



CANADIAN NAVAL REVIEW

VOLUME 16, NUMBER 1 (2020)

Theme Issue: The NSS at 10

**Team Canada (Ships)
Sees the NSS Delivering**

**Reflections on a
Decade of NSS**

**Naval Shipbuilding
Strategies in Australia,
Britain and Canada**

**Arctic Icebreaking
Operations and the NSS**

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CANADIAN NAVAL REVIEW

VOLUME 16, NO. 1 (2020)



Today's Policy Questions, Tomorrow's Policy Leaders

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- provide a source for the public examination of Canadian naval and maritime history and for the development of lessons learned.

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Credit: Heath Moffatt,
via Seaspan Vancouver
Shipyards



The first major vessel to be completed as part of the National Shipbuilding Strategy, the Offshore Fisheries Science Vessel, CCGS Sir John Franklin, sits on the ways at Seaspan Vancouver Shipyards in preparation for launch in November 2017.

Correction: The photo credit for the previous issue's front cover belongs to Corporal Jay Naples, MARPAC Imaging Services.

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Introduction to the Theme Issue

Ann Griffiths, Editor, *Canadian Naval Review*

Occasionally an entire issue of *CNR* is dedicated to a particular theme. This is one of those occasions.¹ In this issue, we examine the National Shipbuilding (Procurement) Strategy (NSS) as it hits 10 years.

The years from the 1990s to 2010 were lean years for the Canadian shipbuilding industry, and in these years the fleets of the Royal Canadian Navy (RCN) and Canadian Coast Guard (CCG) became increasingly old and increasingly expensive to maintain and operate. The NSPS announced in June 2010 was a welcome plan to recapitalize both the RCN and CCG fleets. The other goals of the NSS were to stop the boom-and-bust cycle in Canadian shipbuilding, create employment and ensure that Canada had capacity in shipbuilding, a strategic industry.

The NSS consists of three components: combat ships; non-combat ships; and small ships (less than 1,000 tonnes displacement). A competitive process was launched to determine which shipyards would undertake the large ship work. In October 2011 the government announced that Halifax Shipyard (Irving Shipbuilding) was selected for the combat ships, consisting of 6-8 Arctic and Offshore Patrol Ships (AOPS) and 15 Canadian Surface Combatants. Vancouver Shipyards (Seaspan) was selected to build the non-combat ships, including:

- 3 Offshore Fisheries Science Vessels;
- 1 Offshore Oceanographic Science Vessel;
- 2 (with option for a third) Joint Support Ships; and
- 1 Polar Icebreaker.

Both Irving and Seaspan began updating their facilities, contracts were negotiated and work began on the design of the ships. And, finally, construction of the ships began.

Over the past 10 years the NSS has kept its main components but there have been some changes. For example, construction of the heavy icebreaker, the future CCGS *John G. Diefenbaker*, was moved out of Seaspan's schedule, and 16 Multi-Purpose Vessels for the CCG were added. Seaspan's schedule was rearranged to move one Joint Support Ship up the queue. Two AOPS, destined for the CCG, were added to Irving's list (for a total of eight AOPS). And the NSS was opened up to a third shipyard, Chantier Davie in Quebec, for construction of icebreakers.

What have we got to show for the 10 years? Both Irving and Seaspan facilities have been extensively upgraded. On the West Coast, two Offshore Fisheries Science Vessels – CCGS *Sir John Franklin* and CCGS *Captain Jacques Cartier* – have been handed over to the CCG, and the third is almost complete. Large block construction of the first Joint Support Ship is in progress (although there is no



The second Offshore Fisheries Science Vessel, CCGS Capt. Jacques Cartier, sails out of Burrard Inlet for sea trials, 10 October 2019.

final build contract yet). On the East Coast, the first Arctic and Offshore Patrol Ship (AOPS), the future HMCS *Harry DeWolf*, was launched in mid-September 2018, and continues to undergo sea trials. The second AOPS – the future HMCS *Margaret Brooke* – is now in the water awaiting trials, the third is well into the construction process, and the fourth was started in mid-2019. Design work continues for the construction of the Canadian Surface Combatants (CSC), the biggest element of the NSS.

The NSS tree is now bearing fruit. But it hasn't all been smooth sailing in the past, and it likely won't be in the future – hence the need for examination of the program to see what's working and what's not, and how the process can be improved. That is the purpose of this theme issue of *CNR*. We are fortunate to have Commander Royal Canadian Navy, Vice-Admiral Art McDonald, share his thoughts on the NSS. In addition we have a selection of articles, both positive and negative – even after 10 years, opinions differ on the NSS. Are important elements missing from the strategy? Will it succeed in the long term – and how is *long term* defined? And the burning question is now whether the billions currently being spent to address COVID-19 in Canada will affect the last and most expensive element of the NSS.²

After you read this issue, you will better understand the mountains that have been climbed to get the program up and running, and the challenges that will need to be addressed to keep it going in the future. 🍷

Notes

1. The last theme issue was in 2017 and was entitled "Recapitalizing the Fleet," and before that we had an Asia-Pacific theme and a humanitarian assistance/disaster relief theme.
2. Note that articles in this issue were submitted prior to the full lockdown (or temporary pause) of the shipbuilding industry along with most of the Canadian economy.

Building a Modern Sustainable Canadian Shipbuilding Industry



Credit: Timothy Choi

HMC Ships *Algonquin* and *Protecteur* sit pierside at Esquimalt while awaiting disposal in October 2014. The two ships had collided the year earlier which damaged *Algonquin*, and *Protecteur* later experienced an engine room fire near Hawaii, quickening their retirement even as their replacements were still being conceived as part of the National Shipbuilding Procurement Strategy.

Ten years after the decision to proceed with the National Shipbuilding Procurement Strategy (NSPS) to meet the long-term shipbuilding requirements of the Royal Canadian Navy (RCN) and the Canadian Coast Guard (CCG) is an appropriate time to look back at the evolution of that strategy. We write from the perspective of two Commanders of the RCN from the era before the NSPS who can make comparative judgements about the development of the strategy towards its objective of meeting the needs of the RCN and the CCG.

The procurement of major vessels by the Canadian government during the Cold War and beyond was an inefficient, even extravagant, 'boom-and-bust' cycle. The programs were: the *St. Laurent*-class destroyer escorts completed from the mid-1950s to the mid-1960s; the replenishment ships of the 1960s; the *Iroquois*-class of the 1970s; and the *Halifax*-class Canadian Patrol Frigates (CPFs) and *Kingston*-class Maritime Coastal Defence Vessels (MCDVs), both completed in the 1990s. These were all the results of major and costly ramping up of design, procurement, oversight and construction capabilities that then atrophied. Since the completion of the *St. Laurent*-class, the RCN has been in a continual state of keeping older ships in a reasonable state of repair at great cost. Mid-life upgrades have extended the operational lives of successive ship classes instead of building replacements. The CCG fared even worse than the RCN, keeping ageing vessels in operation until there was block obsolescence. Canadian shipyards were either building a single class of ship or had no orders in these boom-and-bust cycles.

After completion of the CPF and MCDV projects in the mid-1990s, the typical hiatus in building ships occurred. This decimated both government and Canadian shipyard expertise. This resulted in the abysmal failure of the Joint Support Ship (JSS) project of 2004-2008.

A widespread outcry throughout the defence industry and maritime advocacy groups, coupled with momentum inside government, finally caused a complete rethink of how to procure ships for the navy and coast guard in a logical strategic manner. Groups like the Navy League of Canada through the Maritime Affairs program advocated for a Netherlands-like continuous shipbuilding program. Further, the Canadian Association of Defence and Security Industries completed an impressive study that showed national industry had the capacity, given government support, to meet the forecasted ship requirements for the defined 30-year or so period.¹

Within the government, work started by a single naval captain (later to become admiral) took on momentum that led to the announcement on 3 June 2010 of the NSPS, a competitive process to select two shipyards for major build work. This new policy provided certainty of order books for the two yards. This was to end the boom-and-bust cycle and the wasteful and time-consuming requirement for open bidding and ramp-up for each ship class when in fact there was only sufficient long-term work for a limited number of yards.

This strategic approach of partnering with two shipyards, requiring them to modernize in all aspects of shipbuilding, reflected what had become the norm in like-minded Western states. Canada needed to ensure successful procurements for funds invested, and that the procurement led to national capability. This led to the conclusion that a long-term national shipbuilding plan was the best way ahead for Canada.

The NSPS, later renamed the National Shipbuilding Strategy (NSS), is a strategic approach to all aspects of the shipbuilding industry in Canada. It covers building large

(over 1,000 tonnes) ships over at least a 30-year period in the competitively selected yards, while building ships of less than 1,000 tonnes in yards other than the two selected for large ship construction, and a competitive, best value selection of regular refit, repair and overhaul contracts. This strategy was aimed at providing the entire industry with knowledge of where they fit into the future.

On 19 October 2011 Irving Shipbuilding Inc. (ISI) was announced as the winner of the Combat Vessel Work stream, and Seaspan as winner of the Non-Combat Vessel Work stream. After the NSPS shipyards were rebuilt at the shipyards' own expense and project designs were rationalized, contracts were awarded to Seaspan for three Offshore Fisheries Science Vessels (OFSVs), and for six Arctic and Offshore Patrol Ships (AOPS) to Irving, later expanded to eight AOPS with the addition of two for the CCG.

Currently two OFSVs have been accepted from Seaspan, with the third to be delivered later this year. Early block construction for the first Joint Support Ship (JSS 1) began in June 2018 and the keel was laid in January 2020. In May 2019 the government added a further 16 Multi-Purpose Vessels (MPVs) for the CCG, plus a design of smaller mid-shore multi-mission ships.

At ISI, the first two AOPS are in the water but delivery of the first ship has been delayed until later this year. A further two AOPS are under construction and work on hulls 5 and 6 is scheduled to start this year. Selection of the BAE Systems Type 26 frigate as the basis for the Canadian Surface Combatant (CSC) project was announced in February 2019. The plan is for the RCN to acquire up to

15 CSCs to replace the *Iroquois*- and *Halifax*-class ships. In late 2019 the CSC formally entered the Project Definition phase.

The government announced an additional new requirement for six heavy/medium icebreakers for the CCG in August 2019. Currently, the government is negotiating with Davie Inc. in Levis, Québec, to become a third NSS shipyard and to build these vessels.²

On 28 February 2020 the government released a Request for Information (RFI) to industry, with a short deadline, on which shipyard has the capability to build the CCG *Polar*-class icebreaker. Although originally part of the Non-Combat Work stream, this announcement and the addition of 16 MPVs to Seaspan's order book has generated speculation that the ship will be built by Davie.

Thus the NSS has delivered two ships, two are awaiting delivery with a further five under construction, construction is expected to commence on two more later this year, and 16 vessels are in the design phase. In addition, the government has added 24 vessels to the original NSS large vessel package.

Further, a novel requirement called a Value Proposition was a condition of selection as an NSPS contractor. The Value Proposition was in addition to the normal 100% Industrial and Technical Benefit requirement. It required the selected NSPS winners to invest a value equal to 0.5% of contracts awarded to benefit the domestic marine industry. These investments were required to be in three priority areas – human resource development, technology investment and industrial development. Accordingly, both ISI and Seaspan have been investing in initiatives that will significantly enhance the Canadian marine industrial base.

ISI's commitments are already as diverse as funding three Research Chairs (two at the Mulroney Institute of Government at St. Francis Xavier University and a third at Dalhousie University) and supporting the Centre for Ocean Ventures and Entrepreneurship (COVE), a collaborative facility in Dartmouth, Nova Scotia, intended to incubate ocean innovations. ISI has also supported applied Arctic research projects at the Nunavut Research Institute and a new Centre of Excellence in Marine Additive Manufacturing (3D printing) at the University of New Brunswick in Fredericton, to name but some.

Seaspan has also already committed to funding two new Chairs at the University of British Columbia in naval architecture and marine systems engineering. This has enabled the university to offer research-based masters and doctoral programs in these fields. As well, Seaspan is



A centre block of the third and final Offshore Fisheries Science Vessel CCGS *John Cabot* awaits final assembly at Seaspan Vancouver Shipyards on 13 December 2018.



The Centre for Ocean Ventures and Entrepreneurship (COVE), in Dartmouth, Nova Scotia, is funded in part by Irving Shipbuilding as an element of its obligation to invest a part of its contract value into developing Canadian marine industries.

investing in further commercialization and research and development of the Novarc Technologies collaborative robotic welding system in North Vancouver. It also provides financial support to the Camosun Coastal Centre where workers are trained for the shipbuilding industry and which undertakes applied research to enhance productivity in this sector.

As can be seen, these initiatives cover all three of the Value Proposition priority areas but with emphasis on education and training. This element of NSS has significant potential to develop a highly capable workforce in Canada's marine technology industry.

It is fair to say that the government made a bold decision to proceed with a 30-year strategic shipbuilding plan. It has become the nucleus of a world-class shipbuilding industry, including approximately \$500 million of direct infrastructure investment. The NSS has created thousands of high-quality and high-paying jobs. The government estimates that the contracts related to the strategy will contribute between \$7.7 and \$13 billion to Gross Domestic Product and create or maintain 7,350 to 12,000 jobs in the Canadian economy annually during the period of 2012 to 2022. By August of 2019 \$11.4 billion of contracts had been awarded under the NSS with much more to come over the next 30 years.³

Has it all been smooth sailing? No, but most of the bumps on the road have been due to lack of experience both in government and industry in developing infrastructure, people and processes from a standing start. The anticipated timeframes were unrealistic. The human resource problem was underestimated and has been a limiting factor. Fortunately, British Columbia and Nova Scotia have worked hard to increase the student trade population and the apprentice programs are now in full swing. The enormity of this achievement should not be understated.

Is the National Shipbuilding Strategy partnership working? Yes, and moreover the government is providing work packages whenever there is a gap in ship fabrication work so that the trained workforce can be maintained, the

apprentice programs for additional workers remain in place and production metrics continue to improve.

Yes, there is a cost to building ships in Canada. The precise amount seems debatable but the longer the strategy is in place the better the product will become and the man-hours to build will continue to reduce. Contemporary shipbuilding is a high-technology enterprise with employment multiplier effects in other sectors. The overall benefits to Canada are obvious as we will have a sovereign world-class shipbuilding enterprise and the highly skilled workforce that will meet the national strategic requirements for decades to come.⁴ Building offshore would have meant billions of dollars going to other states, would have provided little economic benefit to Canada, created few if any Canadian jobs and would have negatively affected Canadian sovereignty in terms of fostering a high-tech industry and the supply/maintenance chain to support ships as needed through their service life.

What is happening now because of the NSS is in stark contrast to the previous 20 years when no major design/build contracts were awarded and Canadian shipyards went through a long 'bust' period. It is also fact that having competitively selected the key shipyards to build the large ships, the award of build contracts has avoided the normal delays of regional political infighting.

After a substantial expenditure of resources by all parties and many hurdles overcome, the successes achieved and the promise of many more to come can only confirm that the NSPS/NSS was the right way ahead for Canada. 🇨🇦

Vice-Admiral (Ret'd) Gary Garnett

Vice-Admiral (Ret'd) Ron Buck

Notes

1. Canadian Association of Defence and Security Industries (CADSI), "Report of the CADSI Marine Industries Working Group," May 2009.
2. Davie was already involved in several projects outside of NSS, including converting three second-hand medium commercial icebreakers, refitting the 53-year old icebreaker *Louis S. St-Laurent* for the Canadian Coast Guard, and delivering *MV Asterix*, an interim replenishment capability, to the RCN.
3. For more information on these numbers, see Public Services and Procurement Canada website.
4. While not the focus here, similar successes have been achieved in the other two streams of the policy – small ship construction and repair/overhaul.

Team Canada (Ships) Sees the NSS Delivering

Vice-Admiral Art McDonald
Commander Royal Canadian Navy

A decade after the National Shipbuilding Strategy (NSS) was launched, the most comprehensive period of fleet renewal in the Royal Canadian Navy's (RCN) peacetime history continues apace. Arguably, not since the Second World War has the navy-government-industry team, a cohort I call Team Canada (Ships), collaborated so impressively.

Given that around the globe we are engaged in the battle of our time, I'm struck by the nexus between the NSS 10-year anniversary, the 75th anniversary of our victory in the Battle of the Atlantic, and these unprecedented times of pandemic response. In 2020, we're prompted to reflect on the significance of that national effort some 75 years ago in securing Allied victory in the Battle of the Atlantic in what was the Second World War's longest campaign – a national effort against a formidable foe. Yet, ironically, this anniversary has fallen upon us as we struggle with a different type of foe which requires that we again unite from coast to coast to coast in our actions to secure a critical victory. As we fight to vanquish this new hidden enemy, as our predecessors did against theirs 75 years ago, once again unprecedented times have been met with a commensurately extraordinary response. This response comes from the Canadian Armed Forces/RCN and the government of Canada accompanied, of course, by significant contributions from Canadian industry and strengthened by the sacrifices of individual Canadians. We are in it together. And so, as I write, I am heartened to see the effect that we appear to be having by working together – although it's early yet and there's still much to do, we may be beginning to flatten the curve. And, therefore, I think I can be excused here for looking forward, past today's crisis, with some confidence and optimism – the two spices of the NSS – to what lies ahead as a result of one of this era's great national efforts, the National Shipbuilding Strategy.

The future is indeed an exciting one for RCN sailors and our shipmates on Team Canada (Ships). As a result of some great groundwork, innovation and initiative over the first decade of the NSS, the future is now about to arrive, beginning with the delivery of the first of the Arctic and Offshore Patrol Vessels (AOPVs), Her Majesty's Canadian Ship (HMCS) *Harry DeWolf*!

Beginning with *Harry DeWolf*, over the next two decades, the RCN will accept 23 new warships – built here in Canada by Canadians for Canadians – via the NSS. Specifically,



Credit: Timothy Choi

Then-Rear-Admiral Art McDonald speaks to members of Calgary's consular corps at the Danish Canadian Club on 22 February 2019. He was promoted to Vice-Admiral and took command of the Royal Canadian Navy later that year.

in what amounts to a new ship almost annually over the next decades, the RCN expects to receive six AOPVs, two Joint Support Ships (JSSs), and 15 Canadian Surface Combatants (CSCs). And I am so delighted that the next generations of sailors will get to enjoy and be inspired by that 'new car smell' – that visceral signal of their relevance and of an investment in them – that today's Admiralty enjoyed as sub-lieutenants in the *Halifax*- and *Kingston*-classes in the 1990s.

Shipmates, we are on track to have the RCN grow – the first growth since the 1990s – by two ships over the next 12 months upon acceptance of *Harry DeWolf* and sister ship, HMCS *Margaret Brooke*. In fact, four of six AOPVs are already in various states of build, and *Harry DeWolf* has already been at sea for two rounds of builder's trials. Meanwhile, after having cut steel in 2018, the keel of the future JSS HMCS *Protecteur* was recently laid and continues to grow under an early block-build strategy. And, of course, it has been an incredibly significant year for the CSC project, with preliminary design now under way.

All of this is the result of the NSS. Nothing short of a seminal national initiative, the NSS is intended to overcome the historical 'boom-and-bust' cycles in federal shipbuilding in which sovereign shipbuilding capability decreased



HMCS Moncton, wearing an Admiralty Disruptive Pattern paint scheme to commemorate the 75th Anniversary of the Battle of the Atlantic, sets out from Halifax on 16 April 2020 to be ready to assist in COVID-19 operations if called upon. The crew had been in isolation for 14 days prior to boarding to ensure any infection would be identified before heading to sea.

while the maritime industry withered commensurately. The NSS will do this with renewal of the RCN and Canadian Coast Guard fleets. It is a program that not only strengthens our sovereign capabilities but also the country, more generally, through related economic stimulus that brings long-term, high-technology jobs to Canadians from coast to coast to coast. Indeed, the NSS espouses the view that shipbuilding is nation-building.

Of course, while these strategic effects are being realized, their foundation rests on some impressive program-level (tactical) successes in advancing definition and delivery of the various projects/classes. These are known through publicly-available products, but what is less known and needs be celebrated here, I think, is that these are the result, first and foremost, of the growth and evolution of a cohort of the world's best sailors, bureaucrats and industrialists. These people may now pass whole careers or significant parts thereof collaborating on federal fleet build, sustainment and maintenance programs – capturing and sharing with next generations the corporate shipbuilding knowledge that enables success to beget success. Success will also be the result of this cohort's unprecedented innovation and initiative seen daily in the retirement of risk through relational contracting, and an innovative 'work-objectives' (i.e., TASK) contracting system, etc. After almost a decade of personal experience with our efforts under the NSS, I'm convinced that these coalface contributions are significant winds in the sails of the strategy's success.

Ranging back out to the theme of shipbuilding as nation-building, it's important to note that what the RCN sees as a new platform or an innovative in-service support construct must equally be seen for its immediate and enduring economic benefit to Canadians across the country and Canada as a whole. This resonates well with someone like me, the son of a shipbuilding yard welder, just as it does with the thousands of Canadians whose family feeds on NSS work.

Now, obviously, the RCN also feeds on the NSS. Delivery of the new ships is key to the future navy envisioned by

Canada's defence policy, *Strong, Secure, Engaged*. Our future fleet will be composed of a balanced mix of platforms – modernized submarines, leading-edge surface combatants, support ships and patrol vessels. This will provide the RCN with the capacity to deploy and sustain a naval task group that is highly interoperable with Canada's allies and capable of contributing meaningfully to joint action ashore.

Have no doubt – Canada is a maritime country, with three oceans on its borders and a history on the seas. And while that history has shaped us, arguably it is the future maritime environment that will define us more significantly, making the success of the NSS imperative. Naval forces provide Canada with an agile means to respond across a wide spectrum of maritime situations – both at-sea and from-the-sea – and are an essential instrument of national power on the international stage, especially in a world where oceans play an ever-more central role.

In this regard, consider that not since the great era of exploration in the 16th century have oceans played as important a role in global affairs as they do today. Unprecedented levels of commerce move across the world's oceans, undersea fibre optics move information at lightning speed, great power politics are being played out at sea, and oceans are central to the health of the planet in an age of profound climate change. Importantly, the naval capabilities being built today via the NSS have anticipated these trends, equipping Canada with precisely the right tools for the future security environment – whether the task is multi-threat warfare in state-on-state conflict, sovereignty surveillance and response, extending government reach and capacity to Canada's Arctic, or the task of delivering relief to those affected by a climate change event. Indeed, in this ever-volatile world, the need for the RCN has never been greater.

In conclusion, today, a decade into the NSS, the effort and investment in Canada seems impossibly astute! In an unpredictable world increasingly preoccupied with maritime-based/related issues, if indeed the world needs more Canada then the navy should remain absolutely relevant – especially so when raising it and maintaining it offers such economic stimulus. This is what the NSS anticipated and has been delivering.

Thank you to the CNR team for curating this issue devoted to one of the most impressive national efforts of our time. As the NSS unfolds, you'll realize why, for a sailor like me, and for my shipmates across the navy, government and industry, there are exciting times ahead as the last decade of NSS groundwork begins delivering the ships that will continue to be Canada's calling cards. 🇨🇦

Reflections on a Decade of the NSS

Ian Mack

This issue of *Canadian Naval Review* is dedicated to an examination of the National Shipbuilding Procurement Strategy/National Shipbuilding Strategy (NSS) as it enters its tenth year. It is a good opportunity to reflect on the program.

As a ‘plank owner’ in the NSS from the conception and approval phase (2008-2010) and having been continuously involved while working in the Department of National Defence (DND) until I retired in February 2017, I have observed and reflected on aspects of the fascinating journey of this national program. It has grown and changed, seen close to one naysayer for every supporter, and survived many challenges from government officials. To use a hackneyed metaphor, the baby delivered in 2010 has developed significantly, though still not jumping hurdles. I think it fair to say that the NSS shipyards still have a ways to go to be generally rated in the bottom of the top quartile of shipyards globally.

Having been privileged to have provided perspectives on this topic in other papers,¹ I will attempt to avoid things I have said already. And I will attempt to be an optimist, one who, as defined by Winston Churchill, ‘sees the opportunity in every difficulty’ – not my strong suit as those who know me would lament.

Conception Perspectives

Much has been written about the Joint Support Ship (JSS) procurement competition that was terminated in 2008. Having spent tens of millions of dollars to that point with little to show for it aside from the forensic conclusions, this was a significant event. With recapitalization of the Royal Canadian Navy’s (RCN) fleet in the balance, it was assessed as important to adopt a novel approach.

I was consumed in the summer of 2008 with a number of major projects. First I was trying to determine options to re-launch a JSS acquisition initiative. Second, I was working on plotting a new course for the Canadian Surface Combatant (CSC) project after government decisions leading to the project’s inclusion in the Canada First Defence Strategy (CFDS). Third, I was trying to move the Arctic Offshore Patrol Ship (AOPS) project – a government priority – ‘with all due dispatch.’ Finally, I had a number of other projects in my portfolio underway for ultimate delivery to the Canadian Army.

As I recall, I and Commodore Richard Greenwood (the Director-General Maritime Equipment Program Management) were summoned to the office of the Assistant Deputy Minister for Materiel (ADM (Mat)), Dan Ross,



Portrait photo of author.

Credit: Provided by author

who was our boss. We were informed that there was a degree of support for a new shipbuilding approach, raised for consideration by the Materiel Group Chief of Staff Dave Jacobson, whereby we would competitively select a shipyard to build RCN ships over the long term. I was tasked to analyse and develop a related proposal, with Richard’s assistance in providing some human resources support and access to expertise.

What followed were two hectic years for me and a small group. In the group, four were drawn from available-in-Ottawa RCN technical officers (Commanders Joel Parent and Mike Turpin, and Lieutenant-Commanders Kit Hancock and Ro Gulati) and one representative, Ed Lam, was from Public Works and Government Services (PWGSC), the contracting department of government subsequently renamed Public Services and Procurement Canada (PSPC). I tapped Commodore Pat Finn – recently promoted and appointed to lead the CSC project – to be dedicated for about six months to getting the work up and running. Captain (Navy) Rick Houseman continued to lead the JSS project and temporarily covered off as Project Manager (PM) CSC as well. In early 2009 with the NSPS work well underway, Commodore Finn led both the CSC project and the NSPS office team.

The forensic analysis of the terminated JSS procurement process played a pivotal role in determining that the issue was the ‘boom-and-bust’ cycle of shipbuilding of Canada’s fleets. In essence, the complex ship construction



A computer-generated image of the Crown jewel of the NSS, the Canadian Surface Combatant.

capabilities of the previous century had atrophied in the absence of government shipbuilding projects and the shipyards were instead largely focused on ship repair. Furthermore, and of equal importance, this had led to a notable detrimental impact on the broader Canadian marine industrial sector. Effectively, NSPS was seen as a way to address many of the issues at play in the problematic JSS procurement process and could deliver many important benefits – subjects well covered in my previous papers.

As you may recall, in 2008-2009, a global recession was underway, and that affected the government's willingness to commit financial resources. And, on top of that, in the late 1990s there had been a 23% reduction of personnel in government in order to address a chronic national deficit. The impact of these staff reductions was stark in terms of reduced capacity and capability. In the shipbuilding domain, a surplus of ships had dampened the global merchant business and closed yards. The steelwork for ship hulls was often contracted out to capable and less expensive shipyards in Europe or Asia. In Australia and the UK, ships were being built in multiple shipyards and assembled in one.² The acceptance and understanding of the complex domain of project management was just dawning. It was a new century full of opportunity and challenge.

Some day, hopefully, this chapter of the NSPS story will be detailed more fulsomely. Suffice to say that, in a nutshell, the NSPS office conducted analyses, recommended two

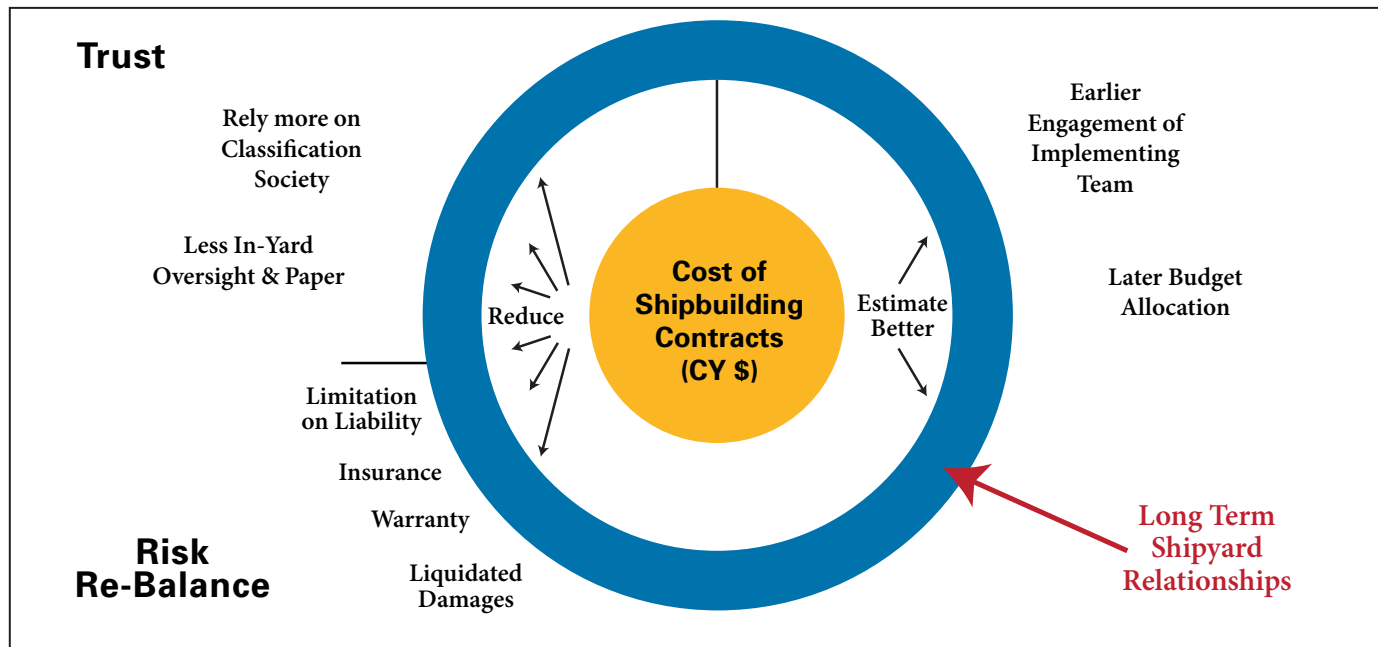
shipyards for selection, formed a broad government consultation group, engaged and brought the Canadian Coast Guard (CCG) onboard, found First Marine International (FMI) as a critical enabler to the subsequent competitive shipyard sourcing process, individually and collectively consulted with the Canadian marine industrial community (shipbuilding, ship design, manufacturers and support), briefed on the concept which in the final approval stages included staff members of multiple Ministers, and approached government more than once. Control was transferred to PWGSC in early 2010, with Tom Ring as the responsible Assistant Deputy Minister (ADM) and two new peers for me, Terry Williston for the procurement and Scott Leslie for almost a decade of implementation.

In the spring of 2010 at the CANSEC trade show, the announcement of the National Shipbuilding Procurement Strategy was made. And a competitive process got underway to select shipyards which would build RCN and CCG ships.

Delivery Perspectives

Having obtained approval for the competitive selection of two shipyards with which to develop long-term strategic relationships, PWGSC launched a qualification process under the steady hand of Terry Williston. Five shipyards qualified: Kiewit Offshore Services in Newfoundland; Irving Shipbuilding in Nova Scotia; Davie Yards (later a consortia for the bid) in Quebec; Seaway Marine and Industrial in Ontario; and Washington Group (later renamed Seaspan Marine) in British Columbia. Only three

Diagram 1: Basic Rationale for NSPS



Credit: Provided by author

actually submitted bids – Irving Shipbuilding, the Davie Yards consortia and Seaspan Marine.

As happens in Canada, all others in the marine sector were no longer involved or consulted once the competitive process was underway. An intense and expedited engagement process was launched with the five qualified yards. In hindsight, although the marine sector had been included in a large consultation event in the summer of 2009, its continued engagement could have been useful as the marine sector industries were very capable potential participants in the bid teams and as much a target for benefits and high-end jobs as the shipbuilders.

In essence, the shipyards could bid on either or both of two streams of work. The first was titled the Combat Package, potentially comprised of six AOPs and 15 CSCs to replace the Canadian Patrol Frigates then entering mid-life modernization. The AOPS build in effect allowed the selected yard to cut its teeth and achieve a predefined capability in preparation for the CSC. The Non-Combat Package potentially included three CCG Offshore Fisheries Science Vessels (OFSVs), one Offshore Oceanographic Science Vessel and one Polar Icebreaker, plus two JSS for the RCN. Of note, the JSS construction was added to the Non-Combat Package in an attempt to balance the scope of work. In effect the selected shipyards were competing to win exclusive sourcing rights for these shipbuilding projects if the government approved the shipbuilding projects identified – and it was implied that more vessels might be added later, especially for the CCG in the Non-Combat Package.

A novel governance model was set in place to oversee and guide all aspects of the procurement process, with essentially two tiers that included representatives of the

executing Departments (DND, PWGSC, Fisheries and Oceans in which CCG was nested, and Industry Canada) plus Treasury Board, Finance and the Privy Council. A shaping committee of Assistant Deputy Ministers (ADMs) was the first tier and reported to a decision-making council of Deputy Ministers. This governance structure was entirely focused on the NSPS and invested in achieving an open, fair, transparent and uncontested procurement.

Third parties were also involved in setting the process, including two of the four big consulting firms and FMI. FMI was unique as it was (and is) accepted globally as the expert in benchmarking shipyards against a broad set of best practices standards. FMI was employed in evaluating the existing capabilities of the five bidders and the gaps that needed to be filled to reach a set of standards at the bottom of the top quartile of shipyards in the world.

Through what I remember as five fulsome engagements with the prospective bidders, the approach and the draft Request for Proposals (RFP) were finalized. Concurrently, a comprehensive approach was put in place for the bid evaluation by adding a review board at the Director-General (DG) level to the traditional approach, to oversee the assessment activity and expeditiously address any issues that arose. As well, FMI was contracted to provide expert input on the shipyard facility upgrade proposals.

The scoring of the three bids was held in total secrecy. Only four people were aware of the winners up until about an hour before they were announced in a televised briefing in October 2011 – and that hour included making the Prime Minister aware of the winning yards. As we now know, Irving Shipbuilding Inc. (ISI) was awarded the Combat Package and Vancouver Shipyard (VSY) (Seaspan) the Non-Combat Package. The procurement process was in

the end uncontested despite its value then pegged at \$50B. The entire process had taken a mere 15 months, and the procurement team led by Tom Ring received many awards subsequently. Of equal importance, there appeared to be widespread and non-partisan support.

For good or for bad, baby NSPS entered the world as a national endeavour to introduce stability for decades to the building of Canada's fleets of ships. I say 'for good or for bad' because many government officials had never appreciated the problematic aspects of the NSPS. Ships would be built sequentially in each shipyard so there was no room for surge or concurrent construction of three classes of ships in the two NSPS shipyards under the government's Build in Canada policy. Shipyard facilities had to be renewed, hundreds of new workers hired, thousands of new processes created and tested, people trained, relationships established with new public and private sector organizations, and ships designed functionally, then in detail and then for production. And all this had to happen before the tedious and challenging production of first ships could start. In terms of the timelines, the government did not manage expectations as well as it could have, and announcements unintentionally misled the media and thus led the public to expect to see new ships in a couple of years. Shipyard workers were given to believe they would have continuous (not continual) employment for life. Hence in large part because of poor communication,

it is my view that NSPS was set up from birth to be perceived as a very expensive failure when compared to the expectations created.

That said, NSS has survived federal elections and a change of government. This is no small achievement for what I have often characterized as a very expensive and risky procurement plan that was initiated for the undervalued national defence program.

Perspectives of the Early Years

Much like a baby must learn to crawl and progress into the toddler stage, so too with NSPS. The first stage was the development of Umbrella Agreements (UAs) with each shipyard, an activity which took three months. Both bidders had committed to completing the recapitalization of the shipyards to meet FMI standards (known as Target State) at their own expense. That the bidders proposed to pay for capital upgrades at no cost to Canada was a response that officials had not expected. This meant that hundreds of millions of dollars would be spent by the shipyards with no guarantee of work, so the shipyards wanted what was soon described as a 'backstop' agreement. The cost of designing and constructing the new facilities was seen by the yards as a potential debt for Canada if no contract work was ever awarded. Hence an agreement was signed with both yards which included retirement of such a debt as contract work was awarded, and before an agreed date after which Canada would also pay an interest charge.



Credit: Seaspan

The 130 metre long Forming Shop is one of the legacy buildings at Seaspan Vancouver Shipyards predating the NSS modernization. Nonetheless, it is home to some of the yard's most advanced equipment, such as this 1000t hydraulic plate press that can bend 2.5"-thick steel plates.

Needless to say, this one aspect in particular required significant negotiations and then approval by the Treasury Board. The signing of these UAs in early February 2012 signaled the real start date of the NSPS.

The early days demonstrated the differing cultures in play. In Halifax, DND focused on turning over the early design work on AOPS to the shipyard. They were met by a full senior team at ISI and progress was positive from day one. In Vancouver, the two clients (DND and CCG) both pressed for progress with their own shipbuilding projects that had been stalled awaiting the NSPS process to be complete. The Seaspan senior leadership team was somewhat confused and overwhelmed by the cacophony of government voices competing for attention, and the newly named shipyard President (Brian Carter) was only then starting to hire his leadership team.

As mentioned earlier, the tasks facing the shipyards were daunting. In Halifax, ISI also had to complete an earlier contracted shipbuilding project (the *Hero*-class) for CCG but this did not deter the Irving team – that baby rolled onto its tummy on day one and struggled to crawl soon after. The Vancouver scenario was different as it was much more of a greenfield site challenge; the initial focus was hiring people with the knowledge and ability to build the facilities and to start to address the design aspects of Canada's priority projects.

These were exciting but difficult times. Both shipyards were advised about where the facility designs submitted in their bids were seen to be at risk of failing to close the gaps identified by FMI. This led to more extensive (and expensive) modified yard proposals for review by FMI on behalf of Canada, and consideration of amendments to the backstop agreements as their exposure increased. Only then could detailed facility designs be prepared to

enable construction. Design teams had to be put under contract by the shipyards before they could take possession of Canada's ship design packages and only then could they review them before taking responsibility for performance. And everyone wanted to be 'production design ready' for the first ship construction as soon as possible once the facilities were commissioned.

Meanwhile government officials were also in team-building mode. Scott Leslie and I felt we were perpetually traveling to the coasts. Project offices needed to adjust to their new Prime Contractors, quickly adopting the shipyards' recommendation to employ a design-then-build two-contract strategy rather than the intended single design-and-build contract approach. PWGSC contracting teams needed to grow as contract negotiations were launched with shipyards keen to start to see revenue. The competing desires of DND and CCG to build JSS and the Polar icebreaker in the same time slot required many months of work by officials before the NSPS governance team could render a decision.

Contract approaches to fit the different clients and shipyards were quite different. In Halifax, the design contract included many individual tasks with cost targets for each based on 'indicative' cost estimates (based on less detailed planning) and two levels of contingency. This was a novel approach for the Treasury Board which usually only approved 'substantive' budgets (usually with much higher degrees of accuracy). In Vancouver, substantive estimates for design were generated which were to prove problematic. The ISI design contract structure was but one successful innovation in the NSPS process.

Ship construction contracts were traditional for both the OFSVs and AOPS, the first ships in the schedule. As expected, the challenges on both coasts of new plants,



The two original NSS shipyards as they appeared right after their modernizations: Seaspan Vancouver on the left, Irving Shipbuilding on the right.

Credit: Heath Moffatt
via Seaspan Vancouver;
Irving Shipbuilding



Despite the large amount of engineering work that had already gone into the future **John G. Diefenbaker** Polar icebreaker, it was beaten out by the Joint Support Ships in the build queue at Seaspan Vancouver. The fate of the Polar icebreaker is now up in the air as the government awaits responses from Canadian shipyards as to their ability to build it before 2029.

people, processes and relationships significantly affected production performance with the first ships of class in terms of budgets and schedules. Of note, such scenarios are very common for experienced shipbuilders throughout the world.

But having learned the basics in the first ships, the NSS baby (the project name had been changed to drop the word ‘procurement’) advanced from crawling to walking. Without doubt, the toddler had a few face plants along the way which differed between the yards but collectively included overly optimistic production norm guesstimates, subcontractor relationship and delivery issues, hiring misfires, quality shortfalls and the like. Along with changes needed to harmonize the construction of the last ship of a class with the subsequent first of a follow-on class, contract amendments were inevitable. Given the constant pressure created by the urgent need to deliver ships, missteps were likely – if you want it fast, you usually make mistakes.

Today two OFSVs have been delivered to the coast guard (CCGS *Sir John Franklin* and CCGS *Captain Jacques Cartier*) and the first AOPS (the future HMCS *Harry DeWolf*) is completing trials before turnover to the RCN. To return to our analogy, one could say that the NSS shipyard youngsters are now walking with a degree of confidence but no swagger just yet.

Perspectives on the Future

I have no crystal ball and I have been out of the business for three years. Nevertheless I believe that the NSS youngster is poised to start to run. Much larger JSS hulls in the West and an exceptionally complex CSC ship design in the East are next up. The shipyards have moved well up the shipbuilding learning curve and made adjustments along the way, some of which have been dramatic. And a third NSS shipyard is now poised to emerge (Davie

Shipbuilding), suggesting a degree of confidence in key elements of the NSS DNA.

Considering our analogy one more time, one might conclude that the NSS youngster that once belonged to a troubled family in a tough neighbourhood has broken free. There will be significant challenges ahead that will undoubtedly cause stumbles and falls – COVID-19 being the latest delaying factor. But Canada did what was considered impossible by re-creating the shipbuilding industry in Canada. And there remain many opportunities to make the NSS even better.

As the saying goes, it takes a village to raise a child – and, I would add, some luck. Just as I was privileged to work with many dedicated people over the past decade, there are many more now toiling in that village. It is up to them and the extended NSS family to improve the odds of continued maturing through innovation and perseverance.

In addition to providing ships to the RCN and CCG, the NSPS was developed to create opportunities to address Canada’s atrophied shipbuilding industry and pump life and jobs into Canada’s marine industrial base. It is time to plan the next set of goals, and support the NSS youngster we have created. 🍷

Notes

1. I have written a number of papers relating to NSPS/NSS that have been published on the Canadian Global Affairs Institute (CGAI) website. See for example, “Another Way to Buy Frigates,” November 2019; “A Third NSS Shipyard,” October 2019; “Emerging Lessons from the National Shipbuilding Procurement Strategy,” March 2019.
2. In the United Kingdom, the Terms of Business Agreement was in place and worthy of study as another example of the desire to adopt longer term and stronger relationships between government and the shipbuilders that permeated the European shipbuilding community.

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Naval Shipbuilding Strategies in Australia, Britain and Canada

Elinor Sloan



Credit: POA (Photo) Ian Arthur, Royal Navy

The future HMS Duncan is launched from BAE Systems' Govan Shipyard on the River Clyde, November 2010.

There has been no shortage of assessments and commentary on Canada's National Shipbuilding Strategy (NSS), now a decade old. But examinations of Canada's strategy in comparison to the shipbuilding strategies produced by Britain and Australia in 2017 have been more limited. This article is a preliminary effort to fill that gap. Its goal is to provide a broader perspective on the shipbuilding path that Canada has chosen, highlight some key lessons from allies, and ultimately mark a first step in determining how best to go about building and sustaining a national security asset that is growing in importance.

Canada's National Shipbuilding Strategy

In the 2010s Canada, Australia and Britain all sought to end a long history of 'boom and bust' in domestic shipbuilding with their first ever continuous-build program, designed to span decades. In Canada as far back as 2001 a committee led by Industry Canada had recommended that the government eliminate the "peaks and valleys" of ship procurement by providing a steady stream of work to Canadian shipyards.¹ But it took the 2008 cancellation of projects to replace navy supply ships and Canadian Coast Guard mid-shore patrol boats – because the bids that came in were well above the established funding envelopes – to spark the launch of a national shipbuilding strategy.

The overall approach that Canada adopted was informed by looking at the experiences of allies, especially Britain.² In 2005 Britain published a Defence Industrial Strategy that included a goal of ensuring a sustainable sovereign shipbuilding industry for complex warship production. At that time Britain had three warship yards, two owned by BAE Systems on the Clyde near Glasgow, and one owned by Vosper Thornycroft (VT Group) in Portsmouth. This situation was the result of a decades' long rationalization process meant to address over-capacity. It was a process in which Britain went from 12 government yards in the 1960s to three private yards by the late 1990s. In the 2005 strategy the Ministry of Defence encouraged BAE and the VT Group to work together on warships, and the companies formed a joint venture, BVT Surface Fleet. Once BAE bought out VT Group's share in 2009, British warship building capacity lay in the hands of just one shipbuilder. That same year the government signed a Terms of Business Agreement with BAE Systems, giving it exclusivity on naval programs like the Future Surface Combatant, and guaranteeing it a certain level of shipbuilding business for at least 15 years. The idea was that this would reduce the cost of shipbuilding and thereby secure the long-term sustainable future of warship building in Britain.

A strategic sourcing arrangement with a single national

shipbuilder was the situation in Britain in 2009 when Canada, led by the Materiel Group in the Department of National Defence, looked to its allies for examples of how to structure a national shipbuilding strategy. The people developing the strategy could also draw on a report to Industry Canada that year which found that “all other NATO countries have a variation of directed procurement as their approach, with generally only one yard positioned to undertake the building of warships or coast guard vessels.”³ Most, if not all, of these countries followed the British approach of designating the shipbuilding yard. This is also the case in Australia where, as we will see, the Australian government took the prerogative to decide which (two) shipyards would be part of its 2017 Naval Shipbuilding Plan.

Canada, by contrast, launched a competitive shipyard sourcing process, making it unique in having injected a measure of competition into choosing its shipbuilding yards. In 2010 the government decided to run a competition to select two Canadian shipyards for large ship construction, one for combat ships and one for non-combat vessels. With the National Shipbuilding Procurement Strategy (NSPS), now known as the National Shipbuilding Strategy (NSS), the government sought to eliminate cycles of boom and bust in federal ship procurement, promoting a long-term continuous build of ships at a slow rate to ensure the shipyards have a regular cash flow and secure workforce. The combat vessels in the NSS include Arctic and Offshore Patrol Vessels and Canadian Surface Combatants, while the non-combat vessels are supply ships for the navy, and a Polar-class icebreaker (now removed from the list of the non-combat program) and Offshore Fisheries and Oceanographic Vessels for the coast guard. In

2011 Irving Shipbuilding in Halifax won the combat ship portion of the competition, while Seaspan Shipbuilding in Vancouver won that of the non-combat ships.

While a casual observer might think that Irving and Seaspan won a competition to build a certain fleet of ships, this was not actually the case. The NSPS Request for Proposals (RFP) was not specific to any ship project; rather, it focused on the ability of a shipyard to become a viable, long-term strategic source. As stated in the RFP, the competition was to “establish a strategic relationship with two Canadian shipyards, selected through an open and fair national competition” and to “designate them as sources of supply, one for combat vessels and the other for non-combat vessels.”⁴ As a mandatory requirement under the RFP, bidders were required to agree to a draft Umbrella Agreement (UA) which would be finalized after shipyard selection, and these agreements made it clear that a shipyard under a UA was not guaranteed shipbuilding contracts that might result from the NSS. Rather, the shipyard would need to negotiate separate contracts for each project.

“One of the least understood concepts of the NSPS,” noted one of the central players in a 2016 assessment, “is the nature of the strategic partnership between the Government and the winning shipyard.”⁵ Indeed, by designating two shipyards as sources of supply for certain ships, while at the same time stating there was no guarantee the yards would build the ships, the government created some confusion. The situation might have been clearer if the RFP had been worded as designating the yards as “expected” or “preferred” sources of supply, and indeed some media commentary used the latter term.⁶ What Irving and



This graphic for the Type 31e general purpose frigate was released by Babcock on 17 April 2020. It will be built by Babcock in Scotland, breaking the monopoly held by BAE Systems over the previous decade.

Seaspan won in the NSPS competition was the exclusive opportunity to establish an Umbrella Agreement with the federal government for future large shipbuilding work, but the UAs themselves, signed in early 2012, were “not a contract to build ships.”⁷ Rather, they set out the rules and terms of negotiation under which future shipyard bids for specific contracts would take place.

Establishing a strategic sourcing arrangement with a shipyard but not guaranteeing specific shipbuilding contracts had a certain logic to it. The core of the issue is how to embed a degree of market competition in warship building to keep costs down, while at the same time supporting continuous build at a yard to remove boom and bust.

The UK National Shipbuilding Strategy

The British approach of establishing a strategic sourcing arrangement with a shipbuilder *and* guaranteeing BAE a certain level of work each year using noncompetitive single-source contracts did not result in the cost-effective and productive program that it had wanted. By the mid-2010s the Royal Navy (RN) and BAE were “trapped in a

sympiotic downward spiral where fewer ships are being built, at greater cost, and with no prospects on the export market.”⁸ Moreover, to fulfill its annual contractual guarantee, the government was forced to order offshore patrol vessels that the RN “neither wants nor knows how it will crew.”⁹

With this in mind, a key aspect of Britain’s National Shipbuilding Plan, released in September 2017, is to break up the warship building monopoly it had established less than a decade earlier. The strategy, based on an independent report the government had commissioned and received in 2016, reduced the BAE build of Type 26 anti-submarine warfare frigates (the Future Combat Ship, later known as the Global Combat Ship) from 13 to eight, replaced the remaining five vessels with a general purpose frigate, the Type 31, and explicitly stated that BAE could not bid on the Type 31 contract. “There is no precedent for building two ‘first of class’ RN frigates in one location in the UK” stated the 2016 report; rather, there was a need for a separate lead shipyard to minimize risk.¹⁰



A lower hull block for the aircraft carrier HMS *Queen Elizabeth* arrives at the Rosyth shipyard for final assembly. This modular approach will also be employed to build the Type 31e, helping to keep multiple yards around the country active.

Credit: LA (Phot) M. Hogan, Crown Copyright

Britain's strategy seeks to encourage competition within naval procurement by adopting a distributed build construction approach. Shipbuilding work is to be distributed to a range of regional shipyards that have demonstrated their cost competitiveness and the modules are then to be assembled at a lead shipyard. In September 2019 Babcock Shipbuilding in Rosyth, Scotland, won the contract to be the lead shipyard for the Type 31e warships. The strategy also consciously focuses on the export market. The first five Type 31e vessels ('e' for export) will go to the RN, but it is hoped that other navies will also buy the ship. Britain assesses that when it comes to light frigates, which will be optimized for maritime security and interdiction operations, there is a potential export market of 40 ships over 10 years (from 2017). Part of this involves affordability and the strategy announced a price cap of 250 million pounds per vessel. Finally, the new approach builds in international competition. The strategy indicates that while Britain's warships must be built at home, its three new supply ships will be subject to foreign competition as a means of maintaining the UK's competitive edge for shipbuilding.

Concerns have already emerged around each of the three core elements of the UK strategy. The distributed build modular approach worked well for Britain when it built its two new aircraft carriers, and for Germany when it built its *Berlin*-class naval support ships. Yet one of the big lessons of Australian shipbuilding was the pitfalls of building distributed modules (see below). Britain's shipbuilding strategy itself is careful to point out that while a distributed approach might promote competition and increase the pace of build, it can also bring higher integration costs. As a result, the UK remains open to either distributed block building or conventional build and assembly in one yard for all future surface ship procurements.

Questions have also been raised as to whether there really will be demand from abroad for British-designed warships.¹¹ One of the unique aspects of naval shipbuilding is that most countries seek such a capability. Moreover, the per vessel price cap – meant in part to facilitate exports – has already come under pressure.¹² The 2017 strategy indicated the government would revise its price cap plans if industry proved unable to meet the challenge, and indeed within two years Britain had dropped the fixed price approach.

Finally, Britain's decision to designate its new supply ships as 'not warships' and therefore open to international competition is a complicated one because even if the ships are produced abroad, sensitive or classified systems will have to be installed in the UK by British companies. After a progress review of the shipbuilding strategy questioned building defence-funded vessels outside Britain,¹³ in



Two keel sections of the first Australian Air Warfare Destroyer are prepared to be joined at a keel-laying ceremony at the final assembly yard in Adelaide in 2012. One of the keel sections was built with faults resulting in delays.

November 2019 the Ministry of Defence halted the international competitive process for the supply ships.

The Australian Naval Shipbuilding Plan

In the early 2010s there were growing calls in Australia for the development of a shipbuilding plan. At the time, its Air Warfare Destroyer program was experiencing serious cost overruns, delays and productivity problems.¹⁴ Like Britain and Canada, Australia also had several other fleets that needed replacement in the coming years, including frigates, offshore patrol vessels and submarines. In 2015 the government commissioned a strategic review of the country's shipbuilding capacity by the RAND Corporation which examined three scenarios: build in-country; build partially overseas and partially in-country; or build entirely at a foreign shipyard. It recommended that Australia build in-country, but that it take steps to institute a steady and predictable continuous-build program to reduce the 'made in Australia' premium.¹⁵ Central to this approach was that Australia should maintain no more than two principal shipyards, one for major surface combatants and submarines, and one for smaller naval vessels. In fact, RAND felt it might be difficult to sustain two yards, but the risk that a natural disaster could shut down a yard warranted a two-yard recommendation.

Australia's Naval Shipbuilding Plan, released in May 2017, sets out plans for three continuous-build programs – minor naval vessels, major surface combatants and submarines. It specifies two shipyards as part of the strategy, the Osborne Naval Shipyard in South Australia which will carry out a rolling acquisition of submarines (at the north yard) and a continuous-build program for major surface combatants (at the south yard), and the Henderson Maritime Precinct in Western Australia which will build the offshore patrol vessels and where existing ships (such as the *Anzac*-class frigates) will receive upgrades and maintenance. In focusing on two yards the strategy follows a model that is like Canada's, although the two yards were not determined through competitive process and one yard, the Osborne Naval Shipyard, is state-owned. Notably, the strategy is predicated on four key enablers: enhancing shipbuilding infrastructure; developing a workforce; fostering a competitive industrial base; and promoting a national collaborative approach.

A distinction between the Australian and Canadian shipbuilding plans is how they addressed infrastructure upgrades. Shipyards responding to Canada's NSS RPF in 2011 were required to include the 'cost to Canada' of infrastructure upgrades that would have to be done before ships could be built. To gain maximum points, all contenders stated a zero cost in this bid category. But when they finalized their Umbrella Agreements in February 2012, the winning yards secured 'backstop' agreements with the government to guarantee that the infrastructure

upgrade costs, in the hundreds of millions of dollars, would be covered if contracts were not signed. Because they did not appear in the original RFP, the backstop provisions became controversial, prompting the Auditor General to state "future RFPs need to be clearer and more explicit on the extent of negotiations of post-bid changes with successful contractors."¹⁶ Australia, by contrast, took as its starting point that if the country wanted to build ships domestically, it would need to invest in its shipyards. Under the shipbuilding plan the government committed over a billion Australian dollars to carry out substantial facility and infrastructure upgrades at the two designated naval shipyards.

In its shipbuilding plan Australia also explicitly rejects the distributed block build approach that Britain chose just a few months later. Australia's three *Hobart*-class air warfare destroyers, the first of which was launched in 2015, were built using this approach. The destroyers were built with blocks for the forward superstructure, remaining superstructure, keel and sonar in yards at Adelaide, Newcastle, Williamstown and Britain/Spain respectively, and brought together for final assembly by Australian Submarine Corporation (ASC) in Adelaide. But in 2010, after the block construction began, it was revealed that the central keel sections did not fit the other modules, contributing to a significant delay in completing the vessels. Australia's Naval Shipbuilding Plan therefore explicitly adopts a vertically integrated approach to build the future frigates, with all blocks to be constructed by ASC at the Osborne Naval facility.

Conclusion

Within less than a decade Australia, Britain and Canada all launched a long-term continuous naval shipbuilding program. This circumstance provides a unique opportunity to undertake a comparative analysis, and to gain preliminary insight on how best to build and sustain a domestic warship building capability. We can already see some lessons emerging, and some questions arising.

One lesson appears to be the value of a vertically integrated over a distributed build approach. Intuitively, building at many shipyards and assembling at a lead yard makes more sense for countries that are geographically relatively small, like Britain and Germany, as compared to Canada or Australia. But even a country like Britain with a positive history of distributed build can have some concerns. When combined with the negative experience of Australia, it seems clear that the vertically integrated path, followed by both Seaspan and Irving, is the right one for Canada. Beyond this there are indications that relying on building for export as a key plank of a sustainable naval shipbuilding industry might be a risky endeavour since



Australian Minister for Defence Industry Christopher Pyne and Minister for Finance Senator Mathias Cormann unveiled the design and turned the first sod for the new surface shipbuilding yard in Osborne, South Australia, on 24 August 2017. This new yard will be used to build the *Hunter*-class frigates, based on the same Type 26 hull as the Canadian Surface Combatant.



This is a rendering of the **Hunter**-class frigate. As is the Canadian Surface Combatant, it is based on the Type 26 hull, with a key difference being the use of the Australian-designed and built CEAFA 2 radars on the pyramidal mast.

almost every country, except a few emerging countries, seeks to build its own ships.¹⁷ A further lesson is the value of incorporating into an overall naval shipbuilding plan sub-strategies for issues that, if not properly addressed, will inevitably derail shipbuilding timelines. One example is the infrastructure strategy that forms part of the Australian plan, as discussed above. But another is its workforce strategy, an enabler designed to ensure that there is the skilled workforce available to build complex vessels like warships. This is something Canada has struggled with in the past.

At the same time, many questions come to mind. What does RAND's point about the viability of two (much less three) shipyards in Australia tell us about Canada's decision in 2019 to open the NSS to a third shipyard? How can we best assess the cost-benefit tradeoff between building at home and buying offshore? Why does naval shipbuilding stand out as a military procurement that many countries insist on undertaking completely or largely at home (unlike, say, fighter jets and tanks)? In the post-pandemic world should such exclusivity be extended to other national security assets?¹⁸ Finally, how can a government best combine guaranteed long-term support to a shipyard with competitive market tension – ultimately the centrepiece of a sustainable warship building industry?¹⁹ All of these lessons and questions, along with no doubt several others, warrant further, detailed investigation.²⁰ 🍷

Notes

1. Industry Canada, *A New Policy Framework for the Canadian Shipbuilding and Industrial Marine Industry* (Ottawa: Industry Canada, 2001), p. 6.
2. Office of the Auditor General of Canada, *Report of the Auditor General of Canada: Chapter 3 – National Shipbuilding Procurement Strategy* (Ottawa: Office of the Auditor General, Fall 2013), p. 10; Jeffrey F. Collins, "Overcoming 'Boom and Bust'? Analyzing National Shipbuilding Plans in Canada and Australia," *Vanguard*, 1 March 2019, p. 5.
3. Mott Macdonald, "Economic Analysis of National Shipbuilding Procurement Practices," Report for Industry Canada (Ottawa: Industry Canada, May 2009), pp. 2-4, as quoted in Eric Lehre, "Fleet Replacement and the 'Build at Home' Premium," *Vimy Paper* (Ottawa: Conference of Defence Associations Institute, 2016), p. 20.

4. Public Works and Government Services Canada, "National Shipbuilding Procurement Strategy: Release of the Request for Proposal to Build Large Vessels for Canada," National Shipbuilding Procurement Strategy, 7 February 2011, as quoted in Martin Auger, *The National Shipbuilding Procurement Strategy: A Five-Year Assessment* (Ottawa: Library of Parliament, 2015), p. 3.
5. Tom Ring, "The National Shipbuilding Procurement Strategy: How did We Get to Where We are Now?" Canadian Global Affairs Institute Policy Update (Calgary: Canadian Global Affairs Institute, 2016), p. 7.
6. "Auditor General Report: Shipbuilding Plan May Fall Short," CBC News, 26 November 2013.
7. Ring, "The National Shipbuilding Procurement Strategy: How did We Get to Where We are Now?" p. 7.
8. Nicholas de Larrinaga, "UK Type 31 Frigates Should not be BAE-Built, Key Report Recommends," *Jane's Defence Weekly*, 29 November 2016.
9. *Ibid.*
10. John Parker, *An Independent Report to Inform the UK National Shipbuilding Strategy* (London: Ministry of Defence, November 2016), p. 15.
11. Jonathan Beale, "UK Shipyards: Five Frigates at Centre of New Strategy," BBC News, 6 September 2017.
12. The predetermined cap puts one in mind of Canada's own historic practice of setting a 'rough order magnitude' cost of a platform during the options analysis stage of a major military procurement that essentially becomes set in stone over time. In 2013 the Auditor General of Canada identified this as a notable problem in shipbuilding and recommended budgets not be capped until definition activities are sufficiently advanced to develop substantive cost estimates. See Office of the Auditor General of Canada, *Report of the Auditor General of Canada: Chapter 3 – National Shipbuilding Procurement Strategy*, p. 21.
13. Sir John Parker, "Review of the Implementation of the National Shipbuilding Strategy," Report for the UK Secretary of State for Defence, 4 November 2019.
14. Government of Australia, "Joint Media Release – Prime Minister and Minister for Defence – The Government's Plan for a Strong and Sustainable Naval Shipbuilding Industry," 4 August 2015.
15. John Birkler et al., *Australia's Naval Shipbuilding Enterprise* (Santa Monica, CA: RAND Corporation, 2015), p. 149.
16. Office of the Auditor General of Canada, *Report of the Auditor General of Canada: Chapter 3 – National Shipbuilding Procurement Strategy*, p. 15.
17. Comments by Innovation, Science and Economic Development Canada official at the 14th Defence and Security Economics Workshop, Carleton University, Ottawa, 25 October 2019.
18. Murray Brewster, "Pandemic Equipment Snarls Will Rewrite Definition of National Security Needs," CBC News, 8 April 2020.
19. Issues here centre around designating a prime contractor, carrying out competitions for warship design and the combat systems integrator role, and accounting for in-service support contracts, among other things.
20. Over the period to 2025, the author will be conducting a study on this topic funded by the Social Sciences and Humanities Research Council.

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Arctic Icebreaking Operations and the NSS

Jeff G. Gilmour

Icebreakers are key tools for projecting power in the Arctic by breaking sea ice for shipping, resource exploration and tourism in northern waters. With receding ice, the transit of ships will likely be increasing on a year-round basis.

Even as the permanent ice melts, the reliance on icebreakers will become more important as the shipping in this region increases. In addition, many states and corporations will be seeking resource development and exploration opportunities in the North. Some countries are already looking at potential cost-saving new shipping routes in the Arctic. Both the Canadian Northwest Passage and Russia's Northern Sea Route (NSR) could cut delivery times between Asia and Europe significantly compared to the Suez Canal route. Russia and Norway have been the most active Arctic states, spending billions over the past decade on natural gas and oil infrastructure, deep-water ports and ships capable of navigating the Arctic Ocean.¹

What is clear is that the Arctic is gaining in importance. This makes it puzzling that the National Shipbuilding Procurement Strategy (NSPS), now the National Shipbuilding Strategy (NSS), did not include more attention to heavy icebreakers.

Icebreaker Ship Classification

Ships are normally assigned one of seven Polar Classes (PC) ranging from PC-1 for year-round operation in all polar waters to PC-7 for summer and autumn operations in first-year ice. These classifications are based on "Unified Requirements for Polar Class Ships" developed by the International Association of Classification Societies (IACS). These rules were developed to harmonize the ice-class rules among the different classification societies and to complement the "IMO Guidelines for Ships Operating in Arctic Ice-Covered Waters."

Unfortunately, some states do not utilize the classification system to the full extent. In many countries icebreakers are identified as 'heavy,' normally operating year-round in moderate multi-year ice, 'medium,' operating year-round in thick first-year ice, and 'light,' operating in only the summer or autumn in medium first-year ice.² The definition of 'heavy' is an icebreaker which can work in 6 feet (1.8 metres) of ice continuously at 3 knots, which also can ram and back through at least 20 feet (6.1 metres) of ice.³

An icebreaker is a special-purpose ship designed to move and navigate through ice-covered waters, and provide safe waterways for other ships. An icebreaker's chief function



The first of Russia's nuclear-powered Project 22220 icebreakers, *Arktika*, is seen here at Baltic Shipyard in St. Petersburg before departing for its December 2019 sea trials.

is to break, separate or divert ice in ice-covered waters. In cases of very thick ice, an icebreaker can drive its bow onto the ice to break it under the weight of the ship.⁴ As a result of this, icebreakers must have very strong hulls. For example, the Russian *Arktika*-class icebreakers have a double hull, with the outer hull being approximately 1.9 inches (48 mm) thick at the icebreaking areas and 0.9 inches (25 mm) thick elsewhere. In comparison, often warships only have hulls one-eighth of an inch thick (3.2 mm). There is also water ballast between the inner and outer hulls on an icebreaker which can be shifted to assist with the icebreaking operations.

Icebreaker Operations in Canada

The acquisition of new icebreakers in Canada has been a less than pleasant experience. It has never been a significant priority for any government in Ottawa. The current



HMCS *Labrador* sails into Copenhagen in 1957 during port visits to northern Europe.

fleet's advanced age is already affecting the ability of the Canadian Coast Guard (CCG) to carry out its mandate in the Arctic Ocean. For years a number of analysts have highlighted the prolonged attempts of the federal government to make decisions on replacing icebreakers for the CCG.⁵ A report conducted by Transport Canada in 2016 concluded:

The Canadian Coast Guard fleet is ageing, which has implications for maintenance as well as procurement. Given that 29 percent of the larger vessels are more than 35 years old and close to 60 percent of small vessels are older than the design life of 20 years; it is not surprising that the number of major systems repairs required is increasing, vessel days are decreasing, and the number of ships out of service is increasing over time.... The Canadian Coast Guard is not receiving the political attention, or the administrative and financial resources it requires.⁶

Even the federal Procurement Minister at the time, Carla Qualtrough, stated in June 2019 that there was “definitely

a capability gap on icebreakers.”⁷ And yet the NSS did not focus on this.

HMCS *Labrador*, which was commissioned for the Royal Canadian Navy (RCN) on 8 July 1954, was the first naval ship to operate in the Arctic. The ship sailed with the RCN until 1957 when it was transferred to the Department of Transport and later became Canadian Coast Guard Ship (CCGS) *Labrador*. It carried out extensive scientific exploration in Canada's Arctic Ocean until it was taken out of service in 1987. In 1969 *Louis St. Laurent* was commissioned for the CCG. The largest icebreaker in the CCG fleet, it has been classified as a PC-4, Gulf Class, Class 1300 or a heavy icebreaker. The ship is 392 feet (119.5 metres) in length, has an 80-foot (24.4-metre) beam and a tonnage of 15,000.⁸

The lack of attention in the NSPS/NSS to icebreakers is not new. It has been clear that icebreakers are considered expendable in government shipbuilding plans. For example, beginning in the early 1970s plans were drawn up to replenish the icebreaker fleet. In 1981 the federal Cabinet approved a design for a Polar 8 icebreaker.⁹ In 1985 the government of Brian Mulroney approved the construction phase of this ship, but then axed the program due to budget cuts.

Canada's second heavy icebreaker, CCGS *Terry Fox*, was built in Victoria, BC, in 1983, originally to support drilling operations in the Beaufort Sea. It was acquired by the CCG in 1992 – it was first leased to and then sold to the CCG. It is classed as a heavy Gulf icebreaker, or PC-4, although it is smaller than *Louis St. Laurent*.

In 2010, just over 40 years after the commissioning of *St. Laurent*, the federal government initiated the National Shipbuilding Procurement Strategy (now the National Shipbuilding Strategy (NSS)) to begin negotiating contracts for Canadian shipyards to build ships for both the



A Canadian Coast Guard helicopter lands on the icebreaker CCGS *Louis St. Laurent* on 10 September 2008, somewhere in Arctic waters.



Credit: Irving Shipbuilding

A rendering of an Arctic and Offshore Patrol Ship in Canadian Coast Guard colours. Two such ships will be built by Irving Shipbuilding after completion of the first six for the Royal Canadian Navy.

CCG and the RCN. It was announced that the future CGS *John G. Diefenbaker*, a PC-2 icebreaker, would be built at the Seaspan Shipyard in Vancouver at a cost of roughly \$1.3 billion. The delivery date was expected to be between 2025-2030. Due to the fact that *St. Laurent* would be over 50 years old when the new ship appeared, and well past its operational life expectancy, this delivery time was questioned.

The other significant issue for the construction of *Diefenbaker* was the list of contracts already underway at Seaspan. The delivery date was pushed sideways because ahead of it in the NSS build schedule were three Fisheries Science Vessels and one Offshore Oceanographic Science Vessel for the CCG and two Joint Support Ships (JSS) for the RCN.

In June 2019, however, the situation became even worse. Fisheries Minister Jonathan Wilkinson announced that *Diefenbaker* was being removed from Seaspan's order book and its budget and design were under review as well. In its place would be the construction of 16 Multi-Purpose Vessels at Seaspan (and two ships are to be built at Halifax Shipyard/Irving for the CCG). The construction of these 18 new ships was part of the \$15.7 billion program which the Prime Minister announced "will renew the coast guard fleet."¹⁰

The problem for the CCG is that there are now no plans to replace the heavy icebreaker *Louis St. Laurent* which is beyond its operational life, and is the largest icebreaker in the CCG fleet. The two CCG ships to be built at Irving in Halifax will be similar to the *Harry DeWolf*-class of Arctic and Offshore Patrol Ships (AOPS) being built for the RCN. The design of the AOPS is based on Norway's NOCGV *Svalbard* which was built in 2001 for about \$100

million. The RCN AOPS will have an open water speed of 17 knots, a range of 6,800 nautical miles at a speed of 14 knots. They will be capable of operating in first-year ice of 47.2 inches (120 centimetres) thickness, and classified as PC-5.¹¹ These two ships plus the 16 ships built at Seaspan will only operate in the Arctic Ocean during the months of June to October, and will only be tasked with light ice-breaking duties in the North.

There have been a number of criticisms directed at Canada's AOPS program. A Senate Defence Subcommittee questioned the ships' limited icebreaking capacity, slow speed, inability to operate year-round in the Arctic Ocean and their limited armament.¹² The navy acknowledges some of the shortcomings of the ships but notes that the ships are not built to go to war. In addition to their lack of icebreaking capability, the delivery date of the AOPS continues to get pushed back – the first ship is to be delivered some time in 2020, instead of the original delivery date of 2018.¹³

In belated recognition that Canada needs icebreakers, the government introduced several new programs. The first was outside the NSS. The Chantier Naval Forillon/Davie shipyard in Laval Quebec was awarded a \$160 million contract to retrofit three 'medium' commercial icebreakers from Norway, designated *Viking*-class.¹⁴ The first of these three vessels, CCGS *Molly Kool*, transitioned into service in the Atlantic region in late 2018, with the other two vessels expected to be in operation in 2020.¹⁵ This is a vast improvement on the situation, but the CCG still needs heavy icebreakers.

In 2019, the Liberal government announced a Request for Proposals (RFP) for six new icebreakers at a third shipyard – i.e., a shipyard other than the two which are currently

involved in the NSS – which was to be determined. It is likely that these ships will be ‘medium’ PC-3 icebreakers; only operating in the Arctic during the summer/autumn months.¹⁶ The contract for the six new ‘program’ icebreakers has now been awarded to Davie shipyard, which had not been part of the original NSS. It seems clear, based on the press release from the federal government, that these six ships will not be able to provide icebreaking services to ships operating in the Arctic Ocean on a year-round basis. The bottom line is that the plan in the NSS to build the heavy icebreaker *John G. Diefenbaker* to replace *Louis St. Laurent* was suspended. The other ships that are to be built are *medium* icebreakers. And now there is discussion of a ‘redesign,’ and a new timeline of 2029 for delivery of *Diefenbaker*. In other words, who knows when this ship will be built.

Other States in the Arctic

It is not always helpful to compare Canada with other states because circumstances differ, but it is nonetheless useful to see what other polar states are doing. In Canada we tend to look at the United States to see how we’re doing. In this case, the United States does not provide a shining example. Currently the US Coast Guard (USCG) has only two icebreakers in service, USCGC *Polar Star* and USCGC *Healy*. (The US Navy has no icebreakers.) *Polar Star*, which entered into service in 1976, is regarded as a heavy polar icebreaker, and *Healy*, which entered service in 1997, is regarded as a medium icebreaker. Efforts to increase the size of the icebreaker fleet began under the administration of Barack Obama and, in a rare example of continuity, gained momentum under Donald Trump, who proposed \$750 million for a new ship, which the Senate approved in 2018. But in the summer of 2018, heading into the mid-term elections, the funding was diverted to another presidential priority: the construction of a wall along the US border with Mexico.

On 6 June 2019 the US government released the Department of Defense strategic approach for the Arctic which is to protect US national security interests and address risks to those interests in ways that uphold the region’s rules-based order, without fueling strategic competition.¹⁷ This document was compiled after the US Coast Guard and the US Navy filed their comprehensive strategic reports on the Arctic to Congress.¹⁸ In comparison, the RCN filed its Strategic Plan 2017-2022 but there was no specific area identified in this document, so nothing relating to Canada’s strategic position in Canadian Arctic territory and the Arctic Ocean.

Other polar states such as Norway, Finland, Denmark and Sweden – which are small countries – have focused more on icebreaking than Canada (and the United States). But it is Russia that pays the most attention to the Arctic – it puts a much higher priority on the Arctic than either Canada or the United States. It is the most important state to consider. For both economic and military reasons, the North is important to Russia, and that means it recognizes the need for icebreakers. Shipping is projected to increase along the Northern Sea Route (NSR), and Russia hopes to boost freight traffic along the NSR year-round. It will substantially increase its icebreaker fleet to 40 with an additional 11 under development.¹⁹ In May 2019, Russia announced the launch of its new nuclear-powered icebreaker, *Ural*, the third of the *Arktika*-class icebreakers.²⁰

Russia seems to be working closely with China in a partnership to exploit the resources in the Arctic, and the NSR is a link in China’s strategic Belt and Road Initiative (BRI).²¹ Unlike in Canada where northern populations are sparse, two million Russians inhabit the country’s Arctic territory, which has several large cities, including Murmansk and Norilsk. They view the Arctic “as their future resource base.”²²



The three Viking icebreakers enter Quebec City in preparation for their conversion to Canadian Coast Guard service at the nearby Davie Shipbuilding facilities.

In the North, Russia has expanded its military foothold. There are at least 18 recently constructed or upgraded military bases along the Russia-Canadian Arctic border, along with an increased air force presence and nuclear submarines.²³ The Arctic port of Severomorsk is home to the Russian Northern Fleet. Foreign observers have counted four new Arctic brigade combat teams and 16 deepwater ports along Russia's Arctic coast.²⁴

With limited Canadian naval capability in the North, will foreign ships transiting the Arctic comply with Canadian regulations as stipulated in the Arctic Shipping Pollution Regulations (ASPPR) and the Northern Canada Vessel Traffic Services Zone Regulations (NORDREG), as well as the International Maritime Organization's 2017 Polar Code? In addition, Canada's new Arctic Shipping Safety and Pollution Prevention Regulations (ASSPPR) came into force in December 2017. These regulations include a variety of safety and pollution prevention measures related to vessel design and equipment, vessel operations and crew training when ships operate in Canada's part of the Arctic Ocean.²⁵ The question is, will Canada have the ability to monitor and carry out year-round surveillance on foreign ship traffic entering the Northwest Passage? What happens if ships do not comply with Canadian regulations pertaining to shipping in Canada's Arctic waters?

For decades federal governments in Canada have failed to recognize the strategic and economic importance of the Arctic Ocean. This can be seen in the lack of attention to icebreakers, but in other ways as well. Unlike the Russian activity in the North, Canadian politicians don't seem to recognize the importance of Canada's three northern territories. The only deep-water ports which are operational

are in Churchill in Hudson Bay and the new construction of a port in Iqaluit. The Department of National Defence (DND) is still attempting to complete the dock at Nanisivik Mine, near Arctic Bay, Nunavut, for refueling the RCN and the CCG.²⁶ This facility is expected to enter full service by the summer of 2020.

Many problems in the North are related to a lack of infrastructure. When the Arctic Policy Framework (APF) was released in September 2019 after four years of study, it was billed as a blueprint for Canadian Arctic strategy up to 2030. The framework was supposed to replace "Canada's Northern Strategy" of 2009 and the "Statement on Canada's Arctic Foreign Policy" of 2010. The APF lists health, infrastructure and economic development as the primary focus but it contains no roadmap on how to achieve any of its goals or spending priorities. The same issues and concerns have been raised by territorial politicians for decades, with no clear plans to resolve these matters coming out of Ottawa.

In 2019 the Premier of the Northwest Territories at the time, Bob McLeod, laid out his vision for the North's future. He argued for development of Arctic waters for transportation, and said that Canada should triple its icebreaker fleet within five years and triple its deep-water port capacity within 10 years. He also noted that he would like to see a full military base, preferably in Inuvik, of almost 5,000 permanent personnel.²⁷ Could this attention start with a focus on heavy icebreakers?

Conclusions

Compared to the initiatives taken by Russia in the Arctic, Canada could be considered a laggard. For decades



Credit: United States Coast Guard

An experimental hull model of the US Polar Security Cutter makes its way through eight scale feet of ice in a facility operated by the National Research Council of Canada in St. John's, Newfoundland, in May 2017.



The medium icebreaker CCGS *Des Groseilliers* undergoes maintenance at Davie Shipbuilding in 2014. Davie will build the replacement for *Des Groseilliers* and its sisters.

Canadian politicians have argued that Canada must develop the North and protect sovereignty but little concrete evidence can be shown as to what steps have been taken to achieve such goals.

One critical problem for the Canadian Coast Guard in the NSS is that once CCGS *Louis St. Laurent* is decommissioned, which will be sooner rather than later because of its age, only CCGS *Terry Fox* will be operational as a heavy icebreaker for use in the Arctic. Unlike other circumpolar states which are increasing the number of icebreakers that can operate year-round in the Arctic Ocean, Canada is not. None of the planned ships being built for the CCG will replace the two heavy icebreakers currently in operation. This seems to make no sense as foreign traffic in the Northwest Passage is bound to increase in the next decade.

On 30 October 2015, the eight Arctic Council states, including Canada, signed an agreement to establish the Arctic Coast Guard Forum. The agreement focuses on establishing areas of responsibility and cooperation for search and rescue operations and icebreaking collaboration. The CCG is responsible for all marine search and rescue (SAR) operations in Canada's section of the Arctic Ocean. Without a heavy icebreaker, how can the CCG undertake SAR operations in the Arctic Ocean on a year-round basis? How dependent is Canada on the assistance of other Arctic Council states in a SAR operation in the Arctic Ocean? New technology, such as satellites and drones, can monitor the Arctic areas, but what response can technology provide?²⁸

Canada is not prepared to handle increased ship traffic in the Arctic Ocean. Unlike Russia, it does not have the necessary infrastructure or defence capability to respond to any potential threats to Canada's Arctic waters. The CCG will not have icebreakers that can operate in the Arctic Ocean

year-round and the RCN has no ships that are built for ice-breaking duties in these waters on a year-round basis.

The NSS included the construction of one icebreaker but it was not at the top of the list for building, and construction of it seems to have been suspended. The addition of a third shipyard to address the lack of icebreakers is a good start – but none of them will be heavy icebreakers. This is a serious lack for a country that defines itself as an Arctic state. 🍷

Notes

1. "The Arctic," *National Geographic*, 2019, p. 68.
2. *Ibid.*, p. 60.
3. "World Wide Icebreaker Classes," GlobalSecurity.org, 2011.
4. "How does an Ice Breaker Ship Work?" *Marine Insight*, 18 October 2019.
5. See, for example, Kim Richard Nossal, "Polar Icebreakers: The Politics of Inertia," in Franklyn Griffiths (ed.), *Politics of the Northwest Passage* (Kingston: McGill-Queen's University Press, 1987), p. 216.
6. Transport Canada, "Canada Transport Act Review Report," 25 February 2016, pp. 220-223.
7. Quoted in Lee Berthiaume, "No Icebreakers in \$15 B Complete Fleet Renewal," *National Post*, 1 June 2019, p. N-10.
8. Canadian Coast Guard, "Vessels," available at <https://inter-j01.dfo-mpo.gc.ca/fdat/vessels>.
9. Note that the Polar 8 was cancelled in 1990.
10. Office of the Prime Minister, News Release, "PM Orders Renewal of Canadian Coast Fleet," 22 May 2019.
11. Government of Canada, "Arctic and Offshore Patrol Ships, Canada," 7 December 2018, available at <https://www.canada.ca/procurement>.
12. The AOPS will have one BAE MK38 25mm gun, compared to the Danish *Knud Rasmussen* Ocean Patrol Vessels which have more substantial armaments. See Senate of Canada, "Report of the Standing Committee on National Security and Defence," May 2017.
13. Brett Ruskin, "Delivery Date for Irving's 1st Arctic Patrol Ship Pushed Back Yet Again," CBC News, 12 November 2019.
14. Canadian Coast Guard, Briefing Notes, 22 August 2019.
15. "Conversion by Quebec Shipbuilder," *National Post*, 23 June 2018, p. NP-12.
16. See Public Services and Procurement Canada, 2 August 2019.
17. US Government, Department of Defense, "Strategic Approach for the Arctic," 6 June 2019.
18. US Coast Guard Report "Arctic Strategic Outlook," April 2019; and Chief of Naval Operations, United States Navy, "Strategic Outlook for the Arctic," January 2019.
19. B. Weber, "Moscow's Efforts on Arctic Infrastructure leave Experts Wondering about Ottawa's Approach," *The Globe and Mail*, 11 February 2019, p. A-10.
20. "Russia, Eying Arctic Future, Launches Nuclear-powered Icebreaker," CBC News, 25 May 2019.
21. John Higginbotham, "We Need Economic Vision for the Arctic, but Canada Lacks Leadership," *The Globe and Mail*, 5 August 2019, p. A-10.
22. "The Arctic," *National Geographic*, 2019, p. 72.
23. Robert Smol, "Getting Tough on Russian Aggression, Everywhere but in the Arctic," CBC News, 27 March 2018.
24. Weber, "Moscow's Efforts on Arctic Infrastructure leave Experts Wondering about Ottawa's Approach," p. A-10.
25. Aiswarya Lakshmi, "Canada Unveils New Arctic Shipping Safety Regulations," *Marine Link*, 14 January 2018.
26. Dave Perry, "Stepping Up in the Arctic," *Canadian Naval Review*, Vol. 15, No. 2 (2019), p. 41.
27. Quoted in Laurie Sarkadi, "NWT Premier will Push Ottawa for Greater Military Presence, More Icebreakers in the North," CBC News, 1 May 2019.
28. For information about satellite systems, see Michael Byers, "Watch This Space," *The Globe and Mail*, 27 July 2019, p. 3. For information about drones in the Arctic, see N. Verkindt, "Canadian Innovations for the Arctic," *Vanguard*, 9 October 2018.

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Making Waves

The National Shipbuilding Strategy: Flawed Premises

Dan Middlemiss

As we look back at 10 years of the National Shipbuilding Strategy (NSS), there are many observations that can be made. I would like to offer some here.

Let me begin by focusing on the near exclusive industry-government orientation of the early deliberations on what was originally called the National Shipbuilding Procurement Strategy (NSPS). Put simply, there were no independent outside studies, parliamentary reports, or broader public consultations. There were perhaps good reasons for this omission: such studies take time and are expensive, and both government and industry wanted to get underway as quickly as possible. Yet wider consultations of this type were undertaken in Australia and the United Kingdom as these countries embarked on their own shipbuilding strategies.

Such broader enquiries, if they had been done, might have shed some critical light on several foundational premises of what has become the NSS. The premises that would have benefited from more thoughtful analysis include:

- The ‘build-in-Canada’ policy which applied to all major shipbuilding projects.
- The export potential of Canadian vessels constructed under the NSS.
- The NSS as a solution to Canada’s chronic shipbuilding ‘boom-and-bust’ syndrome.
- The flexibility of the NSS to adapt to changing requirements and circumstances.
- The job creation objective at the core of the NSS.

Let me comment briefly on each of these premises.

First, while a case can be made that building major classes of ships domestically is advantageous for reasons of strategic security and trade balance, surely the same cannot be said for one-off or limited production run projects. This is because economies of scale and learning curve considerations do not apply in these low quantity cases, sizeable cost overruns usually follow, and exports become a near impossibility. Because learning curve efficiencies tend to peak at about the ninth ship in a batch production run, many other shipbuilding countries have opted to purchase small batch (i.e., 1-4 ships) naval supply ships offshore. Canada’s decision to build two supply ships and a single Polar-class icebreaker seems to invite extra risk, and thus greater costs, given our inexperience in this field. So, from the outset, the NSS focus has been too broad. It would have made more sense for Canada to build only

those ships that have a large production run – but this would, of course, interfere with the other objectives of the NSS.

Second, there are no reported examples of a serious effort by Ottawa to explore the short- and long-term export potential of the various construction programs planned under the NSS. The Defence Analytics Institute set up in 2014 for this purpose seems to be moribund, and no RAND studies have been commissioned to this end. However, there is no shortage of studies demonstrating that purely domestic demand by Canadian government agencies has been grossly insufficient to sustain a viable shipbuilding industry in Canada. The fact that Canada has not managed to sell a single warship, supply ship, or icebreaker abroad in the entire post-World War 2 era, should give us all pause to consider what the realistic prospects are for exporting Canadianized versions of foreign-designed ships. Failure to explore this crucial issue has been a glaring oversight and could prove fatal to the NSS in the long run.

Third, and following from the previous point, the NSS as currently configured deals exclusively with the 25-30 year ‘boom’ phase of the much-discussed ‘boom-and-bust’ cyclical phenomenon. Nobody to date has convincingly explained what happens next in Canada. Experts in other countries have argued that strategies like the NSS need to project outward at least 100 years or more to prevent the so-called ‘valleys of death’ from reoccurring. But in typical aspirational fashion, Ottawa has opted for a ‘build-it-and-they-will-come’ mentality. The history of Canadian warship operations suggests that Ottawa will employ its warships for close to 40 years (and some Canadian Coast Guard (CCG) vessels for even longer) and this practice almost ensures that a long production ‘bust’ gap will develop well before these ships are replaced – unless, of course, Canada can convince some other country to buy ships



A graphic of the *Protecteur*-class Joint Support Ship currently being built at Seaspan Shipyards. It ‘won out’ over the Canadian Coast Guard’s polar icebreaker to be built after the three Offshore Fisheries Science Vessels.



Credit: Vard Marine

Fore and aft views of the Arctic and Offshore Patrol Ship design by Vard Marine. Although the general design appears to be available for foreign purchase, it is uncertain whether there are interested parties and, if so, whether they would be built in Canada.

built in Canada, which as I have suggested, is unlikely. Again, by not thinking this through in public, the NSS is almost surely setting itself up for failure in the long term.

Fourth, the NSS assumes an orderly progression of building projects to stay within budgets and to prevent expensive gaps from developing between the end of one construction program and the start of another. The Parliamentary Budget Officer has projected that production gaps of this nature can be eye-wateringly costly. For example, Irving desperately needed some gap-filler add-ons to its Arctic and Offshore Patrol Ship production line to avoid significant worker lay-offs before the start of its Canadian Surface Combatant program. To fill this gap, Ottawa ordered two additional patrol ships for the CCG, without, as far as we know, considering whether the coast guard had any prior requirement for these ships.

Moreover, an orderly progression of building ships may exist only in the imagination of planners. As we have seen in the case of the Joint Supply Ship program, when Canada's existing supply ships suddenly became unfit for service, there was an urgent need to find interim replacements. So, two limited-time lease arrangements were fashioned, and

a third shipyard was awarded a contract to convert a container ship to service the navy. All this occurred outside the ambit of the NSS and has potentially added a third shipyard to be kept afloat under the strategy. The NSS thus cannot be surged or its order of production quickly altered to meet new needs without adding to the cost to the taxpayer.

Fifth, from its inception, the NSS has fallen victim to the politicians' siren song of job creation. Put simply, from an economic standpoint, governments seldom 'create' jobs. They can entice workers to relocate from one region to another via major procurement contracts, but the net economic benefit to Canada as a whole is minimal at best. Shipbuilders are certainly not in the business of creating jobs; labour is clearly a cost of production – not a benefit – and is something that efficient shipyards try to minimize in order to maximize their profits. And this is one of the paradoxes at the heart of the NSS. On the one hand, the shipyards were required to make upgrades to their facilities as part of the groundwork for the NSS. And, as we all know, creating a modern production facility means minimizing human employees. The new facilities are highly automated. But, on the other hand, one of the stated purposes of the NSS is to create jobs for Canadians.



Minister of National Defence Harjit Sajjan announces the decision to build the sixth Arctic and Offshore Patrol Ship on 2 November 2018, helping to prevent lay-offs in the period until construction of the Canadian Surface Combatant.

Moreover, there is much statistical confusion involved with shipbuilding employment data. Most analyses use Full-Time Equivalents (FTEs) to measure the total labour input of an industry like shipbuilding. A FTE takes the total hours worked by all full-time, part-time, laid off and dismissed workers, plus any overtime hours they have accrued, and divides this by the hours worked by a full-time employee over a specified period of time, usually a 30-hour week. Thus, a single shipbuilding employee who works a full 40-hour week plus overtime, could be considered two or three FTE units. The confusion arises when industry and politicians then misleadingly portray these FTE numbers to mean two or three *actual* workers. FTEs are not a headcount of actual employees. Furthermore, some analysts point out that the Cost-Reimbursable Incentive Fee (CRIF) contract system being used in some NSS programs can create a perverse incentive for a shipbuilder to increase its labour costs to earn a higher profit. This is not a formula to develop a highly cost-efficient industry.

In summary, the NSS has serious flaws: its early consultations were too restrictive and narrowly focused; its build-in-Canada policy covers every project rather than focusing on those with the longest production runs; its temporal horizon for dealing with the boom-and-bust cycle is too short term; its production queue is too inflexible; and its job creation emphasis and messaging has been too contrived and misleading.

As originally conceived, the NSS involved a selection of two main shipyards for an ambitious list of build programs. Two somewhat competing objectives sat uneasily juxtaposed: first, providing vessels to the RCN and CCG within budget and in a timely manner; and second, sustaining a newly resuscitated domestic shipbuilding industry, and its supply chain, over the long term through various contractual mechanisms.

Despite some attempts to reform and streamline the process, the NSS never really tackled the persistent and seemingly intractable problems associated with Canada's dysfunctional defence procurement system. This shortcoming is not the fault of the NSS, but we may question the wisdom of proceeding with very complex and costly programs without a serious attempt to overhaul the existing procurement system beforehand. Why, for example, did Ottawa decide to hold a 'competition' for a Canadian Surface Combatant without any direct reference to costs? And even more important, what bargaining leverage does Ottawa now have over the winning design bidder?

After 10 years, the NSS seems to be increasingly oriented towards propping up Canada's shipbuilding industry, and far less geared towards providing affordable ships on time and on budget. Only time will tell if we can get the NSS back on course. 🇨🇦

Sustaining Seapower: Domestic Shipbuilding is Not Just about Jobs

Timothy Choi

Throughout the past decade of the National Shipbuilding Strategy (NSS), one of the primary debates has been the cost-benefits of establishing and sustaining a domestic shipbuilding industry. The arguments tend to run along the following lines. Those people in favour of the existing NSS arrangement argue that it creates a long run of well-paying, high-skilled jobs that ensures future fleet construction can take place without having to rebuild the shipbuilding industry. The opposition argues that the job-creation aspect takes away from the actual objective of delivering ships to the government in a timely manner and means a significantly higher cost to the taxpayer.¹ I won't delve into these arguments, and instead will question whether the objective of shipbuilding is limited solely to the ships themselves and if the benefit of domestic shipbuilding is solely in job creation. I put forth three suggestions: first, national seapower requires more than just ships; second, domestic shipbuilding is vital for establishing and sustaining a country's seapower *beyond delivering the ships themselves*; and third, building ships abroad is no guarantee of quicker and more reliable timeframes for entry into service, and exposes Canada to increased political risks.

Before I discuss my first point, let me first distinguish between seapower and sea power. *Seapower* is the ability to influence behaviour at sea and from the sea, and a *sea power* is any actor that has some amount of seapower.



Credit: Irving Shipbuilding

The first two Arctic and Offshore Patrol Vessels, **Harry DeWolf** and **Margaret Brooke**, sit outside Irving Shipbuilding during the former's naming ceremony on 5 October 2018.

While this definition has been subject to interpretation and some disagreement, it is commonly used and encompasses the wide range of interactions that humans have with each other in the maritime realm.

Seapower consists of two basic components: inputs and outputs.² In the common imagination, seapower inputs are ships and watercraft, while outputs include specific actions such as projecting lethal force inland from the sea via such weapons as cruise missiles. Yet, ships do not operate on their own in some oceanic void: more than anything else, they require people, whether traditional crews onboard or remote operators offboard.

Thus even if Canada had gone with the option of buying its future fleet from a shipyard abroad, it would have the same requirement for recruiting crews. It has been well-reported that both the RCN and the Canadian Coast Guard (CCG) face recruitment challenges now and into the future.³ This then begs the question of how Canada can expect to increase public awareness and appreciation, if not understanding, of the RCN and CCG, especially as a potential career option. Certainly, the notion of building ships abroad would do nothing to support this need. In contrast, building them at home results in

Canadian shipyard and supply chain workers developing and sustaining that awareness over the next several decades. While these workers themselves are unlikely to be the actual recruits into RCN and CCG service, they serve as community nodes through which their family, friends and neighbours (whether they live on the coasts or the prairies) become conscious of the existence of Canada's seapower. Some of these Canadians, who otherwise may be experiencing the oft-bemoaned 'seablindness,' may now consider a career in the government maritime services. In this way, establishing a domestic shipbuilding industry is not just about ensuring jobs for shipbuilders, but recruiting sailors to crew those ships.

Alfred Thayer Mahan, in the first chapter of *The Influence of Sea Power Upon History*, noted that one of the determinants of a successful sea power is the character of its people and government. Does the populace have an enduring connection with the sea? Do they make their livelihoods from it? Are the governments representing these people thus endowed with an understanding that the fates of their constituents are intimately tied to policies enabling the country's ability to use the seas? Answering yes to these questions helps determine the degree to which the country is both a serious sea power and recognized globally as such. Having a domestic shipbuilding industry is a fundamental component of being able to say yes. One might think of countries which regularly buy modern warships from abroad and receive them in a relatively expeditious manner. Egypt and Saudi Arabia are perhaps



Credit: DCNS/Naval Group

The Egyptian amphibious assault ship ENS **Anwar El Sadat** and its sister were originally built in France for Russia. The Russian occupation of Crimea resulted in the cancellation of the sale and delivery of the **Mistral**-class ships to Russia.



An overhead view of the Canadian Surface Combatant shows one of its possible configurations. With 15 ships slated to be built, the program will occur over a long time whether they are built domestically or abroad.

two countries that stand out as recent examples: the former with its French-built *Aquitaine*-class frigate and pair of *Mistral*-class amphibious assault ships, the latter with its *Al-Riyadh*-class derivatives of the French *Lafayette* frigates and upcoming upgunned versions of the American *Freedom*-class littoral combat ships. Despite such acquisitions that, arguably, give their navies a wider range of capabilities than the RCN, hardly anyone would consider either country to be a sea power worthy of emulation and inspiration. While the RCN's relatively humble 700-ton *Kingston*-class 'coastal' defence vessels sail across the Atlantic to help train West African navies, Egypt's massive amphibious assault ships sit close to home, influencing observers only to the extent of causing them to ask what purpose they serve.

Furthermore, although there is a general assumption that building abroad means quicker ships, this ignores the history of large-ticket Canadian procurements sourced abroad that have languished for decades in the political and bureaucratic stages. The Maritime Helicopter and Future Fighter Replacement programs are two of the most obvious examples where a lack of domestic manufacturing options resulted in extensive delays to a speedy acquisition – despite the 'hot and ready' production lines available abroad.⁴ And so, while foreign shipyards are ready and experienced, there is little incentive for Canadian politicians to expedite the processes necessary for those yards to commence construction as they have little vested interest in ensuring the shipyards and their workers have steady work: there are no votes to be had from French, Italian and South Korean shipyard workers, after all. Thus, while buying abroad may result in quicker and cheaper builds once steel is cut, there is a much longer delay to get to that point as successive governments treat any program progress as legacies from the former government that are ripe for scrutiny and review.

Finally, depending upon a foreign yard to build Canada's instruments of national sovereignty risks the scenario Russia faced with its French-built *Mistrals*. Russia had ordered two of the ships, but this order was cancelled by France after Russia annexed Crimea in 2014, and instead of going to Russia the ships eventually went to Egypt. While Canada is unlikely to engage in behaviour analogous to Russia's actions in Crimea, the case does highlight the risk of leaving one's navy effectively in the control of another country while it is being built. Would Canadian foreign and domestic policies need to be constrained to avoid running afoul of the country building the ships? What happens if the country of construction suffers from domestic unrest, adopts dubious labour standards, or experiences dramatic changes in its foreign policy that make the completion and transfer of the ships impracticable? Given the extensive time-scale of Canada's fleet replacement, much can change throughout the duration of the program. Canada's fleet is a tool for enabling *Canadian* policy, not leverage for a foreign power to hold those policies ransom.

And so, although there is little doubt that significant time and monetary penalties accompany the decision to build domestically, there are other factors at play that must be considered. In a sense, the heart of the issue is how much of a sea power Canada wants to be. Had the foreign build option been taken, Canada would have been the only G7 country without a domestic naval shipbuilding capability. While this seems to be a mere matter of prestige, it would have been accompanied by a gradual reduction in the perception of Canada as a mature and dependable sea power, a relatively reduced maritime consciousness on the part of Canadians that would exacerbate ongoing recruitment challenges, and long-term strategic vulnerabilities because of Canada's reliance on the goodwill and smooth operations of a foreign government and its shipyards. While domestic shipbuilding will not solve these problems on its own, at the very least it puts Canada in a better position to address them and sustain its seapower. 🇨🇦

Notes

1. One could question the veracity of the latter argument. The 1999 official review of the *Halifax*-class project found that the ships were generally comparable to foreign yards in terms of capability delivered for the cost paid, while the NSS 'delays' have resulted mostly from the years needed to rebuild the shipyards rather than any intractable failures in the physical shipbuilding itself. Chief of Review Services, "Report on Canadian Patrol Frigate Cost and Capability Comparison," Department of National Defence, 26 March 1999.
2. For an overview of these definitions, see Geoffrey Till, *Seapower: A Guide for the 21st Century* (4th ed.; New York: Routledge, 2018).
3. See, for example, Lee Berthiaume, "'I Need People': Canadian Navy, Coast Guard Need Hundreds to Man New Ships," *Global News*, 29 February 2020.
4. While some bidders, like Saab, include in-Canada production as part of their offer, this is packaged as part of the aircraft selection process rather than a precursor to it, as in the case of the ships.



The NSS: A Canadian Submarine Response?

David Dunlop

The National Shipbuilding Strategy (NSS) is a long-term, multi-billion-dollar program to renew the Royal Canadian Navy (RCN) and Canadian Coast Guard (CCG) fleets, support the Canadian marine industry and revitalize Canadian shipyards. The strategy was to bring long-term predictability to federal ship procurement and eliminate cycles of boom and bust, providing benefits to the entire marine industry. This strategic relationship with Canadian shipyards was to deliver predictability to the Canada First Defence Strategy, and enable Canada to provide the RCN and CCG with the modern ships they need to defend Canada's interests at home and abroad.

The question is whether or not the lack of certain elements in the NSS will affect government plans for a long-term sustainable shipbuilding industry, and instead create only shorter-term economic benefits. Is Canada going far enough to give the RCN the tools it needs now and will need in the future, and permanently break the boom-and-bust cycle? Is the NSS destined to fail in the long term? Unfortunately, Canadians will not know the answer to these questions for at least three decades when ships built today and in the near future need to be replaced. We should be thinking decades to come, and not just in the short term.

A more sustainable, forward thinking, long-term plan is required to keep Canadian shipyards active and vibrant on a multi-generational basis. While it may seem like the

construction will go on for a long time, after the CCG gets its ships, and the navy receives the six Arctic and Offshore Patrol Ships, the 15 Canadian Surface Combatant (CSC) Type 26 frigates and two *Protecteur*-class Joint Supply Ships (AORs), what next? In one word, nothing! The demise of the NSS will happen quickly if the strategy is not updated soon. Before we know it, we will be left with a rusted-out submarine fleet, aging CSC frigates and AORs that will need replacement, and no means to deploy Canadian assistance at home or worldwide during conflicts or global disasters. We will be back again to the old boom-and-bust times. Without a clear vision, the plan as it now exists will postpone the bust in shipyards but not end it. The navy will again decay if we do not change the NSS and have an ongoing plan in place.

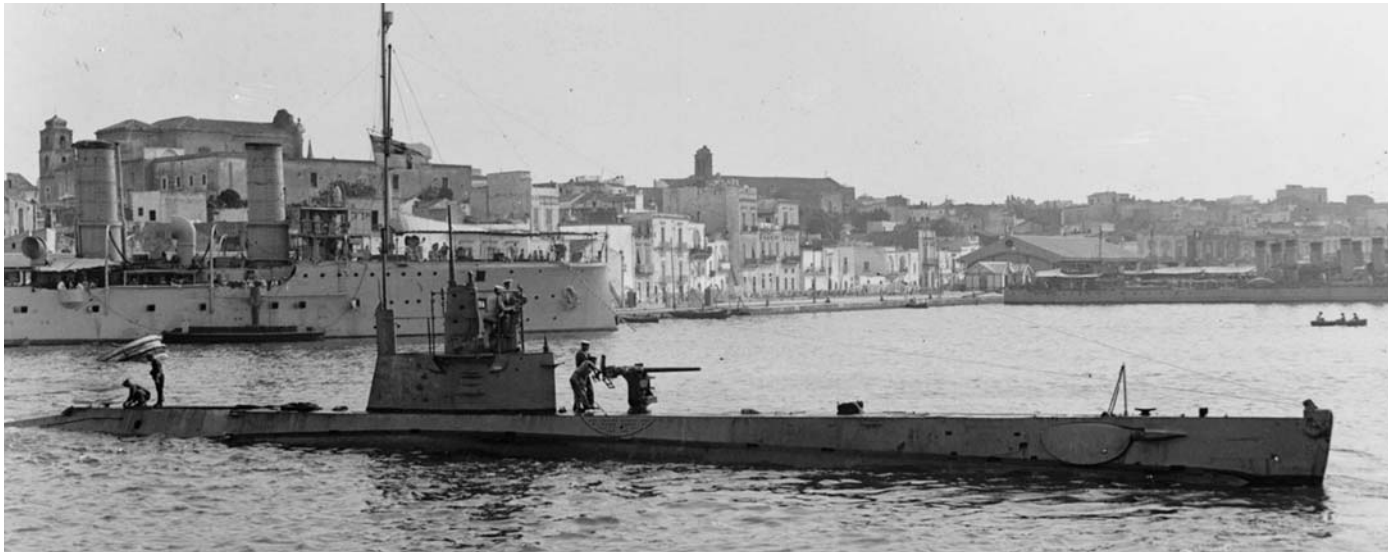
What if we add something to the NSS – submarines. Why are replacement submarines not included in the NSS? A submarine replacement plan is a huge and long-term undertaking, and if Canada is going to stay in the submarine business, it should have included a replacement strategy in the NSS.

The navies of submarine-possessing states, including Canada, understand that submarines with their superior combat power and freedom of action are fundamental components of the seapower paradigm, possessing a level of strategic power that confers an influence out of proportion to initial investment. Canada cannot afford to ignore what happens below the surface of its three oceans which are so vital to national interests. The *Victoria*-class



HMCS Victoria leaves Pearl Harbor on 16 July 2012 as part of RIMPAC 2012.

Credit: Jacek Szymanski, Canadian Forces



Credit: Surgeon Oscar Parkes via Imperial War Museum

HMS H-4 in Brindisi, Italy, August 1916. H-4 was one of 10 H-class submarines built in the Vickers yard in Montreal during the First World War. After the war, two of the class served briefly with the RCN, though ironically they were built in the United States.

submarines are nearing the end of their service lives, and even if they are upgraded/modernized as currently planned, they do not possess an extensive under-ice capability, making them ineffective at best in Canada's high Arctic.

If a new element of the NSS is added to begin submarine replacement, the question then becomes: could Canada build submarines? The last time Canada built submarines was during the First World War for Britain, but there is a compelling argument to be made that with the assistance of an experienced submarine shipbuilder, Canada could produce a fleet of submarines.

In addition to coming up with a plan to build submarines in Canada, the necessary infrastructure, particularly the supply chain, more submariners and training must be in place to support these submarines throughout their service life from project inception to initial operation. A submarine replacement project will reap rewards in Canadian technology as well as leverage domestic capabilities arising from a revamped NSS.

In conclusion, the NSS was a conscious plan to build ships and maintain a strategic capability *in the long term*. But it has failed to deliver a long-term and sustainable strategic plan for Canada. I feel that the government has not thought the NSS through enough and in that respect, it will become a failure at some point down the line. We must think decades or generations in the future, not just the near future. There is no denying the current fiscal constraints on the Department of National Defence, but there is also no denying that the *Victoria*-class submarines will need to be replaced at some point, and if discussion begins now on this, the NSS could be a real long-term success for

Canadian shipbuilding. A revised NSS that fills the holes left in particular by the silence about submarines would ensure that the RCN gets capabilities it needs and Canadian shipbuilding avoids the persistent pattern of boom and bust far into the future. If not, Canada will never live up to its full potential as an influential global middle power. 🇨🇦

A Suggestion for an Intermediate Level of Arctic Amphibious Capability

Major (Ret'd) Les Mader

In his Making Waves article "Arctic Amphibious Capabilities for Canada?" (CNR, Volume 15, Number 2 (2019)), Colonel (Ret'd) Brian K. Wentzell makes an articulate case for Canada's need to be able to respond to future crises in the Arctic and the benefits of having a sea-based polar response capability. Such crises could include challenges to Canada's Arctic sovereignty and humanitarian or environmental disasters. His solution makes thoughtful use of existing (or being procured) resources to be able to deploy up to 330 Canadian soldiers to the Arctic in a crisis using four Royal Canadian Navy (RCN) ships. His suggested solution could be implemented with minimal costs, including: the adaptation of the accommodations of the Arctic and Offshore Patrol Ships (AOPS); doctrine and command and control development; and training.

However, his solution suffers from the disadvantage of its virtue; using existing resources, a response is limited by their capabilities. Half of the RCN's future AOPS and Joint Support Ship (JSS) fleets would have to be committed to deploying, landing and supporting a small infantry

half-battalion. This force would still only have seven helicopters and four small landing craft available to it. Additionally, sea-ice conditions could make the JSS unavailable, leaving the force with only some 180 soldiers, three helicopters and three landing craft.

Therefore, I would like to suggest an increased level of capability for responding to Arctic crises that would supplement the basic level suggested by Colonel Wentzell. This intermediate level would consist of five aspects. First, rather than Colonel Wentzell's suggested modification of a single infantry battalion to become a specialized landing force, I recommend that Canada's three non-mechanized Regular infantry battalions (3 RCR, 3 PPCLI and 3 R22eR) be converted into fully-fledged light infantry battalions that can deploy airborne and amphibious company groups as and where required. Having three such units, geographically dispersed, would greatly facilitate the sustained routine provision of infantry landing teams to the AOPS, the deployment of a surge capability of amphibious-operations trained infantry for a crisis, and the deployment of parachute-delivered infantry task forces, either to work with the sea-borne landing teams or to respond to another crisis elsewhere. The ability of the three battalions to prepare and deploy these forces would be eased by a modest increase in strength. An additional 100 personnel per battalion should allow each to be able to deploy an airborne company group and an amphibious company group simultaneously, if required, less hindered by illness, postings and the needs of individual training.

Landing forces are vulnerable to air interference and attack once their supporting ships have moved away from their location. Thus, second, each Regular brigade group should be provided with an air defence battery that can support landing forces with portable (i.e., 'man-portable') air defence missile detachments. Each of these new

batteries would need a minimum of 100 personnel to sustain routine operations.

Third, the utility of such landing forces would be significantly enhanced by the purchase of one to four Landing Platforms (Arctic) (LPAs) that could deploy, land, sustain and recover a landing force and its supporting elements. These ships would be globally-deployable Landing Platform Docks (LPDs) that are optimized for operations in the Arctic. A simple extrapolation from various existing ships¹ indicates that these LPAs would displace 16,000-20,000 tons and be able to deploy, land and support an embarked amphibious landing team of 350(+) personnel comprising a strongly-reinforced infantry company, command and support elements, mission-required vehicles and equipment, a transport aviation flight, and an amphibious boat troop with a mixture of landing craft. Four LPAs would allow two to be deployed permanently with both Maritime Forces Atlantic and Maritime Forces Pacific, thus allowing one to be available on each coast for deployment during the Arctic navigation season. Fewer LPAs would still provide a valuable reinforcement to the troop-carrying AOPS.

The provision of the troop transport elements needed by the LPAs is the fourth aspect of the suggested intermediate level. Each LPA's boat troop must be able to operate a 'golf bag' of landing craft (LCVP, LCM and hovercraft) in order to cater for different missions and changeable weather, sea and ice conditions. The boat troops could belong to their LPAs or be centralized into boat squadrons, if several troops are established on a coast. The aviation flights should each be equipped with at least six of the transport version of the Cyclone helicopter. The flights would form part of the existing maritime helicopter squadrons, unless sufficient flights are established on a coast to justify the creation of a new squadron.



The Singapore landing platform dock RSS *Endurance* sails off Guam 28 August 2017 during an exercise. It is one of the smaller ships of its type.

Credit: Petty Officer 1st Class Benjamin Lewis, US Navy

Deploying poorly protected LPAs to the harsh, unforgiving Arctic Ocean during an evolving crisis would essentially give an adversary 500(+) potential Canadian hostages. Therefore, in addition to giving the LPAs a robust anti-air and anti-ship self-defence capability, fifth, Canada should provide them with a layered defence that can operate in the Arctic. Thus, the AOPS (including possibly the two currently planned for the Canadian Coast Guard) should be modified to be able to carry self-defence anti-air and anti-ship missile launchers. They should also be provided with the facilities needed to conduct anti-submarine warfare using an embarked Cyclone.

While the above suggestions may seem expensive, the cost of not preparing will be very high for some future Canadian government which has to improvise a response during a crisis. Such improvisation in the harsh, unforgiving polar region will virtually ensure a high risk of failure. Both the above suggestion and Colonel Wentzell's original proposal are completely consistent with current government policy.² The intermediate level would also provide Canada with a valuable capability to conduct sea-based evacuation operations anywhere, as required. The Department of National Defence should implement Colonel Wentzell's proposal soonest, using, however, the three infantry battalion modification described above. It should also seek government approval to develop an intermediate capability. 🍷

Notes

1. Specifically, the AOPS, the Singaporean *Endurance*-class LPDs, and the Netherlands' *Johan de Witt* LPD.
2. See in particular the 14th and 15th paragraphs of the Prime Minister's December 2019 mandate letter to the Minister of National Defence.

The Battle of the Atlantic 75 Years Later

Christopher Perry

May 2020 marked the 75th anniversary of the end of the Second World War in Europe and the longest campaign of that war, the Battle of the Atlantic. The Battle of the Atlantic was the greatest struggle that the Royal Canadian Navy (RCN) has ever faced. Fighting against U-boats, mines, weather, inexperience, and at times with insufficient equipment, the RCN fought alongside allies to help keep open the vital supply lines between North America and Britain as well as the Soviet Union.

At the outbreak of the Second World War, the RCN had six *River*-class destroyers, five minesweepers and two training ships. In terms of personnel, there were under 2,000 regular force officers and men, and just over 3,000 naval reserve forces, for a total of 5,260 personnel.

Over the course of the war, Canada recruited over 100,000 men and women into the Royal Canadian Navy, Royal

Canadian Navy Reserves, Royal Canadian Navy Volunteer Reserves, and the Women's Royal Canadian Naval Service. And in the years of battle, the naval forces lost 2,059 men and women.

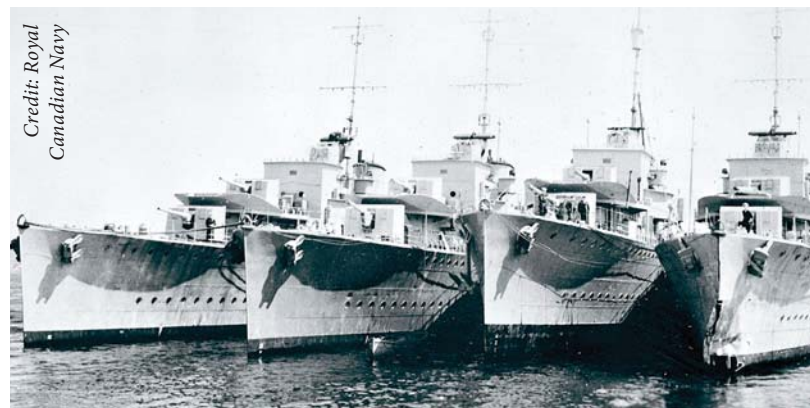
While Canada declared war on Germany on 10 September 1939, RCN ships began patrolling the approaches to Halifax Harbour on 3 September, within hours of Britain declaring war. The first trans-Atlantic convoy, HX-01 left Halifax on 16 September, beginning the longest campaign of the Second World War, which would end with the sinking of the Canadian merchant ship *Avondale Park* by U-2336 at 11 pm on 7 May 1945.

The Battle of the Atlantic was a defining campaign for the RCN, the navy's Vimy Ridge. Inexperienced, hastily trained crews put to sea in hastily built, small, often poorly equipped ships to shepherd the merchant ships carrying supplies and personnel to Britain. Canadian warships sailed with every Atlantic convoy of the war, and out of this a number of lasting national narratives arose.

In 1947 in a lecture on the Battle of the Atlantic, Rear-Admiral Leonard Murray stated:

... corvettes under my command were escorting the convoys between Newfoundland and Iceland in weather conditions for which they were not suited, and they were manned almost completely by amateurs. These officers and men of the Volunteer Reserves were better able to stand up to these than the hardened salts because they did not know enough to expect anything better. Technical and tactical aids were of infinite value but the battle was won by what is commonly called 'guts' and that applied not only to the escort forces but also to the Merchant Navy.¹

Rear-Admiral Murray's statement encapsulates perfectly the legend of the 'prairie sailor.' This was the idea that the



Four of Canada's six destroyers at the start of the Second World War are pictured here in Halifax: HMCS *Assiniboine* (I-18), HMCS *Ottawa* (H-60), HMCS *Restigouche* (H00), HMCS *St-Laurent* (H83).



Credit: Royal Canadian Navy

For the 75th anniversary of the Battle of the Atlantic, the Royal Canadian Navy designed a new commemorative morale patch (centre) that can be worn by sailors.

best sailors came, not from the Maritimes or the West Coast, but from the prairies. The story also holds that these sailors were the bravest and most daring, mostly because they did not completely understand the danger they were in. This reinforces the national narrative that Canadians will give their all to help, jumping in with courage and enthusiasm, ‘guts’ as Rear-Admiral Murray called it. ‘Guts’ went a long way in overcoming the lack of training and proper equipment.

This goes hand in hand with the Canadian narrative of the citizen-soldier, or in this case, the citizen-sailor. The Volunteer Reserves (RCNVR), the ‘Wavy Navy,’ called that because of the wavy bars worn by the RCNVR officers, made up the largest part of the navy. These citizen-sailors, most having never been to sea before, provided the vast majority of the manpower for the navy. These narratives have helped shape the character of the RCN, the attitude of ‘Ready, Aye, Ready’ that is the core of the navy culture. No matter the adversity, the navy will step up, figure it out and accomplish the mission.

The RCN began the war with 13 ships and rapidly expanded to 471 ships ranging from cruisers to armed yachts and landing craft. This was a growth in tonnage of 51-fold, with many of the ships being built in Canadian shipyards across the country. This rapid expansion gave rise to the persistent myth that the RCN was the third largest navy in the world at the time. While this claim is not completely accurate, it does not take away from the astonishing feat that the navy, and Canada in general, accomplished. This growth was unparalleled among navies and, according to the Naval Historian E.C. Russell, at the height of the war in 1944, 1 out of every 116 Canadians was in the navy.² Of those 471 ships, 34 were lost to collisions, storm, mines, accidents and enemy action.

The most lasting impact of the Battle of the Atlantic was the cementing of Canada’s navy as an anti-submarine force, a role that Canada continued to play in the North Atlantic Treaty Organization (NATO) until the end of the Cold War. For 50 years after the Battle of the Atlantic, the RCN focused its technology, training, tactics and strategy on hunting submarines in the North Atlantic. Indeed, until the early 2000s, the reserves had an officer occupation, Naval Control of Shipping Officer, which was dedicated to controlling convoys and protecting shipping from submarines. The focus on anti-submarine warfare led to several breakthroughs and advancements by the Canadian military. The employment of helicopters on small warships revolutionized anti-submarine warfare and naval aviation. The development of the hydrofoil, HMCS *Bras D’Or*, which for many years held the record as the fastest warship, came out of experiments in different ways of conducting anti-submarine warfare.

The experience of the Battle of the Atlantic shaped the role and direction of the navy for decades after. The after-effects are still felt today, which is why we still commemorate Battle of the Atlantic Sunday on the first Sunday in May. This year marked the 75th anniversary of the battle, and even though the parades and commemorations were cancelled, please take a moment to reflect on the sacrifices the navy made, and still makes, on behalf of Canada and the world. 🇨🇦

Notes

1. Rear-Admiral Leonard Murray, Admiralty Conference on the Battle of the Atlantic, 12 February 1947.
2. Quoted from an unpublished manuscript used for an official history of the RCN during the Second World War. The actual ratio is 1 out of every 126 Canadians, based on a population of Canada in 1944 of 11,946,000 and total RCN personnel of 93,034. Statistics Canada, “Estimated Population of Canada 1605 to Present,” 26 August 2015, available at <https://www150.statcan.gc.ca/n1/pub/98-187-x/4151287-eng.htm#table2>.

Dollars and Sense: The First Decade of the NSS

Dave Perry

The 10-year anniversary of the National Shipbuilding Strategy (NSS) is a good time to take stock of the strategy. How have the objectives of rebuilding the shipbuilding and marine sector, and recapitalizing the federal fleets fared so far? How has the strategy changed and how does the future look?

On the industrial and economic front, it is evident that the objectives of the strategy are being realized. The latest iteration of the Statistics Canada/Innovation Science and Economic Development Canada defence industry survey reports an increase of the marine sector's sales of 42% between 2014 and 2016.¹ This was led by a 156% increase in the shipbuilding and platform systems component, a 15% increase in maintenance, repair and overhaul, and a 7% increase in mission and simulation systems.² Over that same period, employment in the sector grew by nearly 1,400 employees, with all of that growth coming from Canadian-owned companies. Through the end of 2018 (the last year for which data is available), the two NSS shipyards had accrued Industrial Regional Benefits obligations totalling \$5 billion, a good proxy for the value of the committed work to date.³ To this point, the economic aspects are those most cited as accomplishments in the strategy's annual reports.

In terms of delivering capability, there are formally three pillars to the strategy – large vessel construction, small vessel construction, and maintenance, repair and overhaul – although few people recognize all of these pillars, at least equally. On the maintenance, repair and overhaul pillar, it is difficult to gauge what impact the strategy has had, as its impacts are at best indirect. The approach on this work has effectively been unchanged since 2010, as pre-NSS procurement practices are used, with no restrictions on which shipyards are eligible to win work. For a number of years the amount of activity in this area exceeded that of the large construction pillars and remains high today. In the summer of 2019 alone, contracts worth a total of \$1.5 billion, with options for up to \$7.5 billion in total value, for the support of the *Halifax*-class frigates were awarded to Victoria Shipyards, Irving Shipbuilding (ISI) and Davie.⁴ In August 2018, a contract was awarded to Davie for three interim icebreakers for the Canadian Coast Guard (CCG) for \$610 million, which involved re-fitting foreign-built icebreakers in Quebec.⁵ One of these, CCGS *Molly Kool*, has already been delivered. Interestingly, while the interim icebreaking project is listed as an NSS project on the government's website, the Interim Auxiliary Oiler Replenishment project, MV *Asterix*,

which entered service in winter 2018, is deemed “outside of the NSS.”⁶

When it comes to construction of vessels under 1,000 tonnes, work is proceeding apace. The impact of the strategy here too is difficult to assess as the only meaningful change to this activity since 2010 is that Seaspan and Irving are not able to win any of the work. At present, projects are underway to build: four large naval tugs for the RCN; steel barges for the Canadian Army; life boats, coastal research, hydrographic survey, channel survey and sounding vessels for the CCG; and coastal patrol boats for the RCMP.⁷

Large ship construction, vessels greater than 1,000 tonnes, is the clear focus of the NSS, and its *raison d'être*. In the first decade, the first two of the Offshore Fisheries Science Vessels have been built by Seaspan in Vancouver and handed over to the CCG. The construction of the first Joint Support Ship (JSS) began in the summer of 2018 with the start of the ‘early block build,’ which is construction of roughly the middle third of the vessel, pending a finalized and approved design and build contract for the entire ship. Construction of the Offshore Oceanographic Science vessel has been rescheduled to occur after the first JSS is built.

For the combat package, the first Arctic and Offshore Patrol Ship (AOPS), the future HMCS *Harry deWolf*, is built, and has completed sea trials, but the handover to the RCN



HMCS *Montreal* enters Halifax Graving Dock to begin a 53-week Docking Work Period. Maintenance and refit is an oft-overlooked component of the National Shipbuilding Strategy.



The large naval tug **Glendale** shown here in October 2018. As part of the National Shipbuilding Strategy, its replacement has been ordered from Ocean Group in Quebec, one of the smaller Canadian shipyards.

has been delayed. As of the time of writing, the second AOPS, the future HMCS *Margaret Brooke*, is in the water and three more of the six AOPS being built for the RCN are under construction. Two additional AOPS will be built for the CCG after the RCN ships are finished. Finally, the Canadian Surface Combatant, by far the most significant project in the NSS, had a preferred bidder identified in October 2018, and a contract for the design signed in February 2019. Following the signing of that contract, the government, ISI and Lockheed Martin Canada launched a process called ‘requirements reconciliation’ to evaluate the proposal from Lockheed Martin Canada and make final determinations about the exact capabilities that would go into the ship. Although the government has made no statement about this activity, industry members have stated publicly that the formal activity of requirements reconciliation was completed in 2019.

The year 2019 was a seminal year for the NSS. Without explicitly saying so, the government of Justin Trudeau launched a major reform of the NSS. In May 2019, it announced the construction of 18 new vessels under the strategy. In addition to the two CCG AOPS, Seaspan will

build 16 Multi-Purpose Vessels. The project for these ships will, if actually executed the way it was outlined, provide Seaspan its first long-run build of a commonly designed ship. This contrasts to the other ships in the non-combat package, with builds of three, two or one vessels apiece. The choppy nature of the non-combat package has been highly problematic, placing major demands on the design and engineering workforce and shipyard management to work through multiple projects, with multiple contracts apiece, with two different government clients (i.e., the RCN and CCG). A series of 16 ships will provide a long ‘runway’ for the shipyard, particularly if the similarities between the Multi-Purpose Vessels are genuinely high.

The fate of the Polar Icebreaker, part of the original non-combat package of work awarded to Seaspan was, however, put into limbo. The NSS website (which as of April 2020 was last updated in November 2019) states that the shipyard to build the icebreaker is “to be determined.”⁸ This foreshadowed the move in August 2019 to add a third shipyard to the NSS, with that new shipyard being designated to build six program icebreakers for the CCG. With this announcement, and the addition of the Multi-Purpose Vessels, the government fulfilled a major portion of the original intent of the strategy which was to replace *all* major CCG ships. At the same time, the move also fundamentally alters to the premise of the strategy. By adding a third yard, which will be Davie in Levis, Quebec, Canada has moved away from having two dedicated, pre-determined sources of supply for combat and non-combat ships.

The announcement of the third yard stated that Davie will join Irving and Seaspan as a ‘strategic partner’ in the context of the six program icebreakers, thus adding capacity to the NSS. But it is unclear what the possible scope of work for Davie will be beyond those icebreakers. The



The medium icebreaker CCGS **Henry Larsen** undergoes maintenance at Davie Shipbuilding in Quebec. The Trudeau government’s decision to include medium icebreakers and have them built at Davie as part of the NSS marks a significant change to the original NSPS arrangement.



CCGS Sir Wilfrid Laurier in the Arctic as it participates in the search to locate the Franklin expedition ships in August 2014. Laurier is one of six Martha Black-class vessels likely to be replaced by the 16 Multi-Purpose Vessels now to be built by Seaspan.

original NSS premise was that Irving and Seaspan would be the default shipyards for RCN and CCG construction going forward. That it is now in question.

Similarly, another premise surrounding the NSS, that it would eliminate the boom-and-bust dynamics in Canadian shipbuilding, has also been altered. Ultimately, busts in Canadian shipbuilding were never going to be fully eliminated, as the production in the two shipyards was always going to experience a dip at some point. Eliminating periods of bust would require some combination of continuous Canadian demand, or work from other commercial entities or foreign governments when domestic demand subsides. So long as government orders were finite, the NSS was always going to face a degree of bust at some point, at least with respect to work for Canada. The initial staff work that went into the strategy had actually assessed that there was only enough work for a single shipyard based on the estimated number of labour hours that would be needed. In opting to split the work between two shipyards, the government of Stephen Harper shortened the anticipated boom period, and shortened it even further by not approving and funding a full fleet renewal for the CCG.

The Trudeau government's addition of a third yard, and approval of both Multi-Purpose Vessels and icebreakers, has altered the boom-and-bust dynamics still further. Seaspan has officially secured more work following the announcement of the 16 Multi-Purpose Vessels than it had originally when it won the non-combat package. But it is no longer the sole strategic source of supply for CCG ships over 1,000 tonnes, which is a significant shift. Further, since the Polar Icebreaker was removed from Seaspan's order book, but not given to Davie along with the other icebreakers, that suggests that the government is considering further breaking up the large construction work beyond the now three NSS shipyards, possibly even sending the work offshore.

As the shipbuilding announcements came just prior to the 2019 federal election, it is impossible to ignore the politics of opening up the NSS to include Quebec-based Davie. But despite the political considerations involving

Davie, the uncertainty regarding the Polar Icebreaker makes it clear that other considerations, particularly adding capacity, were important elements of the Trudeau NSS reform. When the strategy was originally launched, it was understood that the CCG and RCN would need to wait for some of their ships to be delivered, as they had to be built sequentially. But as the strategy unfolded, and projects were delayed, the wait times on the different projects have all increased. The Trudeau NSS reforms may have imperilled the possibility of sustained new shipbuilding work into the future, but they have provided additional capacity which could help reduce the time it takes to recapitalize Canada's maritime fleets.

Actually achieving that, though, is uncertain. The government has stated it intends to have Davie go through the same First Marine International benchmarking and upgrading process as both Seaspan and Irving did during the initial NSS process. If that occurs, it will be years before Davie is in a position to start construction on the icebreakers, unless it can start work while undertaking a facility redesign. Further, the government struggled to manage all of the large construction NSS projects even prior to the addition of the third yard, the Multi-Purpose Vessels, the CCG AOPS and the program icebreakers. How will the government adjust to adding a third shipyard and three new projects to its existing workload?

A decade into the NSS, we've seen concrete economic results, the first large ships have been delivered to the CCG, the RCN is close to receiving its first AOPS, and much additional maintenance on ships large and small has been done. Ten years in, though, the Trudeau government announced a significant, if understated, reform to the NSS that conveys dissatisfaction with the pace of capability delivery. As we look ahead to the second decade, it remains to be seen if the Trudeau reforms can improve the delivery of ships without imperilling the long-term economic benefits which are already being realized. 🍷

Notes

1. The surveys are a recent, valuable creation, which unfortunately means that a longer time comparison is not possible with the same level of fidelity.
2. Government of Canada, "State of Canada's Defence Industry 2018," 2018.
3. Public Services and Procurement Canada (PSPC), "Economic Benefits for Canadians: Canada's National Shipbuilding Strategy: 2018 Annual Report," 2018.
4. PSPC, "News Release: Halifax-class Frigates: Maintaining Canada's Federal Fleet of Combat Vessels," 16 July 2019.
5. PSPC, "News Release: Government of Canada Awards Contract to Enhance Canadian Coast Guard Icebreaking Capability, Securing Middle Class Jobs in Quebec," 10 August 2018.
6. PSPC, "Shipbuilding Projects to Equip the Royal Canadian Navy and the Canadian Coast Guard," updated 13 November 2019.
7. PSPC, "Small Vessel Shipbuilding Projects," updated 13 November 2019.
8. PSPC, "Polar Icebreaker," updated 13 November 2019.

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A View from the West: Narco-Submarines and the Implications for Atlantic Security

Shannon João Sterrett

Although the war on drugs has faded from view because of more urgent threats, the destabilizing flow of drugs by transnational criminal organizations (TCOs) into Western markets continues at unprecedented levels. The US Drug Enforcement Administration (DEA) argues that drug trafficking organizations now constitute the principal criminal threat to the United States.¹ Porous borders, poor socio-economic conditions, weak internal security and under-patrolled ports facilitate the shipment of tonnes of cocaine annually from South America to trans-shipment points in Central America, the Caribbean and Mexico, before being smuggled into consumer markets in the United States, Canada and Europe. TCOs have become increasingly creative in smuggling narcotics. Of the cocaine shipped out of South America, reports suggest 90% is transported by marine vessels such as container ships, pangas, go-fast boats and narco-submarines.²

The emergence of narco-submarines since the mid-2000s has been particularly problematic for maritime security authorities given their ability to evade interdiction as they become more sophisticated. TCOs have primarily relied on Pacific-based routes for their drug-smuggling operations, causing a shift in recent years whereby maritime officials have prioritized interdiction efforts in the eastern Pacific Ocean. Almost all narco-submarine seizures occurred in the eastern Pacific until 2019. Although drug trafficking in the Atlantic, including the Caribbean, is not new, what is new is the presence of narco-submarines in the area. A recent surge of narco-submarine interdictions



HMCS *Whitehorse* sails with the Mexican navy ship *Centenario de la Revolución* during *Operation Caribe* in the eastern Pacific Ocean in 2018.

and seizures on the Atlantic coast of Latin America suggests TCOs have now expanded the use of these vessels for transporting drugs beyond the Pacific. Accordingly, naval and maritime law enforcement forces are facing novel counter-narcotics challenges as TCOs have extended both the production of narco-submarines and their usage to smuggle drugs in the Caribbean Sea and Atlantic Ocean.

The term narco-submarine includes low-profile vessels (LPV), submersible/fully submersible vessels (FSV) and self-propelled semi-submersibles (SPSS) – the latter being the most common. TCOs also utilize unmanned submarines, or torpedoes, that are towed behind other vessels and can be detached for later recovery if the surface vessel is detected. In some cases, TCOs have deployed divers to weld torpedoes onto the bottom of larger vessels. Narco-submarines are equipped with encrypted transmitters to ensure drugs can be recovered if crews are forced to scuttle vessels. They are often designed out of wood, Kevlar and/or fiberglass to evade radar detection, and some utilize lead-lined heat shields and re-routed exhaust systems to avoid thermal scans. While early models in the mid-1990s measured about seven metres in length and could carry just one tonne of cargo, models seized in the mid-2000s indicate rapid development of capabilities. Some vessels measure over 30 m in length, are 3.5 m wide, can support four crew members, are equipped with air-conditioning, have space for a small kitchen, and can dive eight metres underwater.³ They can now transport up to eight tonnes of cargo, usually cocaine, which equates to a street value of USD \$200 million per shipment.⁴

Narco-submarines were first developed by the Revolutionary Armed Forces of Colombia (FARC) in 1990, and the first apprehension of a rudimentary vessel occurred in 1993 off the coast of Colombia.⁵ Their usage remained marginal until technological developments, such as radar



US Coast Guard boarding team members climb aboard a 40-foot self-propelled semi-submersible in the eastern Pacific on 1 September 2019. The submersible was carrying approximately 12,000 pounds of cocaine.



Credit: US Coast Guard

A boarding team from the US Coast Guard Cutter *Vigilant* intercepts a low-profile vessel with approximately 2,183 pounds of cocaine onboard while on patrol in the eastern Pacific Ocean, 9 January 2020.

shielding, submersion capabilities and design innovations motivated TCOs to expand the production of these vessels. From the first apprehension in 1993 until their broader usage in 2006, officials only seized six narco-submarines.⁶ Although there were some narco-submarines operating around the Caribbean in the pre-2006 phase, they were largely utilized on the Pacific coast thereafter. The first narco-submarine captured by US Southern Command (SOUTHCOM) and the Joint Interagency Task Force South (JIATF-South) forces occurred in 2006. Within a few years, maritime forces counted at least 60 narco-submarines events annually. Although it is difficult to know for sure, the DEA now estimates that narco-submarines account for 30% of the drugs traveling from South America and anywhere from 112 to 330 tonnes of cocaine per year are shipped by these vessels.⁷

USSOUTHCOM estimates that only 10-25% of narco-submarines shipping drugs into US markets are intercepted, whereas 50% of go-fast boats are interdicted.⁸ They argue that despite often identifying narco-submarines using airborne radar systems, regional states lack adequate naval assets to interdict the vessels.⁹ Additionally, regional navies have primarily littoral-capable vessels, and are thus challenged to maintain surveillance and intercept the narco-submarines once detected.

Two recent developments concerning narco-submarines indicate that maritime officials may need to alter their current strategies. First, as noted, until 2019 almost all interdictions of narco-submarines occurred on the Pacific coast between Colombia and Mexico. However, over the last year, a number of narco-submarines have been seized along the Atlantic coasts of Colombia, Panama and Costa Rica.¹⁰ It is likely many vessels are departing monthly undetected. Prior to 2019, experts believed that almost all narco-submarines were constructed under the cover of Colombia's mangroves on the Pacific coast. However, recent interdictions demonstrate that operations have expanded, and new Atlantic-based production has been underway for several years.

Second, the interception in Galacia, Spain, in 2019 of a 22-metre Guyana-made and Colombian-operated SPSS carrying three tonnes of cocaine stunned authorities who believed a transatlantic trip by a narco-submarine was impossible.¹¹ Prior to this, experts thought that narco-submarines were only capable of making voyages of up to 2,000 km, whereas this 7,000-km trip demonstrates significant advancements in their construction. As European cocaine consumption has increased, TCOs have established trade routes from the Atlantic coast of Latin America, with transshipment points on the West Coast of Africa, before the drugs arrive in Europe.

What might this mean for the Royal Canadian Navy (RCN)? Part of the RCN's mission in the Caribbean Sea has been to counter drug trafficking, provide humanitarian/disaster relief, and help establish continental security. Since 2006, the RCN has held annual deployments in the Caribbean Sea, and more recently the eastern Pacific, through *Operation Caribe*, which was folded into the US-led multinational *Operation Martillo*, with the same mandate, in 2012. RCN warships and Royal Canadian Air Force (RCAF) CP-140 Aurora aircraft partner primarily with the US Coast Guard (USCG) – with the latter in the role of the law-enforcement authority – to interdict drug-trafficking vessels. The RCN's involvement in the operation has been successful, as at least 105.3 metric tonnes of cocaine have been seized since the campaign's inception.¹² Maritime operations annually seize over three times more drugs than US border authorities and internally throughout the country.¹³ In other words, maritime counter-narcotics is by far the most effective means of limiting the flow of drugs into Western markets.

The RCN recognizes the importance of securing the waters around Central America. In December 2019, Commander of the RCN, Vice-Admiral Art McDonald, stated that the soon-to-be commissioned Arctic and Offshore Patrol Ship (AOPS) HMCS *Harry DeWolf* – being built as part of the National Shipbuilding Strategy (NSS) – will divide its time between the Arctic and the Caribbean Sea, as



Crew members from HMCS *Edmonton* and members from the US Coast Guard Law Enforcement Detachment unload narcotics seized during *Operation Caribbe*, 20 November 2018.

will the other AOPS.¹⁴ *Harry DeWolf* will have multi-mission capabilities well-suited for counter-narcotics operations. Moreover, the AOPS's SCANTER 6002 radar system, Thales IFF (Identification Friend or Foe) system and SA-GEM BlueNaute navigational system, along with its capacity for underwater surveillance, will make the ships capable of locating narco-submarines.

The emergence of narco-submarines operating in the Caribbean Sea and Gulf of Mexico presents novel maritime security challenges. Naval forces must adapt to the expansion of narco-submarines outside of the Pacific Ocean. As noted, regional navies and coast guards are equipped with only littoral capabilities and therefore lack the capacity to patrol the waters around Central America, particularly against submersible and semi-submersible vessels. They are thus reliant on the support from international maritime forces such as from Canada and the United States. The US government has already identified the likelihood of increased drug smuggling and announced in late March 2020 that it intends to ramp up counter-narcotic efforts in the Caribbean and along South American coastlines even during the COVID-19 pandemic.¹⁵

It is clear that we have entered a new phase of maritime counter-narcotics operations given the challenge posed by narco-submarines. With Colombia recording unprecedented levels of cocaine production, and markets growing in Europe and North America, TCOs have been motivated not only to expand their narco-submarine operations, but increasingly rely on these vessels to optimize operational efficiency and as a primary transportation method to minimize the risk of interdiction.

Since maritime drug interdictions tend to be the most effective counter-narcotics operations, blue-water maritime forces capable of submarine surveillance, such as the

RCN, the US Navy and USCG, should play a greater role around transshipment routes in the Caribbean and Gulf of Mexico to interdict the growing number of narco-submarines. This is particularly important because political instability in Latin America has meant that criminal organizations can continue their narco-operations with relative impunity, experiencing only minor interruptions from domestic constabulary forces. (It is interesting to speculate on how the COVID-19 outbreak may affect drug smuggling.)

Although outside maritime forces will have to coordinate with Latin American countries, international military forces are more able than local forces to interrupt the activities of these criminal organizations through coordinated counter-narcotics operations. Canada's contributions, and an expanding fleet as the NSS unfolds, means that the RCN may play a larger role in the future in securing the waters around Central and South America against drug smuggling. 🇨🇦

Notes

1. June S. Beittel, "Mexico Organized Crime and Drug Trafficking Organizations," *Current Politics and Economic*, Vol. 30, Issue 2 (2018), p. 181.
2. Go-fast boats are small vessels capable of reaching speeds of up to 80 knots in calm waters. Pangas are modest outboard-motor power boats usually used for fishing along coasts.
3. Byron Ramirez and Robert J. Bunker (eds), "Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes," US Army Foreign Military Studies Office, 2015, p. 25.
4. Dan Dubno, "The New Technology of Drug Smuggling: Innovative Submarines Bring Millions of Dollars of Cocaine to the US," *Popular Mechanics*, Vol. 195, Issue 4 (May 2018), p.16.
5. Ramirez and Bunker (eds), "Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes."
6. *Ibid.*, p. 16. Colombian authorities report significantly more seizures; however, US experts have contested these claims.
7. Dubno, "The New Technology of Drug Smuggling," p. 16; and Michael P. Atkinson, Moshe Kress and Roberto Szechman, "Maritime Transportation of Illegal Drugs from South America," *International Journal of Drug Policy*, Vol. 39 (2017), p. 44.
8. Dubno, "The New Technology of Drug Smuggling," p. 16.
9. Ramirez and Bunker (eds), "Narco-Submarines: Specially Fabricated Vessels Used for Drug Smuggling Purposes," p. 7.
10. For example, in February 2020, authorities in Panama seized a semi-submersible vessel on the Atlantic Coast attempting to smuggle five tonnes of drugs from Colombia, the fourth vessel seized by Panama in three months. Mitchell McCluskey and Nicole Chavez, "Police in Panama Found More than 5 Tons of Drugs in a Homemade Semi-Submersible Vessel," CNN, 20 February 2020.
11. See Chris Dalby and Lara Loaiza, "A Legend about Colombia's Narco Subs Appears to be Becoming a Reality," *Business Insider/InSight Crime*, 3 December 2019; and H.I. Sutton, "Not Unexpected: First Trans-Atlantic Drug Submarine," *Forbes*, 26 November 2019.
12. Government of Canada, "DT News: Op CARIBBE, the Defence Information Strategy and Happy Holidays from the Defence Team," *The Maple Leaf*, 19 December 2019.
13. Diana Honings, "Coast Guard Breaks Record for Cocaine Seizures," *Coast Guard Compass*, 4 October 2017.
14. Quoted in Murray Brewster, "Canada's New Arctic Patrol Ships Could be Tasked with Hurricane Relief," CBC News, 22 December 2019.
15. Jake Detsch, Robbie Gramer and Dan Haverty, "Trump's Plan to Deploy Anti-Drug Mission in Caribbean Sparks Backlash in Pentagon," *Foreign Policy*, 2 April 2020.

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Warship Developments: The Next Navy

Doug Thomas



Credit: Timothy Choi

The *Iroquois*-class destroyer HMCS *Algonquin* and replenishment ship HMCS *Protecteur* sit at Esquimalt while awaiting disposal in October 2014. The replacements of these ships will join the fleet later this decade.

As we know from reading this issue of *Canadian Naval Review*, the National Shipbuilding Strategy (NSS) – formerly the National Shipbuilding Procurement Strategy (NSPS) – is now 10 years old. It was launched in 2010 by the government of Stephen Harper primarily to solve the ‘boom-and-bust’ cycle of building ships for Canadian government fleets.

A perfect example of this cycle was the world-class shipyard and workforce stood up in Saint John, New Brunswick, to build the Canadian Patrol Frigates (CPFs) in the 1990s. Once the 12 frigates were completed, there was no more work for the yard. A third batch of six ships was cancelled and hoped-for orders from other navies for CPFs or some variant thereof were not forthcoming. Unlike many overseas shipyards there were no government subsidies offered to Saint John Shipbuilding to enable it to reduce its prices to foreign buyers, and without orders the shipyard was closed in 2000 and converted to a lumber storage area.

With NSS, the plan was to select two companies: one to build surface combatant vessels for the Royal Canadian Navy (RCN); and the other to build Canadian Coast Guard (CCG) vessels and naval non-combatant ships. Each shipyard would become a centre of excellence for building and refitting ships, and would thus become a strategic resource for the country.

In 2010, the RCN consisted of three elderly *Tribal*-class (also referred to as the *Iroquois*-class) command and control/area-air defence destroyers, which had been in service since 1972/73; 12 *Halifax*-class frigates commissioned in

the 1990s with a modernization program underway; four *Victoria*-class submarines undergoing upgrades; two elderly *Protecteur*-class supply ships (AORs) completed in 1969 and 1970, which were used to support deployments of the surface combatants, i.e., the destroyers and frigates; and a total of 12 *Kingston*-class Maritime Coastal Defence Vessels (MCDVs), also built in the 1990s, which are used for training and sovereignty patrols, and split between the East and West Coasts. At the time, there was a plan to build Arctic Offshore Patrol Ships for the navy, and a contract had been let to build a maritime helicopter to replace the venerable Sea Kings.

Ten years pass. At this point, the destroyers have been scrapped, the AORs have been retired, the modernization and life extension project for the frigates has been completed, and the submarines have been very active, and will be more active with upgrade work completed. After construction of two ships for the CCG, construction has finally started in Vancouver on the AOR replacements – two future *Protecteur*-class (using an improved design from the German *Berlin*-class) Joint Support Ships. The first Arctic and Offshore Patrol Ship, the future HMCS *Harry DeWolf*, is conducting first-of-class sea trials and five more of the class are at various stages of construction. After the six AOPS have been built for the RCN, two modified versions will then be built for the CCG. Work on the CCG vessels will help to bridge the gap at Halifax’s Irving Shipyard (ISI) between the completion of the AOPS project and the commencement of construction of the Canadian Surface Combatants (CSCs).



The future HMCS Harry DeWolf carries out sea trials outside Halifax Harbour on 23 November 2019.

The program to produce the 'Next Navy' is thus underway, but making way slowly. This column will concentrate on the 15 Canadian Surface Combatants (CSC) which will replace both the destroyers and the Canadian Patrol Frigates. The CSC project is the largest and most complex shipbuilding initiative in Canada since the construction of the steam-powered destroyers of the *St. Laurent*-, *Restigouche*-, *Mackenzie*- and *Annapolis*-classes (the 'Cadillacs') in the 1950s and 1960s, and perhaps since World War II. Construction is expected to commence in about 2023 at Irving in Halifax. During the decade since the inception of the NSS, Irving has greatly improved its shipbuilding facilities. It honed its shipbuilding expertise with the construction beginning in 2011 of nine *Hero*-class patrol vessels for the Coast Guard, and it will further hone its expertise building the total of eight Arctic and Off-shore Patrol Ships.

Lockheed Martin has partnered with Irving and other members of its consortia to build a version of the British Type 26 frigate, the design selected for the Canadian Surface Combatant. This very modern design for a large multi-purpose frigate is based on a design known as the Global Combat Ship. The Royal Navy has announced plans to procure eight units, the first of which is now about half complete, and the Australian Navy will build nine, the future *Hunter*-class. There should be many advantages for Canada in being part of this international effort, including being able to benefit from lessons-learned by other shipyards and navies regarding construction and operation of these vessels. In addition, there should be a better supply of spare parts for those components used by the other navies.

The CSC will be able to conduct a broad range of tasks, in various scenarios, including:

- decisive combat power at sea, support during land operations with naval gunfire support, and contribution to compiling and maintaining recognized maritime and air picture;
- counter-piracy, counter-terrorism, interdiction and embargo operations for medium intensity operations; and
- the delivery of humanitarian aid, search and rescue, law and sovereignty enforcement in regional engagements.



Credit: Lockheed Martin

A rendering of the Canadian Surface Combatant sailing near the coast during the twilight hours. The CSC is expected to increase significantly the RCN's ability to deliver naval gunfire support.

The 15 frigates of the CSC program will become the core of the RCN in the same way that the Canadian Patrol Frigates are now and the Cadillacs were for many years prior to that. There are many advantages to having a common design for the majority of the fleet in a medium-size navy such as ours. These include efficiencies in personnel training, provision of spare parts and coordination of maintenance to name just a few. These big modern frigates will be perfect for a country such as Canada, with a long coastline on three oceans and harsh maritime conditions.

As a final thought on the NSS, it would be well to retain the Interim AOR *Asterix* for as long as possible to back up the single Joint Support Ship that will be available on both the East and West Coasts when they enter service in about 2024-25. *Asterix* has proven to be a very economical and flexible vessel and could be a force multiplier for many years to come. 🍷

Book Reviews

Congress Buys a Navy, by Paul E. Pedisich, Annapolis, Maryland: Naval Institute Press, 2016, 286 pages, USD 39.95, ISBN 978-1-68247-077-0

Reviewed by Colonel (Ret'd) Brian K. Wentzell

Paul Pedisich is an American historian with an interest in the economic history of US naval expansion, and he held the Admiral Stephen B. Luce Chair of Naval Strategy at the US Naval War College. *Congress Buys a Navy* analyses the nexus of politics, economics, regional interests and the funding of the US Navy from 1881 through 1921.

The author analyses the transition in naval policy in a period during which wooden ships under sail gave way to iron and steel hulled steam-powered ships that ranged in size from dreadnoughts to coastal patrol vessels. He does not focus on fleet tactics or individual battles or operations. Instead, he assesses the acumen, or lack thereof, of individual leaders ranging from Presidents and Cabinet Officials to the senior naval officers who influenced and executed naval policies at the international, national and regional levels of the country. The analysis clearly reveals their individual strengths and weaknesses as leaders. The result is an entertaining book that reveals much about each character as well as American society of the period. The book also records the growth of American influence, not just in the Western Hemisphere, but also in Asia and Europe.

The reader comes away with the knowledge that American domestic politics and economic factors were more important than the competence, efficiency and effectiveness of the US Navy until one fateful day in 1898 when USS *Maine* was sunk in Havana, Cuba, by an undetected explosive device. This was the opening round in a war with Spain that resulted in the American occupations of Cuba, Puerto Rico, Guam and the Philippines.

The US Navy and Army gained combat experience while President McKinley and his cabinet became the first modern wartime leaders to serve their country. Later, President Woodrow Wilson led the country through World War 1 and the United States, however unwilling at the time, became a major military and naval power.

This book is highly recommended as it reveals the important changes in American foreign policy, naval strategy and fleet composition over a period of 40 years. It also reveals the complexity and chaotic nature of American politics. In that sense, what we witness today in US politics is not unique or even all that new. Irrespective of its military, economic and technical abilities and competencies, it remains a country with serious internal social, economic and political fragmentation. 🍷

Networking the Global Maritime Partnership, by Stephanie Hsieh, George Galdorisi, Terry Mckearney and Darren Sutton, Sea Power Series, No. 2, Canberra, Australia: Sea Power Centre - Australia, 2014, 126 pages, ISBN 978-0-99250-042-9

Reviewed by Colonel (Ret'd) Brian K. Wentzell

The authors of this book have prepared an unclassified report on the efforts of five Western navies to solve challenges of inter-navy communications capabilities at the command and tactical levels. They have traced the nature of naval communications from the days of sail to the 21st century.

As the authors note, and most of the world has realized, the challenges to be faced by navies have multiplied in a globalized world. The authors have experience working together to solve command, control, communications, computers, intelligence, surveillance and reconnaissance (C4ISR) challenges under the auspices of the Technical Cooperation Program (TTCP) – an inter-laboratory consortium including Australia, Canada, New Zealand, United Kingdom and the United States. And the authors use this experience “to shed light on the challenges navies have in attempting to network effectively at sea” (p. v).

The book provides overwhelming support for the continued development of a range of naval communications for all aspects of operations on, over and below the surface of the seas. The solutions under development by the five states must be capable of sharing all types of communications amongst the participants and their respective alliance partners as well as other naval and military forces participating in coalition operations. The authors acknowledge that care must be taken to protect information that would not normally be made available to certain coalition countries, except where necessary in specific operations.

I strongly recommend this book to the readers of *Canadian Naval Review*. It will be particularly useful for readers who are interested in maritime command and control systems and seek to understand the communication challenges experienced by partnering countries. It should provoke some thinking and action in Canada, particularly with the Royal Canadian Navy's expanding operations in the Arctic, Atlantic, Indian and Pacific Ocean areas. 🍷



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Canadian troops land on Juno Beach as part of **Operation Overlord** in June 1944. This year marks the 75th anniversary of the end of the Second World War.

2020 CANADIAN NAVAL MEMORIAL TRUST Essay Competition

Canadian Naval Review will be holding its annual essay competition again in 2020. There will be a prize of \$1,000 for the best essay, provided by the **Canadian Naval Memorial Trust**. The winning essay will be published in *CNR*. (Other non-winning essays will also be considered for publication, subject to editorial review.)

Essays submitted to the contest should relate to the following topics:

- Canadian maritime security;
- Canadian naval policy;
- Canadian naval issues;
- Canadian naval operations;
- History/historical operations of the Canadian Navy;
- Global maritime issues (such as piracy, smuggling, fishing, environment);
- Canadian oceans policy and issues;
- Arctic maritime issues;
- Maritime transport and shipping.

If you have any questions about a particular topic, contact coord@navalreview.ca.

Contest Guidelines and Judging

- Submissions for the 2020 *CNR* essay competition must be received at coord@navalreview.ca by Wednesday, **30 September 2020**.
- Submissions are not to exceed 3,000 words (excluding references). Longer submissions will be penalized in the adjudication process.
- Submissions cannot have been published elsewhere.
- All submissions must be in electronic format and any accompanying photographs, images, or other graphics and tables must also be included as a separate file.

The essays will be assessed by a panel of judges on the basis of a number of criteria including readability, breadth, importance, accessibility and relevance. The decision of the judges is final. All authors will be notified of the judges' decision within two months of the submission deadline.



‘Stalker,’ the CH-148 Cyclone helicopter attached to HMCS *Fredericton*, flies away from the ship 13 March 2020. On 29 April 2020, contact was lost with Stalker while *Fredericton* was conducting training and maritime domain awareness operations in the Ionian Sea as part of *Operation Reassurance*.

Lost in the incident were six Canadian Armed Forces personnel: **Captain Brenden Ian MacDonald**, Pilot, originally from New Glasgow, Nova Scotia; **Captain Kevin Hagen**, Pilot, originally from Nanaimo, British Columbia;

Captain Maxime Miron-Morin, Air Combat Systems Officer, originally from Trois-Rivières, Québec; **Sub-Lieutenant Abbigail Cowbrough**, a Marine Systems Engineering Officer, originally from Toronto, Ontario; **Sub-Lieutenant Matthew Pyke**, Naval Warfare Officer, originally from Truro, Nova Scotia; and **Master Corporal Matthew Cousins**, Airborne Electronic Sensor Operator, originally from Guelph, Ontario.

Canadian Naval Review expresses its sincere condolences to their families, friends and colleagues.