



UNDERSTANDING CANADA'S SUBMARINE CAPABILITIES
Are they essential to Canada's defence policy?

November 2015

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ACKNOWLEDGEMENTS

Without Phil — *directeur du mémoire extraordinaire* — and his unwavering guidance and encouragement, I would likely have never embarked on this perilous journey deep into the bowels of Canada's submarine capabilities and two years of phallic witticism. I also have lots of gratitude for David McDonough, Ferry de Kerckhove, and the rest of their research team at the CDA Institute for providing me a public platform to develop these ideas. The same thanks to Chris Corrigan at the Royal Canadian Military Institute. I am a writer constantly in need of editors, so my appreciation for those who have read various sections and drafts of this paper is infinite. I should also thank Steve Saideman because my desire to prove him wrong about Canada's submarines has proved a key motivation while writing. Lastly, thank you to the Canadian naval community who not only readily embraced me as a young researcher but offered me the kind of access that still makes me classmates jealous.

ABSTRACT

Canada's latest class of submarines are no stranger to the delays, controversies, and criticisms of defence procurement in this country; the ones that surround both the acquisition and the operational history of the Victoria class submarines have prompted castigators to argue that the Canadian government should discard the current fleet. To be clear, the purpose of this paper is not to question the strategic value of submarines. However, the strategic asset rationale, though militarily irrefutable, may not be adequate enough to justify acquisition, especially under the new guidelines of the Defence Procurement Strategy. Given the shift in military planning theory and the increased financial constraints imposed upon the Canadian Armed Forces' procurement process, I posit that a case built through a capability-based planning lens deeming submarines to be an essential capability must be established if the Royal Canadian Navy seeks to maintain this capability. This paper is an exploration of whether that case can in fact be built.

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PURPOSE

The purpose of this paper is to determine whether, using capability-based planning (CBP), the case can be made that submarines constitute an essential capability for the Canadian Armed Forces (CAF).

INTRODUCTION

At the foundation of defence planning are a series of choices based on fiscal and resource restraints. In an ideal world, this paper would be unnecessary as military resources and technological platforms essential to national defence, including submarines, would be infinitely at our military's disposal. However, that is not the reality of Canada's defence context. As such, this paper is about those series of choices that arise out of a lack of resources for defence acquisitions in Canada.

The government is currently committed to recapitalising the military's major equipment fleets, including that of the Royal Canadian Navy (RCN) through an ambitious national shipbuilding program as articulated in the National Shipbuilding Procurement Strategy (NSPS) and the Canada First Defence Strategy (CFDS). The program would primarily replace the RCN's frigate and destroyer platforms with a joint surface combatant. It also factors in the addition of Arctic patrol ships, icebreakers, and a new at-sea replenishment capability.

While the government has already set aside \$37 billion for this program, including around \$26 billion for the new surface combatant, the recapitalisation project does not factor the increasing need to replace the RCN's four aging Victoria-class submarines, which according to David Perry of the Canadian Global Affairs Institute would be the Canadian Armed Forces' (CAF) largest single-ticket procurement item after the new surface combatant¹. However, as I noted in a previous publication for the Conference of Defence Associations Institute, "a next generation has not yet featured in CFDS, NSPS, or the new Defence Acquisition Guide (DAG), which only makes reference to the submarine equipment life-extension project."²

The lack of foresight in planning for the Victoria class' replacement is troubling because the affordability of the RCN's current recapitalisation projects has already been questioned publicly on several occasions. Concerns regarding the overall costing structure of the NSPS were raised by the Auditor General of Canada in 2013. In his Fall Report, he noted that "Canada may not get the military ships it needs" unless the funding structure is revised.³ The RCN has already suffered from reduced capability and numbers for the new replenishment ship, reduced requirements for the Arctic patrol ships, and could see as few as half of the planned ships built under the new surface combatant project, which is already losing up to \$1 million a day due to

¹ Dave Perry, 'Can DND Afford Submarines?' (Canada's Century of Submarines (thematic panel), Centre for International Policy Studies, University of Ottawa, 24 November 2014).

² Robert Burroughs, 'Canada's Quest for New Submarines', Vimy Paper 23 (17th Annual Graduate Student Symposium, Royal Military College of Canada: Conference of Defence Associations Institute, 2015), p. 4.

³ Office of the Auditor General of Canada, 'Chapter 3: National Shipbuilding Program' (2013 Fall Report of the Auditor General of Canada, Fall 2013), http://www.oag-bvg.gc.ca/internet/English/parl_oag_201311_03_e_38797.html#hd3a.

inflation and delays. Further studies on the funding structure and affordability of the former two projects were conducted by the Parliamentary Budget Officer in 2013 and 2014 and have similar conclusions.

Without the necessary resources to adequately recapitalize the entire RCN surface and subsurface fleet, the CAF must make choices to determine which capabilities it deems essential to its ability to help the government meet their policy objectives. This is the context in which I will investigate whether the case can be made that submarines constitute an essential capability for the CAF. To determine the essential nature of the submarine capability, I will use capability-based planning (CBP).

As the CAF, like other militaries, moved on from the fundamental nature of Cold War threats, it needed a more flexible approach to defence planning that more appropriately took into account fiscal constraints. CBP is one such approach that has now been adopted across major allied militaries, and officially by the CAF in 2005. Briefly, the concept (I will dedicate a section later in this paper in more detail about CBP in the Canadian context) is a philosophy that allows governments to gain “a holistic viewpoint to planning”⁴. As such, CBP shifts the focus in defence planning away from traditional platform-specific replacement approaches to one that is targeted to achieve strategic goals in the broader defence context of any one country. In other words, CBP focuses on what it is a government wants its military to be able to do, instead of simply buying platforms.

⁴ Leung Chim, Rick Nunez-Vas, and Robert Prandolini, “Capability-Based Planning for Australia’s National Security,” *Security Challenges* 6, no. 3 (Spring 2010): p. 84.

If it is determined that the government requires the potentially unique suite of capabilities that submarines provide, then Canada must engage in a properly-framed⁵ national discussion about sustaining its submarine capability by replacing the Victoria class. Formerly the Upholder class of the Royal Navy, the four submarines currently in Canada's possession were only ever intended to be a stop-gap measure that enabled the RCN to maintain at the very least a limited submarine capability. In effect, such a discussion would establish Canada's first "real" submarine requirements, especially ones that are pertinent to the current defence environment.

Although the submarine life extension project envisions prolonging the Victorias' service until the 2030s, with more than half of their service life already expired, the time to discuss replacements is now. As I have noted previously, navies employing similar submarine capabilities whose platforms are also on comparable retirement timelines and are reaching the last decade of their service lives, such as Australia's, have already had this discussion.⁶ In the case of Australia, their government's upcoming Defence White Paper is expected to clearly articulate the need for submarine capabilities to meet their defence goals.

⁵ Debates in the country about the need for submarine capabilities have taken place predominantly in a public space through editorials in national newspapers. Although the debate has been largely vocally dominated by those who disapprove of Canada's submarine force, the discussion is often narrow and limited in scope.

⁶ Burroughs, 'Canada's Quest for New Submarines', p. 6.

Leung et al note that an important aspect of the CBP process is that it “generates a capability development plan for the allocation of resources.”⁷ This is, at heart, a funding issue. Canada has established defence goals and if those require submarines, then the government will have to be realistic about how much submarine capability replacements are going to cost and whether its citizens want to pay for that. Defence procurement is costly and seaboard navies constitute a significant portion of that expense. As previously discussed, the RCN is already struggling with funding for its surface fleet and is dreading the inevitable cost-capability trade-off discussions they predict are on the horizon in the next six months. While in reality, the discussion on submarine capabilities would naturally feature a trade-off — for example, the RCN might opt for submarines in favour of Capability X — because resources are limited, this paper will not indulge in that game. Therefore, although I acknowledge that the positive determination that submarines constitute an essential capability for the RCN would likely result in the RCN or CAF losing another capability, I will examine the submarine question assuming that all other things are equal. As such, I will also not be prescribing which capability (or capabilities) might be sacrificed in the submarine’s place.

CAPABILITY BASED PLANNING

“Defence acquisition, despite being one of the most critical aspects of delivering military capability, has historically been one of its most criticized and debated. There is no shortage of proposals and submissions for acquisition reform, organisational restructures, policy changes, process improvements, and revolutions and evolutions in an effort to improve this vast and complex process. The most often heard criticism with the defence

⁷ Chim et al., p. 84.

acquisition process is that it takes too long, and that the capability is usually delivered over budget.”⁸

It would be prudent to start with a discussion on capability based planning because this methodology will underpin the rest of our discussion. It is against this framework that I will conduct my analysis of the RCN’s capability requirements.

In this section, I will discuss the origins of CBP and how that approach was adopted by the CAF at the turn of the century. Following that introduction, I will identify some of the key characteristics of CBP that explain why it is so prevalent today as a planning tool that most adequately helps militaries address the evolving defence and security environment. Finally, I will conclude by re-emphasising the importance of focusing a planning process around capabilities (and help define what exactly a capability is). That final section will also briefly entail what a discussion on capabilities looks like in the Canadian context, for example, what kinds of capabilities are important to us.

The end of the Cold War and its clearly identifiable threats signalled a shift in thinking among militaries to a new type of strategic planning: capability based planning (CBP). CBP asks “questions regarding what do we need to do rather than what equipment we are replacing”⁹. It is a “method of planning for future capability requirements that is functionally-based rather than

⁸ LCol Claude R. J. Desgagné, “Evolutionary Acquisition -- A Complementary Approach to Capability Based Planning for the Delivering of Aerospace Power” (Canadian Forces Command and Staff College, 2009), p. 7.

⁹ The Technical Cooperation Program (TTCP), *TTCP technical report: Guide to capability-based planning*, October 2004, p. 1. Accessed online at: <http://www.acq.osd.mil/ttcp/reference/docs/JSA-TP-3-CBP-Paper-Final.doc>.

threat-based”¹⁰. As such, the definition of capability requirements becomes “the first step in an effective defence acquisition process”¹¹. The origin of CBP is found in the Technical Cooperation Program among the five nations of the Five Eyes intelligence-sharing network: the United States, the United Kingdom, Canada, New Zealand, and Australia. The Technical Cooperation Program produced *A Guide to Capability Based Planning* to form “the foundation of future capability planning”¹² and defence planning for this network of armed forces.

These militaries today are using CBP as the alternative to threat-based planning. The capabilities they establish are “identified based on the tasks required” of them by their governments¹³.

Because the reality of fiscal and resource constraint “means that it is generally impractical to prepare for all possible futures, [...] wise choices must be made with regard to investments. CBP represents a mature and proven approach to inform such planning decisions.”¹⁴ The Government of Canada officially adopted capability based planning (CBP) as the primary means to provide “the rational (the why) for capabilities (the what) required to fulfil the roles and functions projected” for the CAF in 2005. However, it had already started using CBP in 2000, as laid out in *Leadmark*, the RCN’s primary doctrinal document for more than a decade that also provided the “intellectual underpinning” of the process to determine Canada’s capability requirements of the

¹⁰ TTCP, *Guide to Capability-based planning*, p. i.

¹¹ Ibid., p. 65.

¹² Ibid., p. 74.

¹³ Ibid., p. 1.

¹⁴ Chim et al., p. 81.

21st century. Defence Research and Development Canada describes the transition from traditional forms of defence planning to CBP as follows:

“Strategic decision-making for defence acquisitions has traditionally been a reactive process; that is basing equipment acquisitions of capabilities that have been vital or unsatisfactory during previous CF missions. This approach was previously sufficient, however is now deemed inadequate for various reasons, such as the diversity of military operations, e.g., domestic and continental operations, reacting to a major terrorist attack, supporting civilian authorities, and the importance of strong financial management practices, i.e., the Department of National Defence may only carry forward surplus funds equivalent to 1% of its yearly budget.”¹⁵

The result was that the CAF moved to a more flexible planning process that better helped them identify what future capabilities would be needed. RAND’s Paul Davis describes CBP as “an approach to high-level planning in complex organizations facing uncertain operating environments.”¹⁶ Chim et al detail CBP’s advantage over other planning methods:

“It is this ability that differentiates CBP from other strategic planning approaches that tend to have a narrower organizational focus (e.g. threat-based planning, scenario-based planning, Strengths, Weaknesses, Opportunities, and Threats analysis). Threat-based planning, for example, focuses on one or a small number of fundamental threats, and the response system is designed to best match those contingencies associated with the threats. This philosophy is appropriate for traditional military campaign and organization strategic planning where the threats and the theatre of conflict are substantially understood.”¹⁷

However, as countless militaries including Canada’s have gone to great pains to explain, the current understanding of threats and the theatre of conflict is generally lacking due to the

¹⁵ Mark Rempel, “An Overview of the Canadian Forces’ Second Generational Capability-Based Planning Analytical Process,” Report by Strategic Operational Research Team (Centre for Operational Research and Analysis: Defence R&D Canada, 2010, p. 1.

¹⁶ As in Chim et al., p. 81.

¹⁷ Chim et al., p. 80.

constant evolving nature and growing asymmetry of modern warfare. Then-Lieutenant Colonel Claude Desgagné summarized the current defence context, in contrast with that of former ones, as such:

“The Cold War era presented a clear enemy with a specific and concise threat. It was easy to predict what technologies were needed to be maintained, and for how long. In today’s security climate, it is no longer a stable or predictable threat environment that is being faced, but rather, a dynamic one”.¹⁸

Therefore, because of this new reality, more traditional planning methods such as threat-based planning are “not practicable for the institutional agility required by Government under this evolving, dynamic, all-hazards environment.”¹⁹ The result is that planning becomes more of an outcome-based process, based on what it is that militaries are ultimately trying to do, i.e. their purpose within the government’s toolkit to response to incidents and crises. In order to plan in this way, the emphasis must be shifted away from the platform to the capability, thus supporting a functional approach. The RCN identifies two different aspects of capability, the descriptive and the operational sense. The latter aspect is the one that I will focus on in this paper, which the RCN describes as “having the power, skills, and ability to conduct a particular military or civil activity mission, or task”.²⁰ Examples of this include: self-defence, area anti-air warfare, or area surveillance.

¹⁸ LCol Claude R. J. Desgagné, “Evolutionary Acquisition -- A Complementary Approach to Capability Based Planning for the Delivering of Aerospace Power” (Canadian Forces Command and Staff College, 2009), p. 8.

¹⁹ Chim et al., p. 80.

²⁰ Directorate of Maritime Strategy, *Leadmark: The Navy’s Strategy for 2020* (National Defence HQ: Chief of the Maritime Staff, National Defence, 2001), p. 19.

Chim et al describe the importance of identifying and centralizing capabilities in the planning process by saying that:

“The use of capability as a primary currency supports a functional approach to the articulation of broad requirements. There are several reasons for using a functional approach in strategic planning. Firstly, by developing generic capabilities that may be combined suitably to meet future functional needs, planners are able to emphasize flexibility, adaptability, interoperability, and robustness as core intentions of the approach. Secondly, a capability-based functional description enables clear linkage between strategies, mission objectives and high-level requirements (derived from response planning exercises), without prematurely identifying or prescribing the use of specific resources. Finally, these linkages focus the strategic planning efforts onto the achievement of goals and end-states.”²¹

Although the authors were writing in the context of Australian national defence considerations, many of these are akin to those of Canada. For starters, Canada and Australia share the common fortune that “there is no dominating threat or overriding hazard to the country’s security”.²² These lessons therefore are applicable, and arguably more important, in the Canadian context — indeed, the RCN itself recognizes that “its territorial boundaries [are] safe from direct conventional military assault”²³. Emphasising intentions such as flexibility, adaptability, and interoperability are essential to the CAF’s requirements due to its close cooperation with the US military. Central, for example, to achieving one of the three central goals of Canadian defence policy in defending North America in cooperation with the United States is our military’s ability to work closely, effectively, and efficiently with theirs.

²¹ Chim et al., p. 81.

²² Ibid., p. 84.

²³ Directorate of Maritime Strategy, *Leadmark*, p. 11.

Thus concludes our discussion of capability-based planning. The next section is about identifying priorities for the RCN and what capabilities will be required in order for them to fulfil those goals.

ROLE OF THE NAVY IN CANADIAN DEFENCE POLICY

The RCN's objectives are based on policy. Continuation of the success of the CBP process is clearly articulated defence goals and policy objectives. One could argue that Canada lacks that — one of the Canada First Defence Strategy's strongest criticisms was that it was more of a shopping list rather than a collection of policy objectives. The government of the day admittedly said that this policy was out of date, but in the absence of a CFDS refresh and with no concrete on when a new defence policy might be announced by the new government, this document remains the guiding policy framework for defence discussions in this country. I will be using CFDS as the government of Canada's defence policy.

Canada's current defence policy is articulated by the government's Canada First Defence Strategy (CFDS), initiated toward the end of the Conservative government's first mandate and later published in 2008. That year signalled a landmark year for the CAF. In addition to a renewed defence strategy, the government committed to recapitalising the major land, air, and sea fleets. Though the Martin government started an increase in funding during its mandate, CFDS' detailed list of specific recapitalisation projects indicated that for the first time since

military cuts were announced in the 1994 White Paper, it appeared that the CAF would finally get their opportunity to invest in new equipment on a large scale.

Since the release of CFDS however, the government's efforts to renew the CAF's equipment has, for the most part, been dogged by delays, controversies, and subsequent criticisms. Professor Geoffrey Till's assertions that the RCN, "like most others in the Western world, is confronted by a blizzard of difficult choices as it prepares for operations in the 21st century" is particularly relevant today. Successive reports from the Office of the Auditor General — which suggested that specific recapitalization projects such as the CF-18 fighter jet replacement and the Joint Support Ship were not affordable when announced due to improper costing projections — have made it clear that these projects, in their current capacity are no longer realistic given the fiscal reality.

This leaves the CAF with a series of decisions because fiscal and resource constraints make it impossible to prepare for all possible outcomes. These limitations means that the military will have to scale back its recapitalisation ambitions, either by abandoning capabilities or accepting less versatile ones. Any decision will at least result in existing capabilities not being replaced; that much is evident. In addition to the replenishment ship project, the RCN is also confronting the consequences of exaggerated promises. Delays in the design phase of the new surface combatant to replace the frigates and destroyers have resulted in a tremendous loss of purchasing power.

Despite all of these issues and the arguable lack of clarity surrounding Canadian defence policy, scholars such as James Fergusson of the University of Manitoba have pointed out that:

“[a]t the basic level, the fundamental objectives of Canadian defence policy have not changed, nor are they likely to change — the defence of Canada, the defence of North America in cooperation with the United States, and in contributing to international peace and security. While the specific language in the White Papers surrounding these three objectives vary over time, the objectives themselves have not. The same can be said about the objectives surrounding the objectives concerning either support to civil authorities or defence investments meant to align with broader national economic circumstances and interests.”²⁴

These three fundamental objectives form the foundation upon which the submarine’s case as an essential capability for the RCN as evaluated. Before such an evaluation is possible though, one must consider what kind of navy the RCN suggests it requires in order to help the government achieve their defence policy goals. Based on previous and current government-directed policy objectives, the RCN seeks to employ a “globally deployable, multipurpose and interoperable, combat capable fleet”²⁵ on mid-level operations.²⁶ This mid-level vision is important to keep in mind because it would be unfair when examining Canada’s naval and maritime security requirements to compare the RCN to their American or British counterparts. The former has on any given day 100 naval assets forward deployed around the world, while the latter contributed nuclear-powered submarines that fired Tomahawk missiles into Libya during the NATO mission in 2011. Canada’s is more akin to navies from Australia and the Netherlands, which “may not possess the full range of capabilities, but [has] a credible capacity in certain of them and

²⁴ Dr James Fergusson, “Time for a New White Paper?,” *On Track* Autumn 2015 (October 2015): p. 46.

²⁵ Directorate of Maritime Strategy, *Leadmark*, p. 98.

²⁶ *Ibid.*, p. 14.

consistently demonstrate[s] a determination to exercise them at some distance from home waters.”²⁷

With this in mind, I shall begin my analysis from the bottom of the list, which is the objective to contributing to international peace and security.

This is arguably the weakest part of any submarine argument aside from the Arctic question, which will be addressed later in this paper. The RCN has operated and led missions around the world and in conjunction with various coalitions for the better part of a decade without being able to deploy an operational submarine. The argument as such that submarines are essential to the RCN in order for the institution to continue contributing to international peace and security lacks evidence. Today, the RCN is slowly and steadily introducing Canadian submarine capabilities to international exercises and operations such as the Rim of the Pacific (RIMPAC) 2014 during which HMCS *Victoria* demonstrated its torpedo-firing abilities, or Op CARIBBE during which the same submarine contributed to anti-drug smuggling operations, or even more recently to EX JOINT WARRIOR which HMCS *Victoria* also attended.

The RCN could also tangibly point to the successful integration of German submarine U33 under the tactical leadership of Standing NATO Maritime Group Two and Dutch submarine HNLMS *Zeeleeuw* into NATO’s 2012 anti-piracy mission off the coast of Somalia as evidence that submarines have a role to play in contributing to international peace and security. That role

²⁷ Directorate of Maritime Strategy, *Leadmark*, p. 44.

however, is not in question. The strategic value of submarines is of no doubt, but the discussion today is not on their strategic value but rather the essential nature of their suite of capabilities. That said, given the relative abundance of European submarines anyway²⁸, those examples while good ones would not strengthen a case that submarines are essential to the RCN. For the purposes of this paper, I will be omitting this objective as it does not contribute substantially to our discussion.

The next objective is to defend North America in cooperation with the United States. This is arguably the hardest for me to define what this entails because unlike the NORAD agreement between the US and Canada, the common maritime defence framework has not yet been established. As it stands, each country is largely responsible for their own waters, making the argument that submarines are essential to the defence of North America less convincing. One might be able to use HMCS *Victoria*'s contribution to Op CARIBBE as an example of North American defence, but that would be a poor example given that there is little [public] indication that the RCN would not have been as successful without the support of submarine capabilities each year.

What would perhaps be important to consider from the RCN's perspective is interoperability with the United States Navy (USN). Fundamental to the RCN's contribution to the security of North America is its continued ability to operate efficiently and interoperably with their American counterparts. That partnership is in any case vital to Canadian maritime interests. The

²⁸ Of NATO's 26 European member states, 14 of them own and operate submarines.

US has also tended to reward Canada for increasing its submarine capabilities. For example, once the RCN signalled its intention to re-establish a west coast submarine fleet with the Victoria class, the United States signed a Waterspace Management Agreement with Canada.²⁹

While the United States' preference for Canada to possess submarines should not be considered too heavily when building such a case, it is also somewhat inconceivable to believe that Canada would or could be a full partner in North American maritime defence without access to its own waterways.³⁰ Canada would arguably not have access to the lower part of the water column, subsurface, without some level of submarine capability. One could say that submarines are not essential to accessing and controlling the subsurface waterspace because other resources can be used to achieve that capability such as underwater sensors and or mines. I will discuss the feasibility and limitations of these alternative resources later.

A common argument in support of the submarines has also been the training argument. Canadian submarines have a long history of being used as anti-submarine warfare (ASW) training tools for other RCN naval assets, with the USN, or with other NATO allies. The argument is such that Canada should possess submarines because the RCN would become even more of a key ally for the USN, which only operates nuclear-powered submarines against a growing threat of diesel-

²⁹ Cdr Michael Craven, 'A Rational Choice Revisited -- Submarine Capability in a Transformational Era', *Canadian Military Journal* 7, no. 4 (Winter 06/07), <http://www.journal.forces.gc.ca/vo7/no4/craven-eng.asp>.

³⁰ One of the arguments in favour of the submarine is that possession alone provides the RCN and the CAF with unlimited access to the submarine operations network and the intelligence that that provides. This is important on the home front, which I shall address later, but also on the continental front because of the implications raised should Canada not have access to intelligence about its own waterfront.

electric submarines (the type that Canada and most of the world operates). Though Canada used to be an important training partner for the USN in its ASW exercises, that role has since been replaced by other navies³¹. Therefore, although it could be Canada's interests to regain its place as the USN's primary naval training partner in ASW, it is hard to make the argument that having training vessels for the USN is an essential capability that the RCN should possess in its arsenal. Scarcity of resources still drives defence planning decisions and Canadians must determine how much the country can afford to dedicate solely on ensuring the USN is appropriately trained in a single capability that other navies have already adequately prepared it for. I posit that this line of thinking, again while arguably important for the RCN's and Canada's interests, is not valid when building the case in support of submarines.³²

Without much of a substantial argument that the North American defence objective is vital to building a case for the essential nature of submarines, I shall also be omitting it from the latter part of my analysis. This brings us to the third and arguably most important objective: defend Canada. The RCN recognizes that its "most fundamental responsibility as a navy is to defend the nation from a broad range of defence and security threats"³³. It concludes that in order to fulfil

³¹ Although other countries such as Sweden and Chile have also provided the USN with submarines for training, Canada is unique in that it is the only country that is as intrinsically vested in continental defence as the United States.

³² The closest this argument gets to being convincing is if one argues that essential to North American defence is the ability to combat other submarines and address the proliferation of diesel-electric submarines in the Asia-Pacific region AND the only way to do that was to possess a continental submarine capability that consisted of both nuclear-powered (because the USN have no alternative) *and* diesel-electric (which would be Canada's contribution). However while this may be central to a new government's defence policy, interpreting CFDS in this fashion would be a stretch. I have certainly made this case, but must refer back to the scope of this paper, which sticks strictly to the policy.

³³ Royal Canadian Navy, "Horizon 2050: A Strategic Maritime Concept for the Canadian Forces" (National Defence, 2010), p. 15.

this responsibility, they must have a “an understanding of *who* is operating in our waters, *what* they are doing, and *why*”³⁴.

Canada is part of the modern international system that is built on the global economy, which depends on access to the maritime commons — the principal guarantors of which are navies. Navies are unique in any nation’s “instruments of power and influence” because they are an essential component of the global system itself.³⁵ Because of the nature in which Canada has benefitted from the global system, defending it is “not a matter of choice” for this country; it is “essential” to our way of life.³⁶ Further, “geography, history, and international law all make Canada a maritime nation.”³⁷ For those reasons, the top priority of the RCN remains the protection of Canada, as its oceans are the country’s first line of defence.³⁸

Therefore, to look at the essential nature of submarine capabilities, or any naval capabilities, is to ask if it is ultimately essential to defend Canada. This is crucial test for the submarine argument. If it fails here, then the case for the capability's argument will collapse. In the next section, I will outline what are the RCN’s required capabilities to defend Canada.

³⁴ Royal Canadian Navy, “Horizon 2050”, p. 15.

³⁵ Directorate of Maritime Strategy, *Securing Canada’s Ocean Frontiers: Charting the Course from Leadmark* (National Defence HQ: Chief of the Maritime Staff, National Defence, 2005), p. 5.

³⁶ Royal Canadian Navy, “Horizon 2050”, p. 6.

³⁷ *Ibid.*, p. 11.

³⁸ Directorate of Maritime Strategy, *Charting the Course*, p. 14.

DEFINING ESSENTIAL

Before I discuss the RCN's requirements to defend Canada, I shall detail, in brief, Canada's history with submarines and the general strategic value to submarines.

Submarines are integral in ensuring balance of any maritime fleet. Their mere presence can "alter decision-making in an entire theatre of operations" because they bring to any given task group "unrivalled stealth, persistence, and lethality."³⁹ When the concept of the Oberon class successors was being debated within the RCN, any future submarine capability had to augment the experience gained from the Oberons' operations while remaining relevant to contemporary challenges. This meant that in addition to the traditional core capabilities of the submarine force, such as anti-submarine and anti-surface warfare, the Oberons' successors and their crews would have to contribute intelligence, surveillance, and reconnaissance functions to joint operations while working in support of special operations forces.⁴⁰

The hope was that with the new submarines, the RCN would always be able to commit at least one submarine to a six-month operational deployment anywhere in the world and have a second at a high-enough readiness level to replace the original submarine for another six-month deployment.⁴¹ Because diesel-electric (or conventionally-powered) submarines are a "vehicle of

³⁹ Royal Canadian Navy, "Horizon 2050", p. 39.

⁴⁰ Craven, "A Rational Choice Revisited".

⁴¹ Ibid..

position”⁴², they are an overwhelmingly attractive quality to possess for a middle power operating a medium-sized navy, such as Canada, and for regional powers with littoral conflicts or interests. These nations, for whom a conventionally-propelled submarine is more affordable, recognize that these assets provide “superior combat power and freedom of action”, making the inclusion of a submarine force in a navy “a fundamental component of the sea power paradigm”.⁴³

In 1998, when the then-Upholder class submarines were purchased from the Royal Navy, the justification for the continuation of a submarine force included four criteria: strategic impact, balance, sovereignty and surveillance, and non-combat capability.

Possession of submarines had a significant strategic impact on Canada’s ability to contribute to coalitions and international operations. Possession alone admits Canada to a group of states “participating in regulated and highly classified waterspace management and intelligence-sharing schemes”.⁴⁴ Submarines also provided balance to the fleet by affording Canada “simultaneous vertical coverage of the water column, and horizontal coverage of the maritime warfare

⁴² In comparison, nuclear-powered submarines, which, through their technological superiority, can cover more ground and more manoeuvrable than their diesel-electric counterparts. However, given the enormous cost to build and operate a nuclear submarine, only six countries operate nuclear submarines: the P5 countries of the United Nations Security council (Britain, the United States, China, Russia, and France) plus India.

⁴³ Craven, “A Rational Choice Revisited”.

⁴⁴ Ibid.

continuum.” Submarines are also force multipliers⁴⁵ and contribute to the balance of the fleet in that way too. Paul Mitchell explains this effect by using the Falklands War example, arguably the last time that two navies tested their anti-submarine capabilities against one another.

With the longest coastline in the world, the RCN has a serious responsibility to protect and defend Canada’s maritime domain. Submarines’ detection abilities make them suitable for “domestic surveillance and patrol missions”.⁴⁶ Canadian submarines have conducted sovereignty patrols to monitor American fishing vessels illegally operating in Canadian waters, and more recently have contributed in a similar capacity to anti-narcotic operations in the Caribbean in partnership with American and Latin American navies.

All this said, the purpose of this paper is not to defend or justify the strategic value of submarines. The RCN has already expressed the importance they place on the platform and their desire to maintain that capability. This has been continually articulated in various statements of requirements and in institutional documents such as *Leadmark* or “Horizon 2050”⁴⁷. Naval theory even supports the value of submarines as a strategic asset — they are a game changer of force multiplier. If Canadian defence policy dictated that the RCN needed to process within its arsenal a force multiplier, then the essential capability case for submarines would build itself.

⁴⁵ The single naval unit of a submarine has both the potential and the capacity to deter a significantly more populous or overwhelming enemy. Its characteristics and strategic attributes strengthen and exponentially increase the potency of the fleet’s firepower and capacity to influence and control the area. As a result, significantly more planning and resources go into defending against a submarine.

⁴⁶ Royal Canadian Navy, “Horizon 2050”, p. 39.

⁴⁷ “Horizon 2050”, although prepared by the RCN, has not been publicly released. A censored version is available through the Access to Information process.

Instead, the purpose of this paper is to determine whether the suite of capabilities that submarines possess are essential to the RCN in its ability to deliver on government policy.

The RCN has been relatively consistent in its definition of what it requires capability-wise to defend Canada. From *Leadmark* to *Charting the Course* and even through to “Horizon 2050”, it has maintained five fundamental capabilities that Canada’s navy must possess:

- The ability to create a picture, called the “Common Operating Picture”;
- A multidimensional self-defence capability;
- Some form of operational sustainment;
- Force protection capabilities;
- And underwater defence capabilities, more specifically ASW.

These are five capabilities that Canada alone must be able to employ because although CBP definition implies the existence of partners and allies, Canada “will need the independent capacity to assert sovereignty”.⁴⁸ The RCN’s doctrine suggests that without those five capabilities, Canada would not be able to defend itself.

Creating a common operating picture is simply the ability to see what is going on in Canadian sovereign waters and those just outside. This is crucial for the entire CAF. The RCN claims that a “fundamental national requirement to ensure sovereignty over Canada’s oceanic estate will demand that the Navy retain the ability to exercise effective command and control, intelligence

⁴⁸ Directorate of Maritime Strategy, *Leadmark*, p. 18.

gather, surveillance and reconnaissance beyond the limits of the exclusive economic zone”.⁴⁹

Modern military technology has increased efforts to try and harmonies these components into a single platform, which makes sense given the increase resource demands. Effectively, in order to employ this capability, the RCN requires intelligence, surveillance, and reconnaissance (ISR) abilities.⁵⁰ In other words, in order to defend Canada, the RCN must be able to ‘see’ what is happening above the water, on the water, and under the water through “versatile and easily deployable surveillance and reconnaissance systems”⁵¹. I posit that submarines are central to the RCN’s ability to see.

In addition to access the intelligence sharing and waterspace management scheme with other submarine operating countries, Canada is responsible for monitoring what happens in its own waters. It ensures that it can ‘see’ by being ‘responsible’ for all allied submarine transits, deployments, and activities in the Arctic, which are registered with the Atlantic Submarine Operating Authority. There may be an argument in alternative platforms, but this would require the government to invest significantly in underwater sensors all across Canada’s Arctic and coastal domains. Even then, there is no guarantee of success rate. Alternatively, the government could also invest in aerial surveillance platforms, such as a next-generation Aurora CP-140 aircraft or UAVs, but even the currently existing technology does not provide a complete underwater picture. A surface option is not likely to be more efficient given that surface warships

⁴⁹ Directorate of Maritime Strategy, *Leadmark*, p. 125.

⁵⁰ *Ibid.*, p. 130.

⁵¹ *Ibid.*

used to operating in littoral environments already have a hard enough time using sensors to track underwater assets in this context.

No other naval platform “has the ability to covertly track, identify, and monitor vessels in the bad weather conditions that occur frequently off [Canadian] coasts,” making submarines unparalleled in the realm of intelligence, surveillance, and reconnaissance.⁵² The future of the naval battleground is the littoral coast, which means that any RCN fleet of the future must possess the capacity to defend the Canadian littorals, which are among the largest in the world and are notoriously difficult in which to navigate and operate. Lastly, while the RCN encourages and engages in partnerships on a daily basis, it knows that it cannot rely on other people to see on the RCN’s behalf. In order to defend Canada, the RCN requires “integral and independent” ISR information because although “technological interoperability with allies theoretically may allow access to their systems, there is no guarantee that it will be granted, or that when granted, it will not be limited or the information ‘sanitised’ to some extent.”⁵³

Although underwater sensors may support the RCN’s need to ‘see’ — mines could support this function to a limited degree in the sense that the RCN would know if a foreign asset was in Canadian waters if it hit a mine — they do not [currently] possess self-defence capabilities. The need to “possess a self-defence capability is [...] self evident”, of which the RCN requires a

⁵² Paul Mitchell, ‘The Contribution of Submarines to Canada’s Freedom of Action on the World Stage’, *Canadian Military Journal* 14, no. 3 (Fall 14), <http://www.journal.forces.gc.ca/vo14/no3/page15-eng.asp>.

⁵³ Directorate of Maritime Strategy, *Leadmark*, p. 130-1.

multidimensional one⁵⁴. This by definition must be able to deal with attacks “from air, surface, and subsurface” threats. The RCN needs this multidimensionality in order to deal with the growing number of littoral operations and threats, which “will have to be taken into consideration when planning for, and participating in, operations in support of international security.”⁵⁵ The same considerations and threat trends are expected for both continental and national defence.

Because of the dynamic nature of this required capability, “[n]o one system will suffice”.⁵⁶ Instead, the RCN will need a suite of systems that provides early and effective detection but also speed, range, precision, and lethality when confronting the threat. The combination of these factors makes this suite suitable for providing a self-defence capability necessary for the RCN. In addition, “the ability to deter — or, if necessary, to engage and defeat — an attacking unit must be recognized as a vital part of a robust self-defence capability”.⁵⁷ Once these factors are taken into consideration, an argument in favour of the easily identifiable alternative resources such as mines or underwater sensors struggle. Though mines can provide an exceptional layer of deterrence, they are incapable of providing self-defence to themselves at a unit-level — indeed, the purpose of a mine is to be destroyed — and cannot “take the initiative in asserting and enforcing national or coalition authority”, which is key to exercising sea control.⁵⁸ A similar

⁵⁴ Directorate of Maritime Strategy, *Leadmark*, p. 132.

⁵⁵ *Ibid.*, p. 134.

⁵⁶ *Ibid.*, p. 135.

⁵⁷ *Ibid.*

⁵⁸ *Ibid.*, p. 135.

argument could be made for the two aerial platforms, such as the Aurora CP-140 and the RCN's current UAVs⁵⁹. Further, any naval commander's greatest threat still and always comes from an enemy submarine, as evidenced in both the Spanish Navy's withdrawal from the Turbot Crisis after the Canadian government signalled its intent to deploy a submarine into the area, and the wariness of those involved in the NATO naval blockade enforcing sanctions against Yugoslavia in 1993 who were concerned that should they enter Montenegrin territorial waters, they would encounter conventional submarines.⁶⁰

Operational sustainment, defined as the ability to be deployed without returning to shore for replenishment, continues to be a concern for the RCN. Frigates and destroyers can usually last for about eight to ten days before needing replenishment, which makes their sustained deployment in Canadian waters without a native replenishment capability severely limited. The lack of shore-based assets in the North would also restrict the surface units to "limited operations in or near southern Canadian coastal waters"⁶¹, or to the summer months. The consequence of the RCN's surface fleet's lack of operational sustainment means that it has "little or on ability to act in the far reaches of the exclusive economic zone, in the Arctic, or globally with any meaningful force."⁶² While partner replacement (especially at-sea) is possible, this happens only under certain conditions, e.g. when working within a coalition. Canada needs naval assets who are

⁵⁹ The Auroras could be retrofitted with air-to-surface rockets or conventional bombs in addition to their traditional anti-submarine torpedoes

⁶⁰ Directorate of Maritime Strategy, *Leadmark*, p. 132.

⁶¹ *Ibid.*, p. 146.

⁶² *Ibid.*

independently sustainable over an “extended duration”.⁶³ It is in this capacity that the submarine could be unique in its ability to be operational sustainable. A submarine can usually be deployed for two to three months before returning to port and carries a crew significantly smaller than that of a surface unit.

That said, a significant issue for the current submarine capabilities that Canada possesses has to do with the Arctic. As the polar regions continue to bear the brunt of the consequential effects of climate change, Canada’s Arctic maritime domain will come an increasingly traversed waterway. The trends suggest that increased activity will most likely be in the form of merchant shipping looking to take advantage of the significantly shortened distance between Asia and Europe through the Arctic Circle. Though military activity is less likely, Canada should still be able to maintain and even assert its sovereignty across the entirety of its territory. A key argument in favour of the switch to nuclear submarines back in the late 1980s in Canada was the need for an ability to operate in the Arctic under the ice shelf year-round. Currently, Canada’s submarines cannot do that. Indeed, for the RCN, “[a]mong the key considerations for the replacement submarine will be the ability to operate in all three of Canada’s ocean environments.”⁶⁴ Specifically, this would address the unique requirements and design elements associated with operation under the sea.

⁶³ Directorate of Maritime Strategy, *Leadmark*, p. 146.

⁶⁴ Royal Canadian Navy, “Horizon 2050”, p. 45.

This means that while submarines currently offer the best means to achieve operational sustainability as an individual unit, in order for a future submarine capability to be unique in this regard it must possess the ability to operate in the Arctic year-round. A cornerstone of CBP is the fiscal consideration because of the process's congruent emphasis on obtaining capabilities while remaining economically efficient. As I am examining the submarine argument through a CBP lens, I must also take fiscal constraints into consideration. Therefore, it would be nonsensical to suggest that Canada explore nuclear-powered submarines. That said, as the navy has been implying for decades⁶⁵ now, a future submarine capability must possess air-independent propulsion. There are several variants of AIP currently available on the market, though mostly for smaller, European submarines, but the dissection of each type would be the subject of another paper.⁶⁶

Where submarines already provide a substantive advantage over other alternative platforms or resources is in their ability to contribute to force protection. The way that the RCN has operated in the past suggests that seldom (with the exception of perhaps the submarine) are naval assets deployed individually. Instead, they tend to be part of either a Canadian task group formation or as part of a coalition. As such, the RCN requires the ability to contribute to force protection, which is the ability to provide medium capability to defend other units or national infrastructure. I must point out that this is not to say that other ships are incapable of providing force protection — indeed, Canada's new surface combatant will almost certainly possess some form of layered

⁶⁵ Even before the purchase of the Oberon class submarines the RCN was indicating that it wanted a future submarine to be AIP-deployed.

⁶⁶ For further reading, I would suggest seeing Eric Lehre's work on the subject.

air-defence capability, while the updated Halifax class frigates provide better close-combat self-defence and force protection capabilities — but rather that submarines as resources are unparalleled in delivering on all three of the capabilities presented so far.

The last of the five core capabilities that the RCN has identified and previously (and presently) placed heavy emphasis on maintaining are its underwater defence capabilities. The capability, which is synonymous with anti-submarine warfare (ASW), is important to the RCN because “the threat from submarines will continue to the future.”⁶⁷ A decade after they codified that threat in *Leadmark*, the RCN noted that submarines “are likely to remain the dominant maritime platform for the foreseeable future,”⁶⁸ to which the most capable adversary is another submarine.

The RCN envisions this capability to be one of layered defence that relies on “effective weapons system[s]” and includes a variety of above water (such as the Auroras, which could be considered one of the CAF’s elite ASW platforms) and underwater assets such as mines. As identified earlier in this paper, the force multiplier effect is key to this capability. Mines are an appropriate element a layered underwater defence because they “create an underwater hazard out of proportion to the effort required to create that threat.”⁶⁹ In other words, “sowing mines requires disproportionate efforts to deal with a perceived or actual threat.”⁷⁰ This is not to say

⁶⁷ Directorate of Maritime Strategy, *Leadmark*, p. 154.

⁶⁸ Royal Canadian Navy, “Horizon 2050”.

⁶⁹ Directorate of Maritime Strategy, *Leadmark*, p. 155.

⁷⁰ *Ibid.*

that mines are a perfect platform or resource to deal with underwater threats; quite the contrary, they are a limited resource as they are easily and frequently avoidable and offer no ISR capacity (unless actually hit). To defend against them however, requires a “dedicated standing mine countermeasure force composed of specialized ships and large numbers of personnel”.⁷¹ That last point would be of considerable import for the RCN who would have to consider defending against possible foreign hazards in our own waters. Part of the defence against foreign hazards requires the resources with the ability to defend against mines. If, as previously noted, a dedicated MCM force requires specialized ships and large numbers of personnel who serve no other purpose but to counter mines, then perhaps the RCN should want to turn its attention to a resource that is more flexible.

Given the unpredictable nature of war and conflict today, the RCN admits that it “must be prepared now and as part of coalitions in the future, to be confronted both at sea and ashore by a wider range of potential threats and challenges than we have ever dealt with before.”⁷² This insistence on flexibility and agility of capability works in favour of the submarine’s argument. This flexibility would also allow for the inclusion into the submarine case of the secondary capabilities⁷³ that the RCN envisions, such as naval fire support and sealift, to both of which submarines could contribute. Naval fire support is a capability intrinsic to the submarine, as demonstrated by the British submarines positioned off the Libyan coast in 2011. Canada’s

⁷¹ Directorate of Maritime Strategy, *Leadmark*, p. 155.

⁷² Royal Canadian Navy, “Horizon 2050”, p. 25.

⁷³ I note that these are secondary capabilities because they are not fundamentally essential to the defence of the realm.

current and future fleet of submarines could easily be re-fitted to accommodate submarine-based land-attack missiles, such as those also used in the Gulf, in Bosnia, and in Kosovo. This kind of capability⁷⁴ would “serve to avoid the need to insert other forces into situations where the potential for casualties exists”, such as those where air defence poses a problem for fighter-based air attacks.⁷⁵

The sealift capability that the RCN envisions is particularly specific because Canada is not looking at large-scale amphibious assault capabilities — such is the indication after the previous government did not purchase the French Mistral — and would seek a platform easily “reconfigurable for operations other than sealift”.⁷⁶ Such a resource would also need a high level of independence and flexibility for “immediate retaking or long-term employment” and allow for “intratheatre mobility”.⁷⁷ HMCS *Regina*’s mid-deployment retasking from the Gulf to the Mediterranean indicates that the RCN possesses assets capable of this level of sophistication. However, given the current Victoria class’ use in the sea-based insertion of special forces, ideal for times when port loading or unloading of troops cannot be guaranteed, this appears to be what the RCN is moving toward in terms of realizing the government’s policy objectives.

⁷⁴ The Canadian government was rumoured to be exploring in response to the Syrian conflict.

⁷⁵ Directorate of Maritime Strategy, *Leadmark*, p. 161.

⁷⁶ *Ibid.*, p. 158.

⁷⁷ *Ibid.*, p. 160.

WHERE DOES THE CASE STAND?

From a capability-oriented perspective, the case is solid. The RCN, like most other military institutions, is moving toward a layered defence approach on all levels and the diversity and dynamism of the submarine makes it a unique delivery mechanism of the core capabilities required to defend Canada. That is not to say that the case is not without its faults. There are weaknesses to this case, such as cost factors that are at the heart of the capability-based planning process, that will continue to pose problems for the submarine argument. Discounting the public distaste for submarines⁷⁸, this platform is not cheap and there is not a conventionally-powered submarine currently available that can operate year-round under the ice. Submarines are also problematic on another level that is less important: submarines do not do ‘presence’ well. The purpose of the submarine is to go undetected. This makes it limited in its ability to assert sovereignty in a less-than-lethal way, i.e. if the deterrence factor does not work, then the submarine has no non-extreme way of escalating the situation.

Several questions have emerged during the building process of this case, not least of which has to do with the number of submarines needed to deliver the capabilities required to defend Canada. If the sole purpose — this is not likely — is to do defence of Canada, then the size of the current fleet probably suffices. The current fleet would allow for one submarine to patrol each of our national oceans with a fourth in deep maintenance. If Canada intends to use submarine

⁷⁸ Bringing the Victoria class up to steady state has proven costly, conforming to the media perspective that has fed public perception that submarines are expensive. The “well established narrative of waste and dysfunction”, as Paul Mitchell of the Canadian Forces College describes, will make it difficult to justify spending a significant amount of money on a platform that Canadians see as a failure.

capabilities to meet any of its other central policy objectives, which is to say to use submarines outside a domestic context, then it will likely need a larger fleet. It seems unlikely that four submarines (three at various levels of readiness with one in deep maintenance) would be able to defend the longest coastline in the world, Canada's ocean domain, act interoperably with the USN in North American defence⁷⁹, and engage somewhere in the world (likely in the Pacific) all at the same time. This is yet another layered choice that must be made.

To return to the case, for the essential tasks required of the RCN, the submarine is supremely positioned to deliver. It is, first of all, essential in developing the common operating picture. It is also almost alone in terms of effectively operating in Canadian coastal waters at all ends of the warfare spectrum. It is also unparalleled in providing a layered underwater defence capability. Submarines also contribute significantly to operational sustainment in ways that other naval assets cannot by being able to stay deployed independently longer than others. Lastly, part of a multidimensional self defence capability, submarines almost uniquely contribute a suit of systems that provides effective and early detection against threats, and the speed, range, precision, and lethality needed to respond to said threat.

Canada is not likely to ever develop an indigenous submarine capability. However, Canada requires "some level of indigenous capacity for the development of leading edge systems technology and ship repair and maintenance techniques."⁸⁰ This is important because though

⁷⁹ One possible use for Canada's submarines could be to integrate one based off the West Coast into the USN's Pacific Fleet's Third or Seventh Fleet as a forward-deployed asset.

⁸⁰ Directorate of Maritime Strategy, *Leadmark*, p. 143.

Canada's submarine requirements are not necessarily unique in the world, they are particular enough that only one or two other countries would share design or operational requirements. In developing its next generation submarines, Canada should insist on being involved from the beginning of the process. If that is the next government's choice, then it needs to be engaged in that discussion now while partners with those similar submarine requirements are talking. All of this is to say that Canada needs to address the submarine question now. A case can clearly be made that would meet the test of the independent review panel assessing defence requirements. According to CBP, submarines can arguably be deemed an essential capability to the RCN, especially in the defence of Canada.

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