for Pacific and EEZ operations, a multi-role vessel for amphibious and sea lift operations, a polar-capable replenishment ship, and the two frigates as its principal combatants. The Air Force contributes maritime surveillance through its P-8 Poseidon aircraft and other aerial assets. This combined capability is modest relative to the size of the area and New Zealand's regional commitments.

Common Challenges

Although Canada and New Zealand operate on opposite sides of the globe, both navies are contending with remarkably similar sustainment challenges. Both the *Halifax* and *Anzac* class frigates are approaching three decades of service, and with age comes increasing complexity. Maintenance periods are becoming longer and more resource intensive. Obsolescence is a constant concern, and sourcing replacement parts is becoming increasingly difficult. The material condition of the frigates is declining faster than traditional maintenance

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Source: CRSD Power Point at NFa Courtesy of the Professional Journal of the Royal New Zealand Navy S(P)

Canada, New Zealand, United Kingdom, United States, Japan, Netherlands Multilateral Exercise Oct 2021.

models can accommodate. Fragile supply chains, extended repair timelines, and operational demands are placing pressure on a system that is already finely balanced.

Both navies are also embarking on major ship procurement and building programs. The RCN is progressing toward the introduction of the River class destroyer. While the RNZN is preparing for a fleet renewal with all but one vessel expected to be decommissioned by the mid-2030s. Until these programs come into fruition, both navies must continue to sustain legacy fleets beyond their original design intent, requiring increasingly innovative and adaptive sustainment strategies.

Reflection of Organizational Sustainment

One of the enlightening aspects of my secondment has been observing how sustainment is managed within DGMEPM compared to its New Zealand counterpart, Defence Logistics Command (Maritime) or DLC(M).

DGMEPM is notable for its scale, structured governance, and depth of expertise. It benefits from layered oversight, clearly defined accountabilities and a disciplined approach to sustainment. One particular value I have witnessed is the strength and continuity of civilian staff, many of whom are retired military professionals who bring long-term organizational knowledge and technical expertise to their roles. The blending of military insight with civilian stability has allowed DGMEPM to maintain what I believe is a level of corporate knowledge that DLC(M) struggles to match.

In contrast, the Defence Logistics Command (Maritime) is far leaner. With fewer dedicated positions and frequent staff rotations, sustaining continuity is a constant challenge. However, this environment has also driven agility. Lower levels of delegated decision-making enable faster responses and more immediate problem-solving. Yet, this agility often comes at the cost of institutional knowledge. Crucial lessons are easily lost when personnel rotate every two to three years, making long-term sustainment planning more difficult.

Recognizing these challenges, the RNZN is increasing collaboration with DGMEPM through initiatives such as knowledge exchanges and secondments like the one I am currently undertaking. There are also more frequent visits from DLC(M) staff to DGMEPM to observe and learn from the sustainment approaches being implemented here. These engagements are helping to highlight capability gaps and identify opportunities to strengthen the practices within DLC(M).

Lessons and Reflections

As I enter the final year of my posting, I have begun to reflect on what I will take back with me to New Zealand. There are many technical insights on contracting, capability road-mapping and sustainment processes, but some of the most important lessons are cultural.

First, there is growing momentum toward establishing a sustainment culture that is proactive rather than reactive. I am seeing deliberate efforts within the CAF to embed the principles of continuous capability sustainment, recognizing that maintaining operational relevance cannot be deferred until the next capital project or mid-life refit.

Second, the importance of organizational knowledge cannot be overstated. Canada's culture of retaining skilled technical professionals beyond their uniform service ensures continuity. This is something which I believe is missing from the Defence sector within New Zealand.

Third, both navies face increasing demand with finite resources. The frigates: the workhorses of our fleets, are showing their age. Whether in the North Atlantic or South Pacific, we are stretching legacy platforms beyond their intended service life to maintain operational relevance in an increasingly complex and strategically charged environment. This reinforces the importance of partnerships, learning from one another, and doing what we can within our sphere of influence. Leveraging our partnerships, we can uncover practical solutions, gain perspective, and often realize that our challenges are more akin than we initially thought.

Final Thoughts

My time with DGMEPM has been both a professional and personal highlight. It has demonstrated the strength of our partnership, the similarities in our challenges, and that shared learning can occur between what on the surface are two very different nations' navies.

He Heremana ahau, I am a sailor.

LTCDR Shaun Taylor is a New Zealand Exchange Officer with MSC 5-2 Combat Management Systems, Major Surface Combatant in the Director General Maritime Equipment Program Management (DGMEPM).

Awards

Congratulations to the East and West Coasts Sailors of the First Quarter!

Photo courtesy Corporal Antonio Garcia Alvarez

MS Kyle Aubie was awarded the Canadian Fleet Atlantic Sailor of the Quarter, a marine technician on HMCS *Charlottetown* (FFH-339).

Photo courtesy DND

Maritime Forces Pacific's Sailor of the Quarter was presented to **S2 Jackson Langley**, a junior weapons engineering technician on HMCS *Ottawa* (FFH- 341).

Battle Honour LIBYA, 2011 presented to HMCS *Charlottetown* and HMCS *Vancouver*

(Courtesy Our Navy Today)

On June 20 and July 2, the Royal Canadian Navy proudly presented the Battle Honour LIBYA, 2011 to HMCS *Charlottetown* (FFH-339) and HMCS *Vancouver* (FFH-331), respectively, in recognition of their exemplary service during Operation MOBILE.

Battle honours are a rare and prestigious distinction awarded to military units for exceptional valour and dedication in combat operations. During Operation MOBILE, both ships played key roles in enforcing the United Nations arms embargo off the coast of Libya.

HMCS *Vancouver* escorted and defended vulnerable vessels, supported replenishment ships, and patrolled the embargo zone.

HMCS *Charlottetown*'s deployment marked a historic moment—it was the first time a Canadian warship came under hostile fire since the Korean War.

These honours reflect the bravery, skill, and professionalism of the crews of HMCS *Charlottetown* and *Vancouver*, and Canada's enduring commitment to global peace and international security.

Photo courtesy Corporal Mitchell Paquette

Members of HMCS *Charlottetown*'s OP MOBILE crew gather around the ship's Battle Honours

Photo courtesy Corporal Conor Munn

The HMCS *Vancouver* Battle Honour LIBYA, with Commander Malorie Aubrey, Commanding Officer of HMCS *Vancouver*, and The Honourable Wendy Cocchia, Lieutenant Governor of British Columbia.

News Briefs

Walking in Their Footsteps: The Story Behind Halifax's First World War Memorial Arch

By Gabrielle Brunette

Halifax, 20 May 1915

They trudged carefully along the waterfront, consumed by the anticipation of what awaited them. Each step felt heavier than the last, weighed down by their heavy, woolen uniforms and filled packs. Their boots – once scuffed across farmer's fields, factory floors, school yards, and city streets – now thudded in unison against the wooden planks of the dock, leaving a uniform print behind.

Soldiers. That's what they were now. Stripped of the lives they had led before, marching towards an uncertain future.

Behind them, the city stood still in the early light of morning. Ahead, the ships waited, their engines humming low beneath the sounds of sea and wind colliding, creating waves that crashed against the hulls. One by one, they climbed the gangways – unsure if they would ever come home again.

More than a century later, an idea and an old pair of boots, would bring these footsteps back to life.

A Conversation Over Tea

It began in a small Halifax café, where two old friends, **Corinne MacLellan**, who was a communications officer for the provincial government at the time, and **Nancy Keating**, an artist with a background in public relations, were catching up over a cup of tea.

MacLellan had been in the middle of planning events for the Great War centennial period when she came across an old pair of military boots. They were Ammunition Boots, the standard issued combat boot worn by Canadian Soldiers during the First World War.

Halifax played a significant role during the First World War, serving as the main gateway between Canada and Europe for thousands of Canadian and Allied soldiers. More than 350,000 soldiers were deployed out of the Halifax harbour. "How is it that this is the place that hundreds of thousands of Canadians took their last steps on Canadian soil, and we don't really mark that place? That's weird," MacLellan said.

Looking for ways to honour those thousands of souls – lost or forever changed – MacLellan floated the idea of using the boots to press footsteps into concrete, symbolizing that final march.

Keating teased, "The only time someone would see it is if they tripped over it."

MacLellan shot back with, "If you're so smart, come up with a better idea."

That off-handed challenge marked the beginning of what would become The Last Steps – a memorial arch commemorating the service and sacrifice of those who served in the First World War.

Bringing The Concept to Life

The concept for the memorial was carefully thought out by Keating. It needed to tell the story in a way that would make people truly understand the weight and significance of those final moments. For her, the most powerful way to do that wasn't just to show history — it was to make people feel it. To walk the same path. To take "last steps" of their own.

"The way I looked at it was, those footprints were always there. We just couldn't see them anymore," Keating said. "So, I needed to put them back."

Keating's design consisted of a wooden gangway, like those used to board troop ships during the First World War, leading to a victory arch built out of lumber and steel, with the words The Last Steps fastened above.

"They made a commitment, not knowing what lay ahead. That's what the arch stands for — that moment of decision, of courage," she explained.

Scattered civilian footprints would be painted onto the planks of the boardwalk leading to the gangway, where they turned into the hobnailed pattern of Ammunition Boots.

MacLellan and Keating teamed up with **Ken Hynes**, then-curator of the Army Museum Halifax Citadel. With only a concept sketch in hand – and no funding, formal backing, or location for the monument – the trio set to work, determined to bring this concept to life. "To say that we bonded over a commemorative kinship would be, I think, to put it mildly," MacLellan said.

The team pushed forward, past every obstacle thrown their way, driven by a shared belief that this story mattered and that it had to be told.

They attended various meetings, made countless phone calls, and pitched their idea until their perseverance finally paid off. People began to understand the importance of the monument, and support began to trickle in. "We brought people kicking and screaming along with us until they got the idea," Hynes said with a smile.

In the end, The Last Step was made possible through various community partners from Build Nova Scotia to the Atlantic Canada Opportunities Agency. Coastal Woodworkers in Burnside were brought on to build the structure and the Maritime Museum of the Atlantic provided a location for it to be displayed, next to the *CSS Acadia*.

The Rise and Fall of The Last Steps

From the moment it stood up on the Halifax waterfront in 2016, The Last Steps resonated.

"You'd look at the webcam and there was never a moment someone wasn't there, standing in silence or taking it in," Hynes said. "That's when we knew it had worked."

The monument also caught the attention of people on an international scale, which led to a sister monument being erected in Belgium with the help of MacLellan, Keating, and Hynes. Canada Gate, also designed by Keating and made almost entirely out of steel, commemorates the Battle of Passchendaele where more than 14,000 members of the Canadian Armed Forces were wounded, and almost 4000 were killed in action. It's design – made up of two arches connected by a wooden pathway, similar to those found in trenches, where the hobnailed footsteps continue – symbolizes the arrival of Canadian and Allied soldiers onto Belgium territory. It's meant to be a direct portal from The Last Steps.

But soon that link would be broken, needing to be restored.

By 2023, the arch had deteriorated significantly, after multiple years of being exposed to the harbour's harsh winds and salt air. MacLellan and Hynes made the difficult decision to dismantle the arch themselves, salvaging what they could: the concrete base of the monument and the lettering.

MacLellan remembers the disheartening feeling of breaking down the remains of the monument with their bare hands, thinking this was the end of The Last Steps.

But after so much time and effort put into this project, MacLellan, Keating, and Hynes, had a hard time letting go. "You can't let something so meaningful just fall. It deserves to stand again," Hynes said.

That's when **David Benoit**, Captain(N) (Ret'd) and CEO of Build Nova Scotia, put the team into contact with Fleet Maintenance Facility (FMF) Cape Scott.

Time and time again, the trio have put their fate behind the power of the monument, and every time they have been met with support and understanding. This time was no different.

Renewing a Lasting Legacy

As the former Commanding Officer of the maintenance facility, the retired Captain(N) knew the level of skill, knowledge, and capability of the FMF Cape Scott workforce. The facility could ensure that the monument was once again stood up on the Halifax waterfront for tourists and locals alike.

Recognizing both the monument's historical importance and its alignment with their own legacy of service, FMF Cape Scott agreed to help rebuild and maintain The Last Steps.

MacLellan, Keating, and Hynes have expressed on multiple occurrences how grateful they are for FMF Cape Scott's help with restoring this important monument and piece of history.

"You can't help but believe that there's some energy in the universe that is making the right people show up at the right time," Hynes said.

The rebuilt Last Steps Memorial Arch was unveiled on June 22 at Halifax's Museum Wharf as part of Fleet Week 2025. A delegation of buglers from the Menin Gate in Ypres, Belgium performed The Last Post at the ceremony. The Last Steps continue on.

*In memory of **Ray Brush**, who rebuilt The Last Steps alongside **Mark MacIsaac**. Your dedication and craftsmanship live on in the Navy and wider community.*

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

Photo by Gabrielle Brunette

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CNTHA Chair
Pat Barnhouse

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Lt(N) Jason Delaney

Maritime Engineering Journal Liaison
Brian McCullough

Webmaster
Peter MacGillivray

Webmaster Emeritus
Don Wilson

CNTHA News is the unofficial newsletter of the Canadian Naval Technical History Association. Please address all correspondence to the publisher, attention Lt(N) Jason Delaney, Directorate of History and Heritage, NDHQ
101 Colonel By Dr
Ottawa, ON K1A 0K2
Tel. (613) 998-7045
Fax (613) 990-8579

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Remembering Captain(N) Rolfe Monteith
October 1923 – July 2025

The Royal Canadian Navy, and the Naval technical community in particular, has lost one of its heroes, Captain(N) Rolfe Monteith, CD, in his 102nd year.

Rolfe Monteith left Clinton, Ontario at the age of 17 to join the Royal Canadian Navy as an engineering cadet in 1941. He joined other Canadian volunteer cadets of the Special Entry 55, Britania Royal Naval College, who sailed aboard the merchant cruiser RMS *Laconia* (1921), a converted Cunard passenger liner, in convoy HX 147 with 64 merchant ships and an escort screen that included several Canadian corvettes. A year later, *Laconia* would be sunk with crew and passengers including women, children, and Italian prisoners of war lost. A story retold by Rolfe Monteith in his captivating special feature in the Battle of the Atlantic 75th Anniversary issue of the *Journal* (*MEJ* 93).

Monteith joined HMS *Hardy* (R06) in late 1943 as a young mid-shipman and sailed in company with HMCS *Haida* (G-63) and *Iroquois* (G-89) as part of the escort for battleship HMS *Anson* (79) to the Bering Sea and later escorted Russian convoy JW 54B to Murmansk and Archangel.

> As a very young midshipman, I was on a steep learning curve aboard ship. Being in the engineering branch, I naturally came to the attention of the squadron engineer – one **Cdr Ernie Mill** – who insisted that you be able to operate and restart any and all machinery in the ship, even if a compartment was blacked out. It was an invaluable lesson in damage control in case of enemy action, especially on the convoys from Scapa Flow to Russia where we could expect attacks by German U-boats and Luftwaffe aircraft at any time.

While Monteith was bitter about having to leave theatre and return to Plymouth to complete his engineering course, his former shipmates in *Hardy* were soon to serve on another run to Russia. Their destroyer was struck and sunk by U-278 about 30 days after he had disembarked.

www.youtube.com/watch?v=hpZd0Nev6MA

Sadly 35 men were lost, many of which had become Monteith's close friends. Although not directly involved in this action, he never really got over this incident until a chance meeting at a naval reunion held at Loch Ewe in May 2017. There he was introduced to the son of one of the crew. Learning how **Chief Petty Officer Electrical Artificer Fred Pearce**, who had befriended and mentored him aboard HMS *Hardy*, and others survived the sinking finally brought some closure.[1]

After the war Capt(N) Monteith specialized as an air engineer and was the Engineering Officer of the destroyer HMCS *Sioux* (R-64), a former sister ship to HMS *Hardy*. He also served as Air Engineer Officer aboard the aircraft carrier HMCS *Magnificent* (CVL-21). Later in his career he held appointments both as Director of Air Engineering and then as Director of Marine Engineering, as well as Project Manager of the Canadian Hydrofoil Project, including many other achievements (*MEJ* 106). After his retirement he moved to the UK, and worked for engineering companies Babcock and Wilcox, and the Weir Group.

Upon his retirement Rolfe continued to preserve Canada's naval technical heritage through the formation of the Canadian Naval Technical History Association (CNTHA), the Canadian Naval Air Group (CNAG), the Canadian Veterans Association (UK), the Arctic Convoys to Russia Association as well as reunions including several Special Entry 55. His legacy lives on through the CNTHA News as well as through the CNAG publication *"Certified Serviceable" – Swordfish to Sea Kings: The Technical Story of Canadian Naval Aviation by Those Who Made It So.*

He was one of the founders of Canadian naval technical history and remains a mentor to us all.

1. Obituary by Major-General (ret'd) Mungo Melvin, https://www.forposterityssake.ca/