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Photo courtesy Cdr Edward Feltham

Royal Australian Navy Exchange Officer LCDR Dhananjay Gangurde on HMCS *Windsor* (SSK-877)

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Director General Maritime Equipment Program Management

Commodore Michel Thibault, CD

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Computer-generated image of the River-class Destroyer at sea.
Government of Canada image

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COMMODORE'S CORNER

Filling the Capacity Gap and Building Tomorrow's Workforce

By Commodore Michel Thibault, CD

Photo courtesy Seaspan

Joint Support Ship HMCS *Preserver* at Seaspan with its consolidated bulbous bow in September 2025.

In my previous Commodore's Corner (*MEJ* 113), I wrote about the historical commitment recently made by the Government of Canada, and the pressing need for the Naval Engineering and Maintenance (NEM) Enterprise to quickly adapt and accelerate the delivery of readiness to the RCN. The budget tabled by the government this fall confirms that we expect resources to match our capacity to execute, however the overall demand for the Enterprise continues to exceed capacity. The emergent capacity gap isn't new, but it is exemplified in this current environment and is quickly becoming our Achilles' heel.

The Engineering and Maintenance capacity gap is being felt at all levels of the RCN and industry: the RCN technical occupations are currently operating at approximately 75% of their total capacity. This represents a blended capacity across all technical occupations, with some in the 60% while others are much higher. The public service component on the other hand is at approximately 76%. Industry's capacity gap in the marine sector isn't as easy to quantify but there are clear signs where additional capacity is needed to accelerate delivery.

The RCN is amid one of its most important occupational reviews, with analysis and changes being conducted across all technical occupations. While the drivers for these analysis and changes are multiple, the key ones are fleet renewal and retention. Adapting our occupations to ensure we remain attractive and relevant to reflect both today and tomorrow's challenges is essential in this market, and we must dedicate the necessary focus and support to ensure we are successful. After all, without sufficient qualified technicians, the RCN will continue to be limited in its ambitions and ability to contribute meaningfully to the NEM Enterprise.

Government of Canada image

Artist's rendition of RCN's future fleet – Joint Support Ship, River-class Destroyer and Arctic and Offshore Patrol Ship.

The Maritime Equipment Program Management (MEPM) division is also coping with a capacity gap across its organization; with efforts being deployed to alleviate short-term shortages and planning underway to design the organization required in 2030 and beyond (see *MEPM 2030 – Transforming the Naval Materiel Enterprise and Building the Future of Canada's Naval Sustainment Enterprise* in this edition). MEPM is exiting an era of resource constraints, resulting in an organization that is highly limited in depth and breadth, thus hampering its ability to surge or sustain an increased tempo over a long period. While this situation presents clear risks in our ability to meet the demand placed on the Enterprise, it also presents opportunities to invest in measures that will improve efficiencies. In my opinion, the optimal solution for MEPM is to simplify and streamline existing processes while investing to re-build and bolster our workforce capacity in targeted functional areas. Therefore, mitigating our current capacity gap, and designing and re-building MEPM for 2030 and beyond is one of my top priorities.

The situation within the marine industrial base is more complex and dissimilar, but in general, long-term commitment with constant and sustained demand is a key enabler to a successful human resource strategy. While the National Shipbuilding Strategy has helped communicate the government's long-term commitment to Canada's marine industry and enabled some growth, uncertainty in resource levels year over year have prevented adequate provision of capacity. My hope is that much of this uncertainty is behind us, and that going forward, a constant demand can be placed on our industry partners that provides long-term predictability to allow appropriate planning. The Defence Industrial Strategy expected to be released by the Department of National Defence (DND) is also expected to provide additional clarity and predictability. But once again, feedback received by industry partners support the need for a balanced approach between increasing capacity and streamlining existing processes with DND and the government to allow the necessary acceleration. I look forward to continuing our work together to improve our collective efficiency.

It goes without saying that a key and common strategic issue within the Enterprise is our people. Unless we dedicate the necessary efforts to attract, retain and grow our Enterprise, we will struggle to deliver our program and limit the RCN in its ambitions. There's never been a more opportune time to focus on our people.

I want to take this opportunity to also wish everyone a well-deserved holiday season, and I look forward to continuing our work together in 2026.

FORUM

Remembering Commander (Ret'd) Roger Heimpel: The Engineer with the Red Hat and a Big Heart 1962-2025

Article coordinated by LCdr (Ret'd) Janan Sutherland, CD with submissions from Cdr (Ret'd) Jason Lawton, Cdr (Ret'd) Gerry Parsons, LCdr (Ret'd) Chris Richter, and LCdr (Ret'd) Roberto De Marco

Editor's Note: The passing of Cdr (Ret'd) Heimpel gives all of us the opportunity to remember a mentor and role model. Roger Heimpel, originally from Mitchell, Ontario, joined the Navy in 1981 as a Maritime Engineering Technician. He enrolled in the University Training Plan for Non-Commissioned Members (UTPNCM) in 1987 and attended both Royal Roads Military College and Royal Military College. Roger's first ship was HMCS *Saskatchewan* (DDE-262), and after receiving his commission, he was the Marine Systems Engineer Officer on HMCS *St. John's* (FFH-340) and HMCS *Fredericton* (FFH-337) (*MEJ* 45). Other posting highlights were Damage Control Division Commander, Sea Training (Atlantic) where he led the CHEMOX replacement project, the first Detachment Commander for the *Halifax*-class Modernization/Frigate Life-extension project, Fleet Technical Officer and his last position at N37 as the Deputy Chief of Staff. Cdr Heimpel retired in 2015 and moved to New Brunswick. He leaves his wife Lauralea, son Frank, and stepdaughter Andrea (Kris), two grandchildren, as well as an extended family. Roger was predeceased by his son Ross in 2022.

Photo courtesy LCdr (Ret'd) Janan Sutherland

The passing of Commander (Ret'd) Roger Heimpel in August 2025 leaves a deep void in Canada's Naval Technical community. For many of us, he was a colleague, a mentor, a confidant, and most importantly, a friend. Remembering Roger is not a simple task as he was larger than life, both in presence and impact. He embodied a unique combination of technical brilliance, gruff humour, quiet compassion, and unwavering dedication to those around him.

So how do you encapsulate a man like Roger Heimpel in words? As one of his close colleagues put it: "It's difficult to encapsulate someone so larger-than-life into words." But through the stories, memories, and the voices of those who served with him, we can try. This is a compilation of our efforts.

The Rough Exterior, the Deep Heart

Roger was known for his unmistakable presence—a man who could seem, at first glance, like a character straight out of a western. "He had a rough exterior, sort of like the Marlboro Man," remembered **LCdr (Ret'd) Sutherland**. But anyone who spent time with him quickly realized that this was only the surface. Beneath the hard-edged wit and unwavering confidence was a man of extraordinary empathy. Sutherland continued:

> He painted a landscape scene and gave it to my son, with a personal message written on the back. That was a tender-hearted moment. He visited us in the hospital after my son was born. He cared deeply—not just as a military leader, but as a human being.

NTO table foot rail and leg support detail.

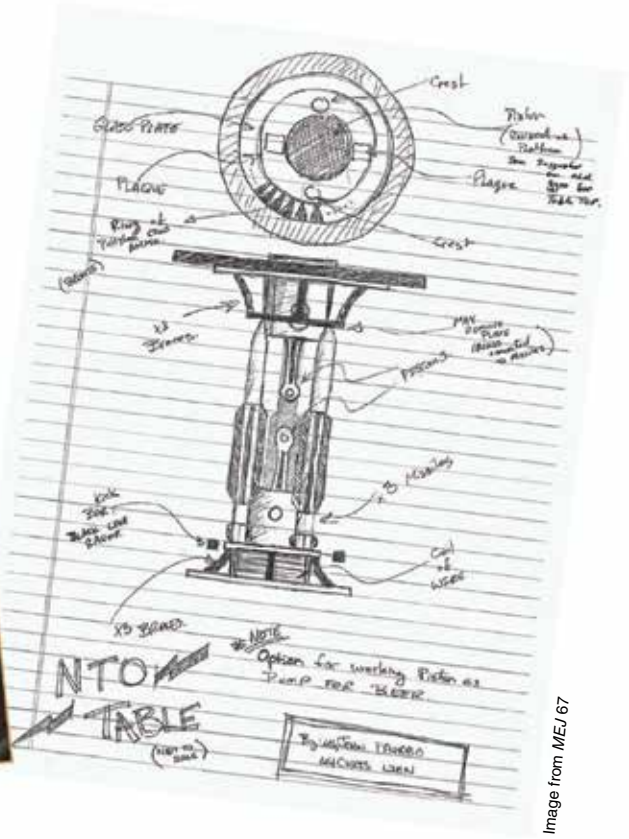

Image from *MEJ* 67

Maritime Forces Atlantic Naval Technical Officers Table, showing original design by LCdr John Faurbo and LCdr Chris Lien, with final production with modifications by Cdr Roger Heimpel.

Roger was a man of paradoxes. A tough leader who quietly painted. A chain-smoking engineer who could bring a room of hardened sailors to tears with his care. "I always saw a hint of a tormented soul," Sutherland added, "he had some regrets in his personal relationships—and shared those lessons with those of us he mentored. He taught not only how to be a good officer, but also how to be a better father, husband, and friend."

Leading from the Front

From his early days at the Damage Control Division to his role as Fleet Technical Officer, Roger led with unshakeable competence. He wasn't afraid to challenge the status quo and always stood up for what he believed was right. **LCdr (Ret'd) Richter** recounted,

> He never let an urban myth get in the way of proper training. When people worried that SCBA[1] gear would sink a sailor if they fell overboard, Roger didn't argue—he just jumped into a pool in full gear and filmed it. That video is still used today.

He pioneered training reforms, pushing for full-team Damage Control exercises instead of just section-based drills. He introduced SCBA into the fleet faster than anyone thought possible. He was relentless in his pursuit of operational excellence and left an indelible mark on how naval engineering is taught and practiced today.

Richter added that Roger would schedule mentorship sessions for junior engineers before their boards throughout the fleet. It must have been a relentless schedule, but he filled every moment. He was extremely generous with his time.

The *Kootenay* Legacy

One of Roger's greatest contributions was ensuring that the story of HMCS *Kootenay* (DDE-258) and the tragedy of the gearbox explosion in 1969, was never forgotten. He taught generations of naval engineers the technical and human lessons from that event, going far beyond the classroom.

"He went above and beyond," **LCdr (Ret'd) De Marco** recalled. "He introduced our class to the survivors. He brought in men like **Earnie Moffatt** and **Dinger Bell** to speak with us. It was unforgettable." Roger ensured the *Kootenay* memorial service was held annually and even flew to Portsmouth, United Kingdom, one year to hold the ceremony there.

(Continues next page...)

1. Self-Contained Breathing Apparatus (SCBA)

But beyond commemoration, he acted. With his children and colleagues, he led work parties to clean up the Sailors' Memorial, honouring lives lost in peacetime. It wasn't about ceremony for Roger. It was about *duty*—to remember, to educate, and to care.

The Mentor

Throughout his career, Roger took mentorship seriously. It wasn't performative, it was deeply personal. He had a remarkable ability to meet people where they were, regardless of rank or background.

"He challenged me to be better, to know more, to be my best," De Marco reflected. "But he did it in a soft, non-intimidating way. His humour was contagious and could put anyone at ease."

For many, Roger's mentorship didn't end when the job did. He kept in touch, checked in on people during hard times, and always paid attention to the small details that mattered most.

"He was more than the rank he wore on his shoulder," said De Marco. "He was one of the best human beings I've been lucky enough to know."

A Life of Service—On and Off the Ship

Roger's technical proficiency extended far beyond the sea. While at NETE, he helped initiate critical work like the Materiel State Validation program and contributed to the development of comprehensive docking work packages—programs still in use today. He was a gifted writer, thinker, and engineer.

Cdr (Ret'd) Lawton recalled, "I thought he created the Tiger Team philosophy—he gathered a group of salty but exceptional senior techs and made it work. During work-ups, he had Hull Techs make eye patches. The Sea Trainers were constantly met by pirates. It was brilliant team-building—classic Roger."

Whether it was organizing triathlons, marathons, or donut breaks with the odd cigarette, Roger built camaraderie. He had a way of making people feel like they were part of something greater.

Even in retirement, he stayed close to the engineering world—contributing to 3D printing initiatives at FMF Cape Scott, coordinating shock testing trials, and mentoring young officers. His retirement party at Royal Artillery Park was packed—a reflection of the many lives he touched.

The Man with the Red Hat

Cdr (Ret'd) Parsons offered a simple yet powerful image: "The man with the red hat and the big heart." Roger didn't need accolades or attention. He led with integrity, and he gave without expectation.

"Not all superheroes wear capes," Parsons said. "Roger was a close friend, a role model, a patriot. He poured his heart and soul into everything—family, the Navy, his art, the outdoors. He gave us guidance on readiness, on FMF resourcing, and on life. We're all better for knowing him."

And so, we remember the red hat. The green coffee mug. The long chats on smoke breaks. The well-timed glare across a boardroom table. The quiet compassion behind a gruff voice. The unwavering commitment to readiness, technical excellence, and—most of all—people.

Final Watch

Roger taught us what right looks like. Not just in technical matters, but in leadership, in service, and in life.

His legacy is not just the programs he built, or the reforms he championed. It is in the countless engineers, sailors, and officers who strive to emulate his example. It is in the human connections he nurtured, and in the standard he set.

To those who were mentored by Roger, carry that wisdom forward. To those who served alongside him, tell his stories. To those who knew him as a friend, remember the laughter, the lessons, the stubborn resolve, and the tender heart.

As we say farewell to a true naval officer, we take comfort in these words:

"Roger, we've got the watch."

FEATURE ARTICLE

MEPM 2030 – Transforming the Naval Materiel Enterprise and Building the Future of Canada's Naval Sustainment Enterprise

By Commander Bobby Gilpin, CD, P.Eng, MASc, MDS, B.Eng

Government of Canada images

The new River-class Destroyers.

Over the next decade and a half, Canada's Royal Canadian Navy (RCN) and its engineering and sustainment community will go through one of the most significant transformations in their modern history. The Maritime Equipment Program Management (MEPM) Division is evolving from a structure designed around today's legacy platforms into one capable of sustaining the next generation of far more complex, integrated, and digitally enabled warships.

This transformation, called MEPM 2030, is about far more than simply accepting new ships. It is about re-imagining how we, as engineers, technicians, procurement specialists, materiel managers, and support personnel deliver materiel readiness for the RCN in a world where change is constant and rapid.

A New Era of Fleet Complexity

Canada's future fleet will be unlike anything we have managed before in size, capability, lethality, and sophistication. Over the coming years, MEPM will take on sustainment responsibility for 15 River-class Destroyers, up to 12 Canadian Patrol Submarines, a potential Maritime Coastal Defence Vessel (MCDV) replacement in the form of a Continental Defence Corvette, two Joint Support Ships, six Arctic and Offshore Patrol Ships, and a range of smaller craft including tugs, barges, and training vessels.

That is not just a growth in hull numbers. It is a transformation in scale, complexity, and technological reach.

One of the biggest changes will come with the introduction of the Aegis Combat System, the operational heart of the River-class Destroyer. Aegis brings Canada into a unique partnership with the United States Navy (USN), where collaboration, configuration management, and disciplined availability practices are second nature. Supporting Aegis means learning to operate at that level, integrating deeply with the USN Naval Sea Systems Command (NAVSEA), managing baselines with precision, and ensuring our engineering, supply, and information systems are fully aligned.

(Continues next page...)

Courtesy of ISI Shipbuilding

Rendering of the future Halifax Shipyard showing multiple River-class Destroyers under construction.

Becoming part of the broader Aegis community will fundamentally change how Canada manages combat systems sustainment. It will require deep technical knowledge, agile governance, and a culture that embraces constant evolution. Integrated teams, possibly built around program of record offices, will work together to deliver sustained availability through life cycle materiel managers, procurement experts, industry partners, and regulatory engineers.

This approach signals a new era of collaboration across the Canadian defence enterprise where government and industry work hand in hand to keep our fleet ready for any mission.

Our Mission and Vision

Our mission in MEPM has always been clear. We deliver materially ready maritime fighting forces with speed and agility to the Canadian Armed Forces.

Our vision for the future builds on that mission. We aim to be a defence leader in materiel sustainment, driven by a professionally, engaged, and resilient team committed to innovation and operational readiness.

These guiding principles have not changed, but the environment we operate in has. The ships we will sustain by 2030 will be software-driven, interconnected, and globally networked. MEPM 2030 is designed to make sure our people, processes, and partnerships evolve right alongside them.

Why We Need to Change

Several forces are pushing this transformation forward.

Fleet renewal is the first. The number of new ships entering service over the next decade will stretch our capacity. Each class brings its own supply chains, training systems, and technical challenges.

People are the second. Recruiting and retaining skilled engineers, project managers, and materiel management professionals is already difficult in today's job market. Doing so while standing up multiple new ship classes demands a clear workforce strategy and meaningful investment in training and professional development.

Funding predictability is another key factor. Sustainment depends on stable, multi-year funding and disciplined delivery against defined targets. Our primary challenges are now two-fold; first, to work with industry partners to make multi-year commitments that will enable them to build the capacity required for higher fleet readiness. Second, to deliver within a fundamentally different paradigm: one where the maintenance program is fully funded and executed through a model that emphasizes clear performance targets, multi-year contractual commitments, greater risk tolerance, and agile contracting mechanisms.

The National Shipbuilding Strategy is a good example of multi-year funding, representing a long-term investment in domestic capability. While not without its challenges, it illustrates the type of consistent engagement that builds a stronger defence industrial base.

At the same time, we must remember that industry is our partner, not our pilot. Government and the defence team must stay firmly in the driver's seat, guiding national priorities and ensuring that public investment delivers the capability our sailors need. That said, how industry fulfills those priorities must not be unduly constrained. The Canada-Industry Integrated Project Team (CI-IPT), is a good example of how stepping back at the right moments can drive greater readiness more quickly. We will continue to lead, but with openness to innovation and a willingness to assume informed risk, recognizing that some of that risk may be realized, and that is acceptable if it moves us toward greater operational effect.

Finally, we must confront our organizational mindset. For too long, defence sustainment has lived by the phrase "doing more with less." The government's current investment posture gives us the opportunity and responsibility to do more with more. That means investing smartly in people, systems, and infrastructure to build a sustainable naval enterprise for the long term.

Designing the Organization for 2030

Transforming MEPM is not just about changing reporting lines. It is a deliberate, multi-year process of analysis, design, and implementation that touches every part of the organization.

The first step is a comprehensive review of how we are structured today. Can our current model manage multiple combatant classes, a new submarine fleet, and emerging technologies such as autonomous systems? Should we reconsider the balance of functionally organized system responsibilities and ship class-based responsibilities? The answer may be to retain elements of our hybridized organization, but with a greater balance towards deep technical expertise in the areas of greatest complexity.

We are also re-examining the roles of the Design Authority (DA) and Naval Materiel Regulatory Authority (NMRA) to ensure they are properly aligned with the demands of the future fleet. Splitting DA responsibilities between platform and combat systems may be necessary to manage increasing integration complexity. We are also assessing how submarine sustainment, cyber security, and autonomous systems fit into this new structure.

Photo courtesy ADM(MAT) PMO Joint Support Ship Detachment

Future HMCS *Protecteur* alongside Vancouver Shipyard, completing outfitting ahead of sea trials expected in 2026.

Building the Workforce

No transformation succeeds without the people in the naval sustainment organization writ large. The future sustainment and engineering workforce will need to be larger, more diverse, and more adaptable than ever. MEPM 2030 includes a focused human resources strategy to identify staffing needs, training priorities, and succession planning requirements. The goal is a resilient organization that can absorb attrition, surge when needed, and sustain multiple fleets at once.

We are also looking at how to strengthen our coastal presence in Halifax and Esquimalt. Closer alignment with the coastal Naval Engineering and Maintenance organizations, including supply could improve responsiveness and integration. The Naval Materiel Enterprise will need to deliver engineering and maintenance expertise where the fleet needs it most, in peace or in conflict, without specifying which organization (Fleet Maintenance Facilities, Maritime Equipment Program Management including Naval Engineering Test Establishment, Fleet Technical Authorities, industry, classification society, etc.) would be entrusted to deliver the services.

Predictability, Performance, and Partnership

Predictability is the foundation of good sustainment. To achieve it, MEPM 2030 will emphasize disciplined, data-driven program management. Resources will be tied to measurable outcomes, and priorities will be balanced across all ship classes through a portfolio-based approach.

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Partnerships emerging from the future fleet will reshape how we deliver naval engineering and sustainment. As Canada deepens collaboration with trusted allies, we are entering an era of stronger interoperability and sovereign capability.

Our involvement in the Aegis Combat System enterprise with the United States, along with participation in the Global Combat Ship partnership with the United Kingdom, Australia, and Norway, connects Canada to a broad network of shared expertise. These relationships provide access to proven practices in combat systems engineering, lifecycle management, and configuration control while strengthening interoperability across allied fleets.

At the same time, Canada's leadership in the Combat Management System 330 (CMS 330) highlights domestic innovation. Deployed on the *Halifax*-class, Arctic and Offshore Patrol Vessels, and Joint Support Ship, with partial integration on the River-class Destroyer, CMS 330 anchors a growing user community that includes Canada, New Zealand, Chile, and our newest partner Germany. Together, these efforts position Canada to contribute meaningfully to allied naval programs while sustaining a strong national foundation in maritime capability.

Culture, Mindset, and Innovation

Charts and funding models will not deliver transformation by themselves. People will. We need a culture that encourages innovation, challenges assumptions, and rewards initiative. Engineers and program officers must feel trusted to find better ways to deliver outcomes. This may further support the need for an evolving set of authorities and faster decision cycles to remain operationally relevant in a changing threat environment, in line with some of the current initiatives being brought to bear by the government.

Doing more with more is about creating sustainable capacity. It means investing in modern digital tools, simplifying governance, and empowering decisions closer to where the work happens including working closely with Canadian industry. It also means prioritizing professional development and lifelong learning so that MEPM remains a centre of technical excellence.

Working Across the Enterprise

MEPM 2030 will not happen in isolation. It will be coordinated across the Materiel Group, including Director General Major Project Delivery (Sea), the RCN, and partners in Public Services and Procurement Canada (PSPC) and Innovation, Science and Economic Development Canada (ISED) and will also include the growing Canadian defence industry. Aligning efforts will prevent duplication and ensure that the transformation strengthens the broader defence enterprise.

We will also continue exploring collaborations with the Canadian Coast Guard and other federal partners where shared support models make sense. The ultimate goal are sustainment solutions that deliver value to the taxpayer, readiness to operators, agility to respond to varying operational needs, and economic benefits to Canadians.

Looking to 2030 and Beyond

By the end of this decade, MEPM and the broader naval sustainment enterprise will operate as a cohesive, forward-leaning organization capable of supporting a modern, multi-fleet Navy. It will possess the depth and technical capacity to sustain advanced systems such as Aegis and CMS 330, the governance authority to manage complex international partnerships, and the agility to anticipate and respond to operational demands, from routine readiness to global contingencies. It will provide Canadian industry the signal it needs to ramp up production. In short, MEPM 2030 will represent a fully integrated sustainment enterprise, unified in purpose, disciplined in execution, and prepared for the fleet of tomorrow.

Most importantly, it will be built around people, including engineers, technologists, and program officers, empowered to innovate, collaborate, and lead.

The path ahead will take commitment, communication, and trust. The reward is a modern sustainment organization ready to keep Canada's fleet at sea, capable, and combat-ready for decades to come.

As naval sustainment professionals, we have always adapted to new challenges and delivered ships that fight, endure, and return home safely. MEPM 2030 is the next step in that proud tradition, ensuring that Canada's future fleet remains safe, capable, and operationally relevant, sustained by a professional, engaged, and agile team ready for whatever comes next.

Commander Bobby Gilpin is the Chief of Staff (Personnel) for Director General Maritime Equipment Program Management.

FEATURE ARTICLE

Heavyweight Torpedo Upgrade Project for the *Victoria*-class Submarines

By Nihal Karyakarte

Strategic Context for Modernization

The Royal Canadian Navy's *Victoria*-class submarines have undergone a major capability boost with the adoption of the Mk 48 Mod 7AT heavyweight torpedo. This upgrade replaces older torpedo technology and addresses a critical need to keep the submarines combat relevant into the 21st century. For years the fleet relied on the Mk 48 Mod 4M variant, a reliable weapon developed with 1980s technology. By the 2010s, the Heavyweight Torpedo Upgrade (HWTU) project set out to modernize this primary armament. The selected solution, the American built Mk 48 Mod 7 Advanced Technology (AT) torpedo, offers a significant technical leap over the older Mod 4M. The Mod 7AT is an advanced heavyweight torpedo featuring a fully digitized sonar and improved guidance systems for precise targeting and tracking, along with software/hardware upgrades that dramatically enhance its range, homing ability, and resistance to countermeasures. In fact, the new torpedo's Common Broadband Advanced Sonar head and modernized electronics greatly improve its ability to detect quiet targets and operate in complex acoustic environments. In practical terms, this means a *Victoria*-class boat can engage targets at greater distances and with higher effectiveness than was possible with the older weapon. Upgrading to the Mod 7AT also aligns Canada's submarines with those of key allies, ensuring interoperability in combined training and a secure supply chain for the torpedoes going forward.

The *Victoria*-class boats are among the RCN's most strategic assets; their stealthy, long-range capabilities are critical for protecting Canada's maritime approaches and supporting allied missions abroad. Upgrading their primary weapon to a modern standard is essential to maintaining this strategic edge and national sovereignty. Modern anti-submarine warfare demands such advancements, as the latest torpedoes must be able to detect ultra-quiet submarines and outmaneuver evolving countermeasures. By adopting the same advanced torpedo used by principal allied navies, Canada also gains interoperability benefits in training and logistics.

Photo courtesy Marc St. Jean

HMCS *Corner Brook* embarks Mk 48 7AT shape in support of Harbour Acceptance Trials May 2025.

Program Objectives and Scope

Initiated in 2012, the Heavyweight Torpedo Upgrade (HWTU) project's primary objective was to replace or upgrade Canada's inventory of submarine-launched heavyweight torpedoes from the Mk 48 Mod 4M to the Mk 48 Mod 7AT across the *Victoria*-class fleet. The scope of this national undertaking was comprehensive. It involved converting a number of the existing torpedoes to the Mod 7AT configuration (including both warshot and exercise versions) and procuring additional Mod 7-compatible components to support training and test firings. Rather than purchasing entirely new torpedoes, the Navy chose to upgrade its existing stock of Mk 48s using conversion kits, a cost-effective approach that modernized the weapons' electronics and performance. In tandem, the

(Continues next page...)

Photo by Bo Lilly

HMCS *Corner Brook* on range Nanoose Bay in support of Sea Acceptance Trials July 2025.

project had to integrate the new torpedo into the submarines' combat systems and physical infrastructure. This meant installing new onboard hardware and software, most notably the Weapon Control Manager (WCM) to replace the legacy Weapon Data Converter (WDC) in each submarine's fire control system. The WCM is a modern interface unit that manages communication with the Mod 7AT and ties into the boat's fire control console, effectively translating firing commands to the new torpedo's digital language. Upgrading to Mod 7 also demanded changes to torpedo tube components. For example, new cabling, connectors, and tube penetrators to accommodate the Mod 7's guidance wire and telemetry signals.

Beyond the submarines themselves, the project included the necessary support infrastructure and training. A shore-based torpedo trainer (for loading and firing simulations) was upgraded so crews could practice with the new system alongside theoretical training on the Mod 7AT's characteristics. Specialized test equipment and tools were delivered for maintenance of the upgraded torpedoes. An initial cadre of RCN submariners and technicians underwent training on the differences introduced by Mod 7AT, including its new digital support systems and maintenance procedures. By the time the first upgraded torpedo was loaded into a submarine, a broad support ecosystem, from updated technical manuals to prepared personnel had to be in place to ensure safe and effective use of the weapon.

Trials and Technical Milestones

With modifications completed on the first submarine, the HWTU program progressed through a set of formal test milestones. Each upgraded *Victoria*-class boat would undergo Harbour Acceptance Trials (HATs) to validate the installation in a static, controlled setting, followed by Sea Acceptance Trials (SATs) to prove the system at sea under operational conditions. These trials are essential steps toward achieving Initial Operational Capability (IOC) and, eventually, full fleet introduction.

The first submarine to be upgraded, HMCS *Windsor* (SSK-877) led the way as the first-of-class trial platform. By mid-2022, *Windsor* had completed its HATs (pier-side system checks and dry-run simulations of torpedo launch) and prepared for live-firing evaluation. In August 2022, *Windsor* deployed to the Atlantic Undersea Test and Evaluation Center (AUTEC) in the Bahamas to conduct the inaugural exercise firings of the Mk 48 Mod 7AT in Canadian service. This trial, carried out on a deep-water instrumented range with RCN weapons engineers and allied experts in support, was a defining milestone for the project. Over two days in August 2022, HMCS *Windsor* fired a series of eight exercise torpedoes, testing all six torpedo tubes (including a two-shot salvo). *Windsor* achieved seven out of eight planned shots (one planned firing was skipped due to a torpedo tube fault). Nevertheless, the trials proved the new weapon could be effectively launched and controlled from the submarine.[1] The crew and trial staff gained invaluable hands-on experience with the Mod 7AT in realistic firing scenarios. Notably, the trials were a collaborative effort involving RCN weapons engineers, DND's underwater warfare specialists, field service representatives, and U.S. Navy observers. Extensive data-recording instruments captured each launch for detailed post-trial analysis, ensuring any anomalies would be understood and addressed.

Technical findings: The first-of-class trial did uncover a few technical issues that required resolution. Operating a wire-guided torpedo is a delicate affair, a thin guidance wire connects the weapon to the submarine during its initial run, and it must be severed cleanly post-launch to avoid snagging or flooding the tube. For instance, some torpedo tube guidance wire cutters did not function correctly on the first attempt (one cutter's actuator hose was found disconnected, and another's firing pin seized mid-stroke), necessitating on-site fixes during the trial. There were also instances of

(Continues next page...)

1. Exercise torpedoes were run without warheads and were recovered for analysis after each firing.

minor seawater leakage through a torpedo tube's guidance wire penetrator gland due to a missing seal, and the initial firings revealed the need to maintain a higher external hydraulic pressure (around 195 bar) to ensure each torpedo's engine would start reliably. None of these issues caused lasting problems. All were corrected in situ but they highlighted the importance of rigorous maintenance and pre-launch checks. The engineering team swiftly captured these lessons and implemented changes: adding preventive maintenance routines for the wire cutter and penetrator assemblies, updating crew checklists, and issuing interim guidance to maintain optimal hydraulic settings and thoroughly verify equipment status before firing.

Thanks to the extensive data recorded during the trials, the root causes of these anomalies were identified and effective solutions put in place. This first-of-class trial success enabled the declaration of an IOC for the new torpedo in late 2022. By IOC, eight exercise-configured and twelve warshot Mod 7AT torpedoes had been delivered and accepted for service.

Following *Windsor*'s success, attention turned to upgrading the next submarines. By 2025, HMCS *Corner Brook* (SSK-878) had emerged from an Extended Docking Work Period that installed several notable upgrades, including a new BQQ-10 sonar suite and the capability to fire the Mk 48 Mod 7AT torpedo. After finishing post-refit trials and crew workups by mid-2025, *Corner Brook* undertook its highly anticipated series of torpedo firing trials at Nanoose in July 2025, marking the latest achievement of the HWTU program.

Recent Firings Aboard HMCS *Corner Brook* (2025)

Corner Brook's firings proceeded smoothly: all planned shots were successful, and the previous issues from 2022 (wire cutter hang-ups, tube seal leaks, etc.) were notably absent. The wire-cutting devices performed as intended, and improved pre-launch procedures (verifying seals, maintaining hydraulic pressure, etc.) ensured reliable torpedo launches throughout. Performance data confirmed that the Mk 48 Mod 7AT met its expected range and target-tracking parameters, validating the system's full integration. Tactically, this trial proved the upgrade's value, a *Victoria*-class boat armed with Mod 7AT torpedoes can confidently engage modern undersea or surface threats at long range, restoring a credible deterrent capability.

(Continues next page...)

Collaborative Effort and Engineering Excellence

The Canadian Forces Maritime Experimental and Test Ranges (CFMETR) were another crucial partner. For the *Corner Brook* trials, CFMETR provided the controlled environment and instrumentation that made detailed evaluation possible. Range safety officers and tracking specialists planned the firing scenarios in concert with the submarine crew. Their support ensured the trials were conducted safely (with proper ocean space clearance, target hulks or telemetry receivers in place, and torpedo recovery vessels on standby). CFMETR's involvement hearkens back to the long history of Nanoose Bay supporting submarine weapons testing, from earlier Mk 48 trials to these latest Mod 7 exercises.

Also integral to the team were experts from both East and West coast Fleet Maintenance Facilities (FMF), a specialized group of RCN and Defence scientists/engineers focused on submarine and torpedo systems. FMF members were embedded in the project to analyze data from each firing and advise on technical solutions. For example, FMF analysts examined high-speed video frames to understand water flow and performed computational modeling to validate the hydraulic pressure tweaks. Their analytical rigor gave the project leads confidence in the fixes applied after *Windsor*'s trials.

In addition, representatives from U.S. Naval Undersea Warfare Center (NUWC) Keyport and NUWC Newport were on-site for test events. The Mk 48 Mod 7AT is originally a U.S. developed weapon, so having NUWC helped in diagnosing any torpedo-internal issues and liaising with their Warfare Center when needed.[2] This cross-organizational cooperation ensured that problems could be rapidly identified and solved, drawing on the best expertise available whether it be Canadian military engineers, defense scientists, maintenance technicians, or allied specialists.

The HWTU program stands as a case study in successful collaboration: DMEPM(SM) orchestrated the effort, FMFs executed the hands-on work, CFMETR and FMF enabled rigorous testing and analysis, and NUWC partners lent specific knowledge. Such teamwork was essential given the complexity of submarine systems requiring careful maintenance and modernization to assure safety and effectiveness. By leveraging diverse expertise, the RCN was able to overcome the HWTU challenges and deliver a greatly enhanced capability to the fleet.

Toward Full Capability and Conclusion

With HMCS *Windsor* and *Corner Brook* now having proven the Mod 7AT torpedo system, the HWTU project is marching toward Full Operational Capability (FOC) for all *Victoria*-class submarines. FOC is expected by late 2027, once all submarines have been upgraded and the remaining torpedo stock converted or delivered. The project will then close out in 2028 after final documentation and logistics handover.

This upgrade has a profound impact on the RCN's submarine capability. As part of the broader *Victoria*-class modernization effort to keep the boats effective into the 2030s, the HWTU significantly enhances their lethality and relevance. Senior naval leadership has expressed strong confidence in the modernized *Victoria* class, noting that with upgrades like the Mod 7AT torpedo and a well-trained crew, these submarines are "very combat-capable" and ready for operations whenever called upon. Indeed, the *Victoria*-class boats remain critical strategic assets for Canada, stealthy, persistent, and now armed with a state-of-the-art heavyweight torpedo, they can deter adversaries and decisively respond to threats beneath the waves.

As HWTU nears completion, the journey to Mod 7AT has been more than a technical upgrade. It reflects a sustained effort to preserve and enhance Canada's sovereign undersea combat capability. HWTU has been an iterative engineering success, and as it nears completion, it not only leaves the fleet with a much-improved weapon, but also a legacy of technical expertise and confidence that will inform future naval projects and will inform the Navy's approach to any next-generation submarine programs.

Nihal Karyakarte is the Heavyweight Torpedo Upgrade Project Manager in the Submarine Section at DGMPEM, in the National Capital Region.

2. Indeed, Canada's collaboration with NUWC has historical roots: NUWC engineers helped design the A-cable protective boot back in earlier trials.

Photo courtesy Marc St. Jean

FEATURE ARTICLE

Reflections on My Role in the *Victoria*-class Submarine Sustainment Program

By LCDR Dhananjay Gangurde, Royal Australian Navy

Serving as an Australian submariner on exchange with the Submarine Section of the Director General Maritime Equipment Program Management (DGMEPM) has been one of the most formative experiences of my career. Over the past two years, I have been embedded in the *Victoria*-class submarine enterprise; collaborating with engineers from the Canadian public service, naval engineers, sailors, and industry partners. This role has allowed me to contribute directly to the sustainment of Canada's submarine fleet while learning how another navy manages the complex challenge of maintaining an aging but capable class of submarines.

This article reflects on my role, the opportunities I have been given, and the lessons I have learned. My observations highlight the ongoing challenges of submarine sustainment, the importance of international collaboration, and the professional growth that comes from serving in a different naval context.

Sustaining the *Victoria*-class

Submarine sustainment is a delicate balancing act that reconciles the operational need for availability with the technical imperative of preserving long-term material health. The *Victoria*-class enterprise experiences this challenge acutely, having only four submarines in the class: typically one in service, two undergoing major maintenance, and one preserved for training and sustainment purposes. This situation underscores both the significance of the mission and the importance of each boat's contribution.

A key part of my role involved developing and enforcing the *Victoria*-class Submarine Usage and Upkeep Plan (the Class Plan). At that time, this plan was guided by the Submarine Technical Instruction (SMTI) 516, which focused on *Victoria*-class submarine maintenance scheduling and work package creation under the 9+3 Operating and Maintenance Cycle. The 9+3 model envisioned nine years of service, comprising of operational periods and shorter maintenance periods, followed by a three-year Extended Docking Work Period (EDWP) for major maintenance and upgrades.

In practice, however, this model proved unachievable. The assumptions underlying SMTI 516, particularly

Photos courtesy LCDR Dhananjay Gangurde

LCDR Dhananjay Gangurde with West coast Formation Technical Authority LCdr Viq Zia.

regarding the Fleet Maintenance Facility's (FMF's) output capacity, did not materialize. As a result, EDWP life-cycle items expired earlier than expected, and HMCS *Windsor*, the only submarine licensed under SMTI 516, required longer maintenance than anticipated. Operational time was consequently reduced whenever a work period extended beyond its planned schedule. Scheduling became increasingly ad hoc, leaving limited lead time for planning and creating cascading impacts across the enterprise. This included blurred boundaries between estimation and execution, resource misalignments, and a greater administrative burden to meet material certification requirements.

To restore predictability, a new instruction, SMTI 522: *Victoria-class Submarine Upkeep Cycle Philosophy and Class Plan*, was approved. SMTI 522:

- Stops the preventive maintenance clock during a work period, resuming only when complete.
- Adjusts durations for work periods based on FMF's historical capacity.

(Continues next page...)

- Mandates advanced planning to align operational and sustainment needs.
- Outlines clear responsibilities for DGMEPM (SM5), CANSUBFOR, FMF, and others.
- Sets firm timelines for work items to be vetted in advance.

The philosophy of SMTI 522 is rooted in stewardship and leadership across the enterprise. Multiple organizations—DGMEPM (Submarines), Canadian Submarine Force (CANSUBFOR), the Formation Technical Authority, and FMF—each bring different priorities. In my view, strong central leadership is essential. The Deputy Director DGMEPM (SM5), as the leader of advanced planning, is well-positioned to ensure work period requirements are known early and to align and focus stakeholders on the upcoming submarine work period.

As Admiral Hyman G. Rickover observed:

> Responsibility is a unique concept. You may share it with others, but your portion remains unchanged. You may delegate it, but it is still with you. Unless you can point your finger at the individual who is responsible when something goes wrong, then you have never had anyone really responsible.[1]

While stark, this perspective underlines the importance of accountability in submarine sustainment. Ownership will strengthen Canada's ability to deliver a predictable usage and upkeep cycle.

Through this experience, I gained a deeper appreciation for the discipline required to sustain a small fleet. In such an environment, even minor delays can cascade across the enterprise. Success depends not only on technical solutions but also on systematic planning, disciplined documentation, and enterprise-level alignment.

Lessons for Submarine Engineers

Several key lessons stand out from my time in the *Victoria*-class enterprise:

1. Adaptability Matters: Submarine sustainment rarely goes as planned. Equipment can fail unexpectedly, schedules can slip, and new tasks can emerge. The most effective engineers are those who can adapt quickly while still adhering to established procedures and guidelines.

2. Thorough Documentation is Essential: Rather than being a hindrance, detailed documentation serves as the foundation of resilience in submarine sustainment. It provides the enterprise with a collective memory and a knowledge repository, allowing teams to avoid repeating mistakes and supporting informed decision-making in a complex and dynamic environment. This documentation serves as a safety net, providing us with the confidence to tackle the challenges of submarine maintenance.

3. Collaboration is Key: No single organization possesses all the answers. Engineers, sailors, project managers,

1. Rockwell, Theodore, *The Rickover Effect: How One Man Made a Difference*. Annapolis, MD: Naval Institute Press, 1992, 341.

LCDR Dhananjay Gangurde, Cdr Edward Feltham, LCdr Simon Bell with HMCS *Corner Brook* in the background.

and contractors must work together to achieve success. Building trust and respecting diverse perspectives are essential for operational effectiveness; these are not optional enhancements.

4. Professional Mastery Builds Credibility: In the submarine industry, credibility is rooted in technical competence and integrity. Engineers who are knowledgeable about their systems, acknowledge their limitations honestly, and pursue continuous improvement earn the respect necessary for effective leadership.

This experience challenged me to step out of my comfort zone, adapt to a different naval culture, and approach familiar problems from new perspectives. It deepened my appreciation for the shared challenges and values that unite allied submarine communities.

Conclusion

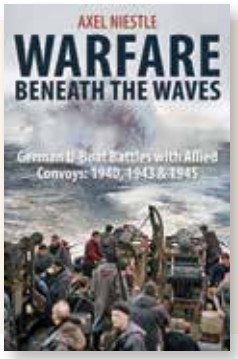
Professionally, I return to the Royal Australian Navy with a richer understanding of enterprise-level sustainment. Modern submarine programs demand not only technical skills but also systems thinking, collaborative leadership, and a commitment to lifelong learning.

The *Victoria*-class enterprise provided invaluable insights into the art of naval engineering on aging platforms. From maintenance cycle planning to enterprise collaboration, the lessons I learned will continue to shape my approach to engineering leadership. As navies worldwide balance the sustainment of legacy fleets with preparation for future capabilities, the principles of adaptability, documentation, collaboration, and professional mastery remain timeless.

I am grateful to the Canadian Armed Forces, my colleagues in the Canadian submarine enterprise, and the Royal Australian Navy for the opportunity to serve in this role.

LCDR Dhananjay Gangurde is a Marine Engineer Officer – Submariner with the Royal Australian Navy who has recently served as the Submarine In-Service Manager in DGMEPM. Currently, he is employed with the Naval Shipbuilding and Sustainment Group (NSSG) for the Collins Submarine Program, where he oversees maintenance periods for the Collins-class submarines on the west coast of Australia.

Title of Interest



Warfare Beneath the Waves: German U-Boat Battles with Allied Convoys: 1940, 1943 & 1945
By Axel Niestlé
Published (2025)
by Pen & Sword Books Ltd.
ISBN: 9781805000730 (hardcover)
288 pages

The longest continuous military campaign of the Second World War, the Battle of the Atlantic, is widely considered one of the most complex naval battles in history. Between 1939 and 1945, German U-boats and warships, together with the Luftwaffe, fought against the Royal Navy, the Royal Canadian Navy, the United States Navy and convoys of Allied merchant ships in a series of devastating battles.

In this book, eminent naval historian Axel Niestlé focuses on three particular convoy battles that took place during this period: the German attacks on Allied Convoy SC 7 in October 1940, on Allied Convoy SC 118 including the Canadian corvettes HMCS *Fennel*, HMCS *Dunvegan*, HMCS *May Flower* and the minesweepers HMCS *Cowichan* and HMCS *Truro*, in February 1943 and on Allied Convoys JW 66 (with HMCS *Huron*, *Haida* and *Iroquois*) and RA 66 in April and May 1945. Niestlé takes readers through these individual battles in incredible detail, with a host of photographs, maps and diagrams supporting his detailed examination of the history, tactics and key personages behind these campaigns. Of particular interest to Canadian readers is a photo of HMCS *Monnow* alongside the surrendered *U 427* at Loch Eriboll, May 1945.

The end of secrecy embargoes and the increasing availability of online archives, together with Niestlé's expertise in this area of military history, have come together to make *Warfare Beneath the Waves* a meticulously researched and important piece of writing about the Battle of the Atlantic.

West Coast Naval Technical Community Seminar

2025 Lockheed Martin Canada Award

Photos by Ann Mech

Lt(N) Brayden Gray
Top Naval Combat Systems Engineering Officer
Phase VI candidate

Presented by Patrick St-Denis
Lockheed Martin Canada Inc., Victoria

Honorary Captain(N) Jeanette Southwood
The guest of honour at the Naval Technical
Community Mess Dinner

CFB Esquimalt on the 30th October, 2025

News Briefs

Signed. Sealed. Delivered.

(Courtesy RCN)

On August 21, the RCN accepted the sixth and final Arctic and Offshore Patrol Vessel (AOPV) HMCS *Robert Hampton Gray* (AOPV-435). This delivery marks the completion of a fleet of vessels that have already had an exemplary deployment history since the commissioning of the first ship in 2021. The AOPVs have demonstrated numerous operational capabilities, with multiple deployments on Operations CARIBBE, HORIZON and NANOOK. The AOPVs have also circumnavigated North America, deployed to Antarctica, and have provided support to Canadians at home under Operation LENTUS.

Following official delivery, HMCS *Robert Hampton Gray* and its crew will undergo sea trials, warm and cold weather trials and post-delivery evaluations. The ship's commissioning ceremony is expected to take place in 2026, after it arrives in its home port of Esquimalt, British Columbia.

RCN Photo

HMCS *Robert Hampton Gray*

Welcome to the fleet!

Honouring 80 Years of Courage at Sea

(Courtesy RCN)

To mark the 80th anniversary of the end of the Second World War and the Battle of the Atlantic, the Hamilton Naval Association is proud to reintroduce a long-lost Canadian treasure: "*All the Little Ships*."

Originally aired in 1964 on the CBC television program *Telescope*, this rare film features recently retired **Admiral Harry DeWolf** aboard HMCS *Haida* (215) as he tells tales not only of HMCS *Haida* but of "*All the Little Ships*" of the wartime RCN.

Never-before-seen footage shot by **Bill Pugsley**, a wartime officer who resigned his commission so he could serve two years on the lower deck, as a gunner, and document it. A story of sacrifice, memory, and Canada's naval legacy—rediscovered.

A special thank you **LCdr Doug Martin** (Ret'd), former Commanding Officer of Naval Reserve Division HMCS *Star*.

All the Little Ships can be viewed here:

https://www.youtube.com/watch?v=h6I2M3Za7CE
https://hamiltonnaval.ca/all-the-little-ships/

Government of Canada

A rediscovered film on the Battle of the Atlantic.

The opinions expressed in this video are those of the original creators and do not necessarily reflect the official policy or position of the Royal Canadian Navy. Any references to outside organizations, products, or services do not constitute endorsement or affiliation.

News Briefs

Royal Canadian Navy Pays off *Kingston*-class Warships

(Courtesy Our Navy Today)

On September 29, the RCN announced the formal paying-off of its *Kingston*-class Maritime Coastal Defence Vessels after nearly three decades of service. HMCS *Saskatoon* (MM-709), *Whitehorse* (MM-705), and *Brandon* (MM-710) were retired during a ceremony in Esquimalt, followed by a second ceremony in Halifax, on October 3 to mark the paying off of HMCS *Shawinigan* (MM-704), *Summerside* (MM-711), *Goose Bay* (MM-707), *Glace Bay* (MM-701), and *Kingston* (MM-700).

Commissioned in 1996, the *Kingston*-class ships served as training platforms and supported a wide range of domestic and international operations, including sovereignty patrols, search and rescue, mine countermeasures, and deployments around the world. Over their years of service, *Kingston*-class vessels and their crews deployed on Operation CARIBBE in the eastern Pacific and Caribbean, Operation PROJECTION in West Africa, and Operation REASSURANCE in the Baltic Sea, as well as multiple domestic operations across Canada's three oceans—particularly in the Arctic and northern regions.

Photo courtesy RCN

Kingston-class paying off ceremony in Halifax, Nova Scotia.

The term "paying off" originates from the British practice of paying a crew their wages once a ship completed its voyage. In the RCN, the tradition continues as a formal ceremony in which the naval jack, ensign, and commissioning pennant are hauled down, the crew departs the ship for the final time, and the vessel ceases to be referred to as His Majesty's Canadian Ship.

RCN adding New Drones to Strengthen Maritime Security

(Courtesy Our Navy Today)

The RCN is getting new Uncrewed Aircraft Systems (UAS) to boost its surveillance and targeting abilities at sea. The Government of Canada has awarded two contracts to MDA Systems of Richmond, B.C., worth over $100 million for the equipment and up to $336 million for long-term support over 20 years. Each system will include two drones and will be used aboard *Halifax*-class ships.

This marks the first time the RCN is fully adopting drones as part of its operations. The new systems will help the Navy monitor potential threats both at home and overseas, providing near real-time visuals to support missions. The drones will work alongside existing tools like the CH-148 Cyclone helicopters until they're fully in use.

Initial operational capability is expected in 2027, with full capability by 2032. This investment supports Canada's defence policy and will also boost the Canadian economy—potentially adding $18 million to the GDP each year and supporting 145 jobs annually.

Schiebel S-100

News Briefs

Ville de Québec Receives Critical Remote Support from FMF Cape Scott During Deployment

By Gabrielle Brunette

Fleet Maintenance Facility (FMF) Cape Scott conducted remote repairs on His Majesty's Canadian Ship (HMCS) *Ville de Québec* (FFH-332) in the summer of 2025, after the ship was left inoperable due to a problem with its Integrated Platform Management System (IPMS).

The *Ville de Québec's* IPMS, which controls key ship systems such as propulsion, power generation, and damage control, was experiencing a glitch causing it to crash periodically. With no new units available, a replacement IPMS computer was sourced from HMCS *Fredericton* (FFH-337). *Fredericton*'s computer was not reconfigured for the *Ville de Québec,* which caused *Fredericton*'s IPMS system to merge with the *Ville de Québec*'s IPMS system, corrupting the IPMS.

"While this might sound harmless, the two ships operate on slightly different platforms," **Ned Burns**, Work Centre Supervisor of Control Systems Engineering, explained. Each platform has distinct configurations, including the hydraulic start system and emergency fuel tank sequence. This mismatch left *Ville de Québec* unable to operate its IPMS properly, thus keeping the ship alongside. The corrupted system had to be completely restored, unit by unit, using a "known good" database as the benchmark: the *Ville de Québec*'s initial IPMS system.

Back in Halifax, a team from FMF Cape Scott, consisting of three Electronics Technicians, **Aaron Tweedy**, **Blake Robicheau**, and **Shaun Best**, and Engineer, **Andrew Crutcher**, developed a plan to remotely guide the *Ville de Québec* IPMS Technician **Master Sailor (MS) Justin D'eon** through the reinstallation of the system.

The team carefully guided MS D'eon, relatively new to the role of IPMS technician, through an operation that normally takes a team of four experts working side-by-side the better part of a day to complete. The process required him to reflash and reload more than 40 individual components: processors, consoles, control units, and large display screens. Each had to be carefully brought online in the right order, or risk undoing all previous progress.

Photo by: Corporal Brendan Gamache, Formation Imaging Services

CH-148 Cyclone helicopter, Avalanche, prepares to land onboard HMCS *Ville de Québec* for Op HORIZON, in the Atlantic Ocean, on 7 April 2025.

"If you miss one machine or boot something up wrong, it can push the bad database back through the whole system and you're back to square one," Tweedy explained.

The teams worked incredibly well together, navigating the challenges of working in different time zones. Both the team at FMF Cape Scott and the *Ville de Québec* IPMS technician took turns staying up all night to troubleshoot the system. Most importantly, they maintained a direct and clear line of communication throughout the entire process.

"He would carry out tasks as directed and then provide excellent feedback," Tweedy said. "That's crucial—he was our eyes and ears on the ground. By reading his emails or having discussions with him, we could picture exactly what he was doing and then develop the right process from there."

After the ship's "basin trial", a series of tests on the ship's main propulsion system and other major equipment, the *Ville de Québec* was finally declared fit to sail, just in time for a scheduled missile exercise.

"As a supervisor, I couldn't be prouder of these guys. The effort they put in, no one asked them to do it, it was driven by their own pride and determination," Burns said.

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

PRESERVING CANADA'S NAVAL TECHNICAL HERITAGE

CNTHA

NEWS (WINTER 2025-2026)

Canadian Naval Technical History Association

Looking Back: The Multi-Ship Refit Program for Steam Destroyers

By Capt(N) (Ret'd)
Roger Chiasson

Maintaining an aging surface fleet is hardly a new experience for a cost-conscious RCN. From the mid-1970s until the mid-80s, the Navy embarked on an innovative multi-ship refit program aimed at reducing costs, and improving refit management for Canada's East Coast destroyer escorts to see them through to the 1990s.

Was it successful? In 1980, after 11 refits under the new scheme, naval engineers from No. 2 Canadian Forces Technical Services Agency in Montréal conducted a comprehensive review of the program, documented in an 8,000-word report co-authored by **Capt(N) D.H. Benn, LCdr R.J. Houle**, and myself. Looking back, the report offers unique insight into what became a key stepping stone in the development of today's in-service support contracts for refitting naval vessels.

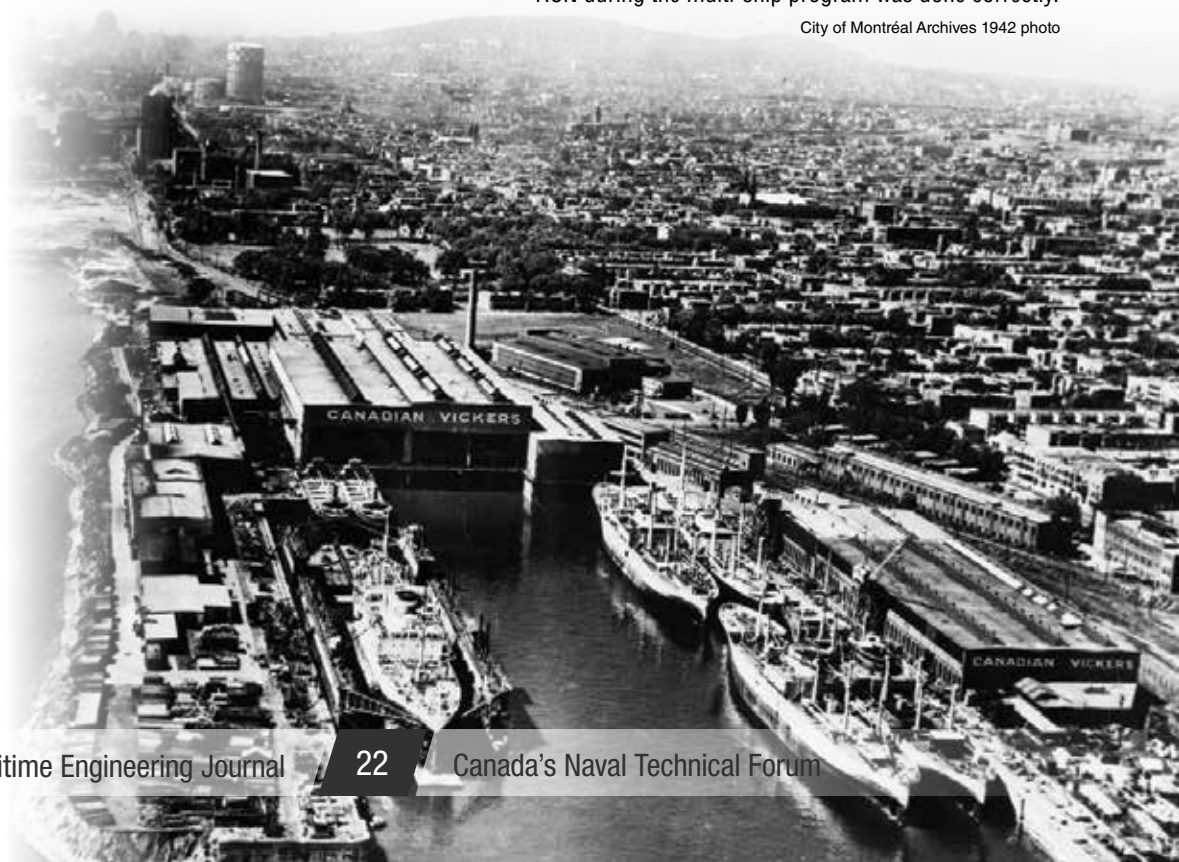
The Multi-ship Approach

For some years, it had been government policy to conduct individual refits at commercial shipyards for the Navy's fleet of steam-driven destroyers commissioned in the 1950s and '60s. By adopting a radically new multi-ship approach, whereby ships of the Atlantic fleet would be refitted sequentially by a single yard (Canadian Vickers Ltd., Montréal), it was envisaged that economies of scale would result in greater efficiencies and cost savings by allowing the contractor to assemble, develop and maintain a well-trained work force current in naval technology, supported by a network of subcontractors with recent experience in naval repairs. With the assurances offered by a long-term contract, Vickers would have the stability to develop improvements in planning and standardization of procedures for overhauling complex naval systems, which should in turn improve performance with respect to delivery.

Along with this, the Navy introduced its so-called 'zero-manned' refit concept, which no longer required ships' crews to separate from their families to support a refit by providing onboard security, carrying out a

Capitalizing on the lessons learned by each successive refit, and supported by a skilled work force that could look forward to steady work, the Vickers shipyard in Montréal made considerable progress in ensuring that all refit work done for the RCN during the multi-ship program was done correctly.

City of Montréal Archives 1942 photo



Royal Canadian Navy photo

HMC ships *Ottawa* (DDH-229) and *Fraser* (DDH-233) in the Halifax Naval Dockyard, circa 1967. The RCN would soon adopt a radically innovative multi-ship refit program, whereby ships of the Atlantic fleet would be refitted sequentially by a single yard, i.e. Canadian Vickers Ltd., Montréal.

portion of the technical repair work, and conducting set-to-work. Under the new system, ship's staff would turn their ship over to the contractor, who was now responsible for safety and security, and then return home to Halifax until the trials phase was set to begin at the end of the refit. Overseeing the refit work and quality assurance (QA) would be the responsibility of the Canadian Forces Technical Services Detachment (TSD).

To help ensure that no work was overlooked due to the absence of ship's staff, special attention was directed at improving pre-refit surveys to identify and incorporate known defects and deficiencies into a Particularized Specification List (PSL) for each individual destroyer. The PSL would augment the items already listed in the Standard Ship Repair Work Catalogue (SSRWC) that was normally published six to seven months ahead of a refit as part of the Request for Proposals package. Generally, the PSL/SSRWC system was a great improvement over the previous single-ship Maintenance and Repair Specification List (MRSL), although the lag between the pre-refit survey and the actual commencement of the refit could be substantial. This meant that the ship's condition on arrival in the contractor's yard was usually considerably worse than what was depicted in the PSL, necessitating additional surveys by the TSD, and negotiation of costly arisings of unforeseen work.

By their very nature, arisings that revealed themselves once equipment had been opened and examined could not be negotiated from a position of strength. DND was often faced with a "take it at this price or leave it" option, which caused numerous technical, scheduling, logistics, and financial problems. While arisings were less common than with typical single-ship refits, some hurdles still existed, particularly when equipment needed repair that was not identified in the MRSL. The solution was vested in the TSD, which often referred the issue to the DND life-cycle material manager (LCMM), or the Naval Engineering Unit in Halifax.

Finally, to ensure quality control over the significant amount of repair and overhaul (R&O) work, the Naval Engineering Test Establishment (NETE) in Montréal supported the Vickers refits by conducting comprehensive vibration analysis and pre-installation testing of all overhauled machinery and electronics.

Supply Support

Responsibility for the logistics support of multi-ship refits rested, ultimately, with NDHQ's Directorate of Procurement and Supply Maritime. Generally, supply support was well administered. Government Supplied Material stores for individual ships were marshalled at the Canadian Forces Supply Depot (25 CFSD) in Montréal 90 days prior to the commencement of a refit, and transferred to the Vickers yard, and to their charge, 30 days prior to the start date. These processes ran smoothly, but we did identify several weaknesses in overall logistics support on the part of both DND and the contractor:

- DND deficiencies related to improper identification and poor packaging of materials; issuing shelf-expired stores; abusing the demand system by using a higher priority than was required; and classifying demands on the Supply System for completion of work arisings as "one offs," when data indicated that many requirements were repetitious, and should have been classified as "recurring."

- Contractor deficiencies included lack of sufficient staff and commitment to assume the initiative in procuring the materials needed to meet work arisings—Vickers had a tendency to shift this task to the Crown on the premise that materials were not available commercially, thus placing the onus for expediting, and the consequences of late delivery, on the Crown; and placed heavy reliance on our TSD supply technicians to ensure compliance with the material handling aspects of the contract.

(Continues next page...)

Royal Canadian Navy photo

HMCS *Fraser* (DDH-233) with *Margaree* (DDH-230) in the background. Both ships were part of the destroyer multi-ship refit program at Canadian Vickers Ltd.

Quality Control/Assurance

The multi-ship contracts included a Contractor's Quality System Requirement, which in essence spelled out the contractor's inspection procedures for ensuring that the quality aspects of the refit were being maintained. This requirement was not as all-pervasive as the DND standards, but nevertheless demanded a commitment to a quality control program, and assurances that the work was being performed under controlled conditions, and being inspected for compliance by an internal organ of the company that was not subservient to production.

While Vickers never quite fully achieved this as we had envisioned, considerable progress was made over the course of the contracts to ensure that all the work was done, and done correctly. This was due in no small measure to the competence of the contractor in capitalizing on the lessons learned by each successive refit, and supported by a skilled work force that could look forward to steady work.

Despite various shortcomings and frustrations, few if any delays in deliveries were ever attributable to contractor performance, and, if warranty claims served as any measure of success, the paucity of post-refit claims spoke well of the program. The contractor's reliance on TSD personnel for technical and QA knowledge, and to close the gaps in supervisory staff was problematic, but there was an underlying spirit of respect and mutual co-operation between the TSD and Vickers to get the job done.

Observations

Midway through the 10-year program, we were pleased to report that many aspects of the multi-ship refit program were running relatively trouble-free. We were fortunate that despite some early schedule slippages the multi-ship refits were completed essentially on time, but we questioned why bonuses for timely completion were never considered feasible, especially considering the contractor really didn't have much to lose by late completion.

It was in the area of traditional refit work where we determined improvements had to be made if we were to progress to the next degree of efficiency in ship refits. In the opinion of the overseers, some means still had to be found to reduce the volume of arisings, which were costly, disruptive, and inspection-intensive. Furthermore, we found that a disproportionate effort was required to process routine production-line repairs due to inadequate contractual arrangements that placed the onus on the Crown rather than the contractor.

We also noted that some aspects of the refits could have been better automated. Considering the commitment at the time to extend the lives of the steam destroyers to the 1990s, there was a strong argument for getting in step with the Forces-wide repair & overhaul philosophy. Doing so would have introduced greater repair-by-replacement (RxR) into ship refits, thereby reducing the volume of non-competitive arisings. The repair of valves was a classic example of how this could have saved us time and money. Whereas the contractor was told to "remove, open, examine, close, test, and reinstall" valves, could they not have been told to overhaul them as well? Our experience was that it would have been more efficient to specify full overhaul in the contract, rather than have to deal with costly arisings.

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An undated aerial view of the Canadian Vickers Ltd. Shipyard, Montréal.

Conclusion

The multi-ship program for the RCN's East Coast fleet of steam destroyers achieved the majority of its aims. Relinquishing entire responsibility for safety and security to the contractor, and handing off responsibility for oversight and quality assurance to the TSD proved successful. But even though it appeared to be the right solution at the right time for the kinds of problems we were experiencing with a fleet of aging ships, we could already see where the needle was pointing in terms of increasing the cost-effectiveness and general efficiency of the refit process.

In our closing remarks, which now seem both prescient and amusing in hindsight, my co-authors and I noted that "The day must certainly be approaching when we as the customers will be able to adopt a completely hands-off approach to ship refits...To those who look upon such a suggestion with incredulity, let us remind ourselves of our reaction, not so many years ago, to the proposition that ships' staffs leave their ship in someone else's custody, and pick it up when it's ready. Such a routine is now second nature. What will we be taking for granted in 1990?"

What indeed?

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