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The Readiness of Canada's Naval Forces

Report of the Standing Committee on National Defence

**Stephen Fuhr
Chair**

June 2017

42nd PARLIAMENT, 1st SESSION

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has the honour to present its

SIXTH REPORT

Pursuant to its mandate under Standing Order 108(2), the Committee has studied Canada and the Defence of North America and has agreed to report the following:

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THE READINESS OF CANADA'S NAVAL FORCES

GLOSSARY

AOPS:	Arctic/Offshore Patrol Ship
AOR:	Auxiliary Oil Replenishment
ASW:	Anti-Submarine Warfare
CADSI:	Canadian Association of Defence and Security Industries
CAF:	Canadian Armed Forces
CANSOFCOM:	Canadian Special Operations Forces Command
CBSA:	Canada Border Services Agency
CCG:	Canadian Coast Guard
CCGS:	Canadian Coast Guard Ship
CFB:	Canadian Forces Base
CFINTCOM:	Canadian Forces Intelligence Command
CJOC:	Canadian Joint Operations Command
CPF:	Canadian Patrol Frigate
CSC:	Canadian Surface Combatant
CSIS:	Canadian Security Intelligence Service
DCC:	Defence Construction Canada
DFO:	Department of Fisheries and Oceans
DND:	Department of National Defence
DRDC:	Defence Research and Development Canada
EEZ:	Exclusive Economic Zone
FFS:	Federal Fleet Services
HADR:	Humanitarian Aid and Disaster Relief
HCM / FELEX:	Halifax Class Modernization / Frigate Life Extension
HMCS:	Her Majesty's Canadian Ship
IISS:	International Institute for Strategic Studies
ISED:	Innovation, Science and Economic Development Canada
ISR:	Intelligence, Surveillance and Reconnaissance
JSS:	Joint Support Ship
JTF:	Joint Task Force

JUSTAS:	Joint Unmanned Surveillance and Target Acquisition System
MARLANT:	Maritime Forces Atlantic
MARPAC:	Maritime Forces Pacific
MCDV:	Maritime Coastal Defence Vessels
MSOC:	Marine Security Operations Centre
NATO:	North Atlantic Treaty Organization
NDDN:	House of Commons Standing Committee on National Defence
NORAD:	North American Aerospace Defense Command
NSPS:	National Shipbuilding Procurement Strategy
NSS:	National Shipbuilding Strategy
PCA:	Permanent Court of Arbitration
PSPC:	Public Services and Procurement Canada
PWGSC:	Public Works and Government Services Canada
RCAF:	Royal Canadian Air Force
RCMP:	Royal Canadian Mounted Police
RCN:	Royal Canadian Navy
SAR:	Search and Rescue
SIPRI:	Stockholm International Peace Research Institute
UAS:	Unmanned Aircraft System
UNCLOS:	United Nations Convention on the Law of the Sea
U.S.:	United States

INTRODUCTION

In early 2016, the House of Commons Standing Committee on National Defence (the Committee) decided to undertake a study of the defence of North America, with initial emphasis on the Canadian North American Aerospace Defense Command (NORAD) region and aerial readiness. After several months of hearings and a visit to NORAD headquarters in Colorado Springs, Colorado, the Committee released a comprehensive report on the topic in September 2016. Entitled *Canada and the Defence of North America: NORAD and Aerial Readiness*, the report examined how the Canadian Armed Forces (CAF) and, more specifically, the Royal Canadian Air Force (RCAF), contribute to the aerial defence of Canada and North America in collaboration with the United States (U.S.) through NORAD.¹ While the report focused primarily on NORAD and aerial readiness, it also highlighted the importance of the maritime and land domains to the defence of Canada and North America. Accordingly, the Committee expressed its intent to “complete reports on aspects related to the readiness of naval and land forces” in the future in order to inform the Defence Policy Review.²

With that intent in mind, in October 2016, the Committee began a study of Canadian naval readiness and the defence of North America. The Royal Canadian Navy (RCN) is currently in the “midst of its most intensive and comprehensive period of recapitalization in its peacetime history,” as Rear-Admiral (Retired) Patrick Finn, Assistant Deputy Minister (Materiel) at the Department of National Defence’s (DND), told the Committee.³ Indeed, in recent years, the federal government has launched a number of major naval procurement projects to renew and modernize the RCN fleet over the next three decades. These projects include the acquisition of more than 20 new major naval ships, all of which are to be built in Canada in the coming years through the National Shipbuilding Strategy (NSS). At the same time, the federal government is moving forward with the renewal of the Canadian Coast Guard’s (CCG) aging fleet, with 15 new ship projects. Tens of billions of dollars are being spent on the modernization and recapitalization of the RCN and CCG fleets, with great benefit to industry and workers across Canada.

In so many ways, Canada is building today the Navy and Coast Guard of tomorrow. As Vice-Admiral Ron Lloyd, Commander of the RCN, told the Committee: “Readiness is about our ability to provide credible naval options to government for employment not only today but, equally as important, tomorrow, and preparations for readiness must begin long before yesterday.”⁴

The defence of Canada in the maritime realm is the responsibility of the RCN. The RCN has been protecting Canada and its maritime interests for more than a century. Since the 11 September 2001 terrorist attacks in the U.S., RCN warships have been

1 House of Commons Standing Committee on National Defence (NDDN), [Canada and the Defence of North America: NORAD and Aerial Readiness](#), 42nd Parliament, 1st Session, September 2016.

2 Ibid., p. 4.

3 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

4 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

almost continually deployed on naval operations at home and abroad. Specifically, between 2001 and 2017, the RCN made well over 110 warship deployments on various international operations.⁵ The high operational tempo in the past decade and a half has placed significant pressure on the RCN, its personnel and their families, but it also has displayed the flexibility and high level of readiness of Canada's naval forces. These operations are a clear demonstration of the extent to which the "Navy provides the Government of Canada with its most ready and responsive military force," as the Committee was told by Commander (Retired) Ken Hansen, Science Advisory Committee Member of the Institute for Ocean Research Enterprise.⁶ This point was emphasized by Vice-Admiral Lloyd. "The RCN prides itself on being a rapidly deployable force ... [and] highly respected force, capable of operating across the full spectrum of operations, from humanitarian assistance through to coalition operations," he said. "I'm very proud of our history as Canada's first responders."⁷

The RCN is the smallest of Canada's three armed services (army, navy and air force). It is composed of approximately 14,000 men and women, which includes both Regular and Reserve Force members of the CAF.⁸ The RCN fleet currently consists of 28 surface warships and submarines (12 Halifax class frigates; 12 Kingston class maritime coastal defence vessels, or MCDVs; and 4 Victoria class submarines)⁹ as well as 8 Orca class patrol craft training vessels¹⁰ and various auxiliary vessels, tugs and tenders.¹¹ The fleet operates from two naval bases: Canadian Forces Base (CFB) Halifax in Halifax, Nova Scotia, and CFB Esquimalt in Esquimalt, British Columbia. The Atlantic Fleet (Maritime Forces Atlantic, or MARLANT) is based in Halifax and the Pacific Fleet (Maritime

5 This data excludes the number of warships deployed on domestic operations between 2001 and 2017. RCN international operations include 39 warship deployments in support of the international campaign against terrorism and piracy (Operations APOLLO, ALTAIR, SIRIUS, SEXTANT, METRIC, SAIPH, and ARTEMIS, 2001-2017); 2 in support of the international response to the Libyan Civil War (Operation MOBILE, 2011); 7 in support of NATO assurance and deterrence measures in Central and Eastern Europe (Operation REASSURANCE, 2014-2017); and 64 in support of the international campaign against illicit trafficking by transnational organized crime in the Caribbean Sea and the eastern Pacific Ocean (Operation CARIBBE, 2006-2017). In addition, Canadian warships have been engaged in several humanitarian aid and disaster relief operations abroad, such as in the United States in 2005 (Operation UNISON) and Haiti in 2008 and 2010 (Operations HORATIO and HESTIA). Department of National Defence (DND), "[The Canadian Forces' Contribution to the International Campaign Against Terrorism: October 2001–October 2003](#)," 7 January 2004; "[Operation ALTAIR](#)," "[Operation SEXTANT](#)," "[Operation SAIPH](#)," "[Operation SIRIUS](#)," "[Operation METRIC](#)," "[Operation ARTEMIS](#)," "[Operation MOBILE](#)," "[Operation REASSURANCE](#)," "[Operation CARIBBE](#)," "[10 Years of Success for CAF on Operation CARIBBE](#)," 22 December 2016; "[Operation HORATIO](#)," and "[Operation HESTIA](#)."

6 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

7 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

8 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

9 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd). See also DND, "[The Fleet: Canadian Patrol Frigates](#)," "[The Fleet: Maritime Coastal Defence Vessels](#)," and "[The Fleet: Long Range Patrol Submarines](#)."

10 DND, "[Patrol Craft Training Vessels \(Orca-class\)](#)."

11 Stephen Saunders ed., *Jane's Fighting Ships 2016-2017*, IHS Global, 2016, pp. 102-110.

Forces Pacific, or MARPAC) in Esquimalt.¹² In addition, there are 24 Naval Reserve Divisions located across Canada.¹³

The RCN is facing challenges as it undergoes “the largest recapitalization ... in its peacetime history.”¹⁴ Canada must continue to have a strong, balanced, multi-purpose, combat-capable navy to protect its maritime interests at home and abroad. The highly professional women and men of the RCN have been protecting our country, our freedom, and our way of life on the oceans of the world for more than a century. They have incessantly stood by the Navy’s motto, “Ready, Aye Ready.”

Witnesses heard in the course of this study believed that the RCN needs to be capable of protecting our home waters and of responding wherever our national interests are challenged around the world. “A properly equipped navy at the right degree of readiness is inherently flexible,” explained Navy Captain (Retired) Harry Harsch, the Navy League of Canada’s Vice-President of Maritime Affairs. “It provides the government with a range of policy options across the spectrum of conflict from diplomacy to humanitarian operations to constabulary operations to the often-complicated world of peace support operations and all the way to war-fighting if necessary.”¹⁵

The Committee undertook the present study in order to gain a better understanding of the state of naval readiness in Canada and how the RCN contributes to the defence of Canada and North America. The Committee held 14 hearings on the topic between October 2016 and February 2017. It received testimony from a number of witnesses, including representatives of the CAF, DND, the CCG, and Public Services and Procurement Canada (PSPC) as well various academics and stakeholders. The Committee would like to thank all witnesses for their contribution to this study. It is hoped that this report reflects, as faithfully as possible, the views they have expressed on the subject of Canadian naval readiness.

Based on the testimony received over the course of the study along with publicly available information, the Committee agrees to report the following findings and recommendations to the House of Commons.

THE MARITIME SECURITY ENVIRONMENT AND NAVAL THREATS TO NORTH AMERICA

1. An Uncertain and Unpredictable World

Canada might appear to be well shielded from foreign threats given that it is surrounded by the Arctic, Atlantic and Pacific Oceans and shares a continent with the

12 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton and Rear-Admiral Art McDonald).

13 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 9 February 2017 (Commodore Marta B. Mulkins). For a list of the 24 Naval Division, see DND, “[Naval Reserve Divisions](#).”

14 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

15 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Navy Captain (Retired) Harry Harsch).

U.S., its closest friend, military ally and trading partner. It nonetheless remains exposed to the volatility and unpredictability of the international security environment.

Although Stephen Burt, Assistant Chief of Defence Intelligence at the Canadian Forces Intelligence Command (CFINTCOM), emphasized that the CAF and DND “do not see a state actor that has both the capability and the intent to use military force against Canada,” he urged caution. “While it takes many years for states to develop new capabilities,” he told the Committee, “intent is much more difficult to discern, and it can change rapidly and with little warning in response to international events and competing national interests.”¹⁶ He defined “threat” as a combination of “capability and intent.” A country might have intent to harm Canada, but no military capabilities to do so. Similarly, a country might possess military capabilities, but if it has no intent to harm Canada, it would not constitute a military threat. However, “intent can change very quickly,” he reminded the Committee.¹⁷ Accordingly, Canada must remain vigilant and continue to monitor the intent and capabilities of foreign states, as Vice-Admiral Lloyd explained.¹⁸

That being said, Mr. Burt told the Committee that “there remain many serious threats to Canadian interests globally.”¹⁹ The Committee enumerated some of those threats in its *Canada and the Defence of North America: NORAD and Aerial Readiness* report of September 2016.²⁰ That list included threats emanating from failed and failing states; transnational and domestic criminal and terrorist networks; political, ethnic and religious violent extremism; cyber-attacks; the proliferation of ballistic and cruise missile technology; the acquisition and possible use of weapons of mass destruction (chemical, biological, radiological and nuclear) by state and non-state actors; global power shifts; and the aggressive rhetoric and actions of countries such as China, Iran, North Korea and Russia and other regimes worldwide.

To expand on that list, in recent years, armed conflicts have been causing instability in many regions of the world, as the wars in Afghanistan, Iraq, Syria, Ukraine, Yemen, and elsewhere can attest. Millions of men, women, and children have been displaced as a result of the violent conflicts in Iraq and Syria, resulting in a significant refugee crisis in the Middle East and Europe.²¹ At the same time, military spending and arms trading has been steadily growing in many regions of the world over the past decade, particularly in the

16 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

17 Ibid.

18 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

19 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

20 NDDN, [Canada and the Defence of North America: NORAD and Aerial Readiness](#), pp. 5-17.

21 Heidelberg Institute of International Conflict Research, [Conflict Barometer 2016](#), Heidelberg, University of Heidelberg, 2017, pp. 13-19; Stockholm International Peace Research Institute (SIPRI), [SIPRI Yearbook 2016: Armaments, Disarmament and International Security \(Summary\)](#), 2016, p. 1-27; “2016 Annual Defence Report,” *Jane’s Defence Weekly*, Vol. 53, No. 50 (9 December 2016), pp. 8-38.

Middle East and Indo-Asia-Pacific regions, heightening tensions and, in certain cases, culminating in regional arms races.²²

According to several witnesses heard in the course of the current study, Canada faces a more uncertain and unpredictable world today than it used to just a few years ago.²³ According to Commodore (Retired) Eric Lerhe of Dalhousie University's Centre for the Study of Security and Development, "the world situation has gotten worse" over the past decade as a result of the escalating wars in Iraq and Syria and of rising security challenges to global order stemming from China and Russia. In particular, he pointed to mounting international tensions with Russia since 2014 over the broader Ukraine crisis. He also referred to China's growing maritime and territorial ambitions in the East China Sea and the South China Sea, which are causing strains in international relations, particularly with neighbouring countries in the Indo-Asia-Pacific region.²⁴ "There are increasing concerns that these actions [by China and Russia] will lead to interstate war," he warned the Committee, adding that the "chances of conflict will rise" in the coming years if those countries continue "to aggressively pursue their international interests irrespective of the risk and international law."²⁵

While the CAF and DND "do not see any intent on the part of any country to attack [Canadian territory] militarily," Mr. Burt continued in his testimony, "that does not mean that no country has the intent to harm Canada's interests. A number of states are doing things that harm our interests." China and Russia are cases in point. As he explained:

In the case of Russia and China particularly, some things being done that involve international law are creating uncertainty in terms of how we will need to act in the future. That harms Canada. As a nation engaged in global trade, we need a certain foundation of rules to conduct our affairs and so that our interests will be protected. So each time these nations or other states take measures that, while they are not military threats, properly speaking, affect our interests, that poses a problem for Canada and is a threat to our interests.²⁶

It is, therefore, imperative that Canada remains cautious and ready to defend its interests at home and abroad, especially in the maritime domain.²⁷

2. A Transforming Maritime Security Environment

Canada is a "maritime nation," Navy Captain (Retired) Harsch explained to the Committee. Accordingly, it is imperative that Canada protect its maritime interests against potential security challenges and threats at home and abroad.²⁸ Canada possesses the

22 SIPRI, [SIPRI Yearbook 2016](#), pp. 17-21; SIPRI, "[SIPRI Fact Sheet: Trends in International Arms Transfers, 2016](#)," February 2017.

23 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers and Joel Sokolsky).

24 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

25 Ibid.

26 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

27 Ibid.

28 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Navy Captain (Retired) Harry Harsch).

world's largest coastline, the second-largest continental shelf, and the fifth-largest Exclusive Economic Zone (EEZ). It is also heavily dependent on the oceans for trade.²⁹ As one of the major trading nations of the world, much of Canadian trade goes by way of the oceans. To illustrate this point, Vice-Admiral Lloyd told the Committee that "on any given day, Canadian Tire has a third of its inventory on the high seas."³⁰

Indeed, economies around the world are becoming increasingly dependent on the oceans, not just for trade and commerce, but also for communication, transportation, food, undersea mineral and energy resources, industry and tourism.³¹ Approximately 90% of global trade activities depend on sea transportation. In fact, it is estimated that about two-thirds of the world's oil travels by sea.³² The "lifblood of nations' economies" flows on the world's oceans, Vice-Admiral Lloyd told the Committee.³³

This growing economic dependence on the oceans is prompting countries worldwide to invest in their naval forces in order to safeguard their interests in the maritime domain. The naval buildup underway in the Indo-Asia-Pacific region is testimony to that. According to Vice-Admiral Lloyd, one of the main reasons why the naval budgets of Indo-Asia-Pacific countries are continually rising and "we are seeing a 60% increase in their navies" is "probably a direct correlation of the link between safety, security, and prosperity and the oceans of the future." What we are seeing globally, he noted, is an "increased naval presence on the world's oceans" and an "increased importance being placed on the global maritime commons."³⁴

It is not surprising that more and more defence experts and scholars are now "calling the 21st century a maritime century," as Vice-Admiral Lloyd emphasized.³⁵ James Boutilier, Adjunct Professor of Pacific Studies at the University of Victoria, testified: "This is the quintessential maritime era, and naval vessels will be one of the keys to inter-state relations."³⁶ Indeed, the "rapid changes under way in the global maritime order" are leading to the emergence of a "new strategic environment," as Vice-Admiral (Retired) Drew Robertson of the Naval Association of Canada explained. This new strategic environment is ushering in a wide range of new security challenges as "nations throughout the world, but especially Russia and China ... continue to make significant and disproportionate investments in maritime forces, particularly in the Asia-Pacific region," as "great state co-operation continues to give way to competition and confrontation at the expense of the international rules-based order, especially at sea and, most notably in the

29 Ibid.

30 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

31 Ben Lombardi, [The Future Maritime Operating Environment and the Role of Naval Power](#), Ottawa, Defence Research and Development Canada (DRDC), May 2016, pp. 1-2.

32 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen); Royal Canadian Navy (RCN), [Leadmark 2050: Canada in a New Maritime World](#), 2016, p. 2.

33 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

34 Ibid.

35 Ibid.

36 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

South and East China Seas,” and as the previously inaccessible Arctic Ocean “opens up to commercial shipping and resources extraction.”³⁷

DND’s Assistant Chief of Defence Intelligence summarized the maritime security challenges of the 21st century according to “five geopolitical realities,” which he described to the Committee as follows:

1. China’s ongoing naval expansion and its willingness to challenge the global rules-based order at sea, as evidenced by the increasing frequency and intensity of maritime territorial disputes in the South China Sea and East China Sea;
2. Russian military modernization and aggression, as evidenced by the illegal annexation of Crimea and the ongoing Russian-sponsored conflict in Ukraine;
3. Persistent instability in many areas of the world, with failed and failing states continuing to provide the ungoverned spaces needed by terrorists to organize and flourish;
4. The increasing global demand for energy and resources, which relies on the free flow of commerce through strategic maritime choke points;
5. Ongoing climate change, which could lead to potential social instability.³⁸

3. China and Naval Tensions in the Indo-Asia-Pacific Region

China’s emergence as a naval power and its increasingly aggressive behaviour at sea was regarded by many witnesses as a top security concern.³⁹ Most of them were troubled by the ongoing maritime and territorial disputes between China and neighbouring states in the East China Sea and the South China Sea, which had been heightening tensions in the Indo-Asia-Pacific region for many years. Many witnesses pointed to the negative reaction of China’s government to the July 2016 ruling of the Permanent Court of Arbitration (PCA) in The Hague, Netherlands, against China’s claims in the South China Sea, as a warning sign.⁴⁰ While the United Nations Convention on the Law of the Sea (UNCLOS) requires China to accept in totality the PCA ruling, explained Commodore (Retired) Eric Lerhe, the Government of China has “rejected the court’s findings outright and lashed out at any state that supported the arbitration.”⁴¹ China’s reaction to the PCA is disconcerting for Commander (Retired) Hansen:

Their [People’s Republic of China] repudiation of the United Nations Convention on the Law of the Sea and its dispute resolution mechanisms has really laid bare the very blatant ambitions they have for the South China Sea ... and how they intend to manage their relations with neighbouring states ... They signed the United Nations Convention on

37 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

38 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

39 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

40 Permanent Court of Arbitration (PCA), [“Press Release: The South China Sea Arbitration \(The Republic of the Philippines\) v. The People’s Republic of China,”](#) 12 July 2016.

41 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

the Law of the Sea, they ratified it, they thereby agreed to all the processes, definitions, and dispute resolution mechanisms, and now they've simply rejected it.⁴²

In Stephen Burt's view, China's maritime and territorial disputes with neighbouring states in the Indo-Asia-Pacific region could become a serious threat to global commerce if those disputes got "hotter" and local naval forces decided to "block trade" through regional choke points, such as the Strait of Malacca between Indonesia and Malaysia.⁴³ According to Robert Huebert, Professor of Political Science at the University of Calgary, China will probably become "one of the biggest threats we are going to be facing" in the future. China is "expected to become a maritime nation presenting a challenge to western nations," he explained, and "we can see that they're getting increasingly unhappy with the existing international legal dimension just by looking at the recent arbitration decision that went very clearly against them." In his view, China is "increasingly going to be threatening western interests" at sea.⁴⁴

Several witnesses spoke about how naval expansionism in China and growing naval tensions in the Indo-Asia-Pacific region has prompted a naval arms race of unprecedented proportion in that area of the world. For instance, James Boutillier said that over the past 25 years, China has "built the equivalent of 22 Royal Canadian Navies end-on-end." China's naval fleet, he emphasized, now consists of more than 330 surface combatants of all sizes and shapes, not to mention around 60 submarines. The navies of Australia, India, Indonesia, Japan, Pakistan, South Korea, Taiwan, and other Indo-Asia-Pacific countries are all undergoing similar expansions. Navies in the Indo-Asia-Pacific region "are not only modernizing," Mr. Boutillier explained, but they are "engaged in an arms race."⁴⁵ As a result, the largest concentration of surface warships and submarines in the world is in the Indo-Asia-Pacific region. In 2015, for example, about 45% of the surface warships (2,147+ of the 4,784+) and 42% of the submarines (221 of the 519) operational worldwide were owned by Indo-Asia-Pacific nations. These numbers did not include the approximately 360 additional surface warships and submarines that were either under construction or on the order books for Indo-Asia-Pacific navies at that time.⁴⁶

As Mr. Boutillier noted, "there has been a shift of the most staggering profundity in terms of the global naval balance." He continued: "The global economic centre of gravity has moved from the Euro-Atlantic to the Pacific, and this has been replicated in the maritime realm."⁴⁷ He contrasted the extraordinarily rapid expansion of naval forces in the Indo-Asia-Pacific region with the "dramatic numerical decline" in the "old front-line navies" of Europe and North America over the course of several years as a result of "budgetary disarmament." In this respect, in 2015, Europe, the region with the second largest

42 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

43 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

44 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert)

45 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

46 Martin Auger, *Global Comparison of Naval Forces*, Library of Parliament backgrounder prepared for NDDN, 3 February 2017, pp. 8-10; Stephen Saunders, ed., *Jane's Fighting Ships, 2015-2016, IHS Global*, 2015, pp. 2-1013.

47 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

concentration of surface warships and submarines, accounted for barely 19% of the surface warships (898 of the 4,784+) and 27% of the submarines (141 of the 519) operational around the world.⁴⁸ To illustrate his point, Mr. Boutilier noted that in 1962, the British Royal Navy possessed 152 destroyers and frigates, whereas today it has only 19. Similarly, he stated that the United States Navy “has been more than cut in two numerically” over the past 30 years, “falling from 575 ships to about 273 ships.”⁴⁹

4. Russian Naval Power Renewal

Some witnesses also raised concerns with the rejuvenation of Russia’s naval capabilities. “Russia still certainly remains a threat,” emphasized Joel Sokolsky, Professor of Political Science at the Royal Military College of Canada. “It’s a particular threat in the waters around Europe” and “it may well be a new threat in terms of North American defence.”⁵⁰ Russia possesses one of the world’s largest navies, with more than 230 surface warships and submarines.⁵¹ Its naval assets are equipped with some of the most sophisticated naval weaponry available, including the latest type of ballistic and cruise missiles. In fact, Russian naval forces have been showcasing some of those weapon systems in combat during the ongoing Syrian Civil War. As Vice-Admiral (Retired) Drew Robertson noted, Russia fired cruise missiles from the Caspian Sea across Iran and Iraq into Syria from frigates. It also fired cruise missiles from its submarines in the Mediterranean Sea into Syria. Those “submarine- and ship-launched capabilities,” he reminded the Committee, are exactly the same as those that would be used against North America or other potential targets in the event of a future conflict.⁵²

The expansion and modernization of Russia’s submarine force, in particular, was regarded by some witnesses as a serious security threat to North America. Robert Huebert, for example, expressed worries about “renewed Russian submarine development” and what this could mean for Arctic security in the coming years.⁵³ The Russians are investing significant funds in their nuclear submarine program, he told the Committee, adding that this capability will give Russia “a broader maritime reach.” In his view, Canada and the U.S. should be concerned with the expanding nuclear submarine capabilities of “an increasingly aggressive Russia” and how those naval assets could potentially be used against North America.⁵⁴ In this respect, Russian submarines equipped with ballistic and cruise missiles capable of reaching North America regularly operate in the Arctic and routinely patrol the waters around Canada and the U.S.⁵⁵

48 Auger, *Global Comparison of Naval Forces*, pp.1-7; International Institute for Strategic Studies (IISS), *The Military Balance 2016*, 2016, pp. 27-480.

49 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

50 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Joel Sokolsky).

51 IISS, *The Military Balance 2017*, pp. 213-215.

52 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

53 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

54 Ibid.

55 NDDN, [Canada and the Defence of North America: NORAD and Aerial Readiness](#), pp. 15, 29.

However, not all witnesses regarded Russian militarization as a threat to global security. “I think we are all genetically coded to think of Russia as a superpower and a superpower that is re-emerging,” explained James Boutillier, “but if you look at the Russian GDP, it’s about the equivalent to that of Italy or Australia.”⁵⁶ In 2016, Russia announced that it would be reducing its defence spending.⁵⁷ However, Canada must remain cautious and continue to keep a “close watch” on Russian military capabilities and intent, as a DND official explained.⁵⁸

5. The Impact of Climate Change on the Maritime Domain

Several witnesses spoke about how climate change is transforming the maritime domain and its impact on the future international security environment. According to the RCN:

Global warming will physically alter our operating environment, with increased impact around the world and especially in the Arctic. Climate change will intensify the severity of weather, alter patterns of rainfall and food production, melt polar ice and Arctic permafrost, change ocean chemistry, and stress delicate ocean ecosystems. Many of these effects will be most strongly felt in coastal regions. Of greater importance will be their social consequences, which will add to already significant pressures facing many coastal states.⁵⁹

“We see quite clearly that the scientific evidence is overwhelming that our climate is changing,” Robert Huebert asserted. “It is warming to a degree that I think many people 10 years ago were not prepared for ... It is unfortunately only a matter of time until we see increasing storm powers and rising sea levels that will affect us and other nations.”⁶⁰

In particular, there are serious concerns as to how the rise in sea levels and the increased frequency and strength of extreme weather, such as tropical cyclones or hurricanes, will impact coastal regions and result in an increase demand for humanitarian assistance and disaster relief around the world.⁶¹ It should be noted that 80% of the world’s population and major cities are in the littorals, so within less than 100 km of the sea.⁶² People and urban infrastructures located in low-lying regions of the world are particularly exposed and vulnerable to rising sea levels and extreme weather. According to James Boutillier, Bangladesh is “expecting over the next quarter century to lose upwards of a third of the land area as a result of rising sea levels and storm inundations.”⁶³

56 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

57 “Russian Defence Budget Set to Drop by 12%,” *Jane’s Defence Weekly*, Vol. 53, No. 44 (2 November 2016), p. 14; “2016 Annual Defence Report,” *Jane’s Defence Weekly*, Vol. 53, No. 50 (9 December 2016), p. 20.

58 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

59 RCN, [Leadmark 2050](#), pp. 7-8.

60 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

61 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

62 Lombardi, [The Future Maritime Operating Environment](#), p. 5.

63 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

These phenomena could cause serious humanitarian crises and could result in mass displacements of populations.⁶⁴ The expectation for the future is that naval forces worldwide will be increasingly called upon to conduct more humanitarian aid and disaster relief operations as a result. It is also expected that they will be called upon to intervene more often in migrant crises, as populations flee disaster-stricken coastal regions by sea.⁶⁵ In sum, as Robert Huebert explained, navies will need “to respond to the increasing problems and threats that climate change is now producing,” adding that “a warming climate automatically means more stress is placed on the requirements for what a navy has to do.”⁶⁶

6. The Opening of the Arctic Ocean

The opening of the Arctic Ocean and how it impacts on Canadian interests was also addressed in the course of this study. According to current estimates, within the next few decades, melting ice in the Arctic will provide access to a wealth of untapped raw materials and will open up new maritime trade routes. As noted in a recent Defence Research and Development Canada (DRDC) study on the future maritime operating environment, some scientists believe that if climate change trends continue, “there could be ice-free summers in the Arctic within 25 years,” which “offers the prospect of longer navigation seasons.”⁶⁷ Although the Committee was told that Canada faces no imminent threat from Russia or other states in the Arctic,⁶⁸ increased human activity in the North will pose a wide range of security concerns and threats in the future as a result of changes in the Arctic maritime environment.

Witnesses who testified before the Committee repeatedly pointed to the effect of climate change and the melting of the polar ice on the Arctic region as well as to the emerging challenges and potential security threats resulting from those changes. They spoke about potential increases in military and commercial ship and submarine traffic in the region; infringements on Canadian sovereignty; industrial exploitation of oil and other natural resources; environmental pollution and degradation; and to various other concerns. They also pointed to the possibility of an increase in search and rescue related incidents in the Arctic as a result of more traffic in the region in the coming years.⁶⁹

64 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

65 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

66 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

67 Lombardi, [The Future Maritime Operating Environment](#), p. 56.

68 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

69 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson and Commodore (Retired) Daniel Sing); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron and Robert Huebert); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson and Mario Pelletier).

However, some witnesses focused on the growing geostrategic importance of the Arctic and how competing claims and interests between states could lead to tensions in the region. Even countries such as Canada and the U.S. have boundary disputes in the Arctic. The U.S., for example, refuses to recognize Canada's claims in the Beaufort Sea and continues to ascertain that the Northwest Passage is an international strait rather than Canadian internal waters.⁷⁰ Witnesses also spoke about the ongoing "militarization" of the Arctic and how the five littoral Arctic states (Canada, Denmark, Norway, Russia and the U.S.) are strengthening their military capabilities in the region. They also pointed to the potential use of northern waters by adversaries in the event of a conflict.⁷¹ Robert Huebert, for example, pointed to the threat of Russia in the Arctic.⁷² Witnesses also observed that the region is no longer considered as the sole domain of the five littoral states. Several of them emphasized the fact that other nations, such as China, are operating naval assets in the Arctic.⁷³

That being said, security in the Arctic is complicated by the geography and harsh climate of the region. "Climate change obviously is having an effect on our Arctic, but that effect is still relatively gradual," Stephen Burt, DND's Assistant Chief of Defence Intelligence, explained. "The Arctic still presents a very difficult operating environment, particularly for commercial purposes. That change, while it is real and while we are seeing even now a certain amount more of tourism traffic and research vessels, and whatnot, will continue to be gradual, probably throughout my lifetime."⁷⁴ Accordingly, the Arctic Ocean has a total area of about 14 million square kilometres, but according to DND, approximately 11.7 million square kilometres of it remains covered by ice in winter and 5.2 million square kilometres in the summer. In this context, DND indicates that "surface travel is possible along the southern limits of the Arctic Ocean," particularly the Northern Sea Route (or Northeast Passage) north of Russia and the Northwest Passage north of Canada.⁷⁵

From a military standpoint, the limited access to the Arctic region also constrains the activities of "potential aggressors in the north," as Rear-Admiral John Newton, Commander Maritime Forces Atlantic (MARLANT) and Joint Task Force (Atlantic), told the Committee. The Arctic is "a hard place to go, really hard," he said. "It only becomes

70 Robert Dufresne, [Controversial Canadian Claims Over Arctic Waters and Maritime Zones](#), Background Paper PRB 07-47-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 10 January 2008, pp. 1-16.

71 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

72 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

73 Ibid.; NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

74 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

75 DND, [Naval Operations in Arctic Waters: The Operational Legal Challenges of Naval Operations in Canada's Arctic Waters](#), Office of the Judge Advocate General, June 2008, p. 4.

marginally easier ... during a few weeks, maybe three months at the most.”⁷⁶ Commodore (Retired) Daniel Sing, the Naval Association of Canada’s Director of Naval Affairs, agreed:

From the perspective of the Royal Canadian Navy ... only large vessels—mostly Russian and sometimes nuclear—have the capacity to venture into the northern ice cap. Once they are in the ice, those vessels advance at a very low speed of two to three knots. When necessary, should those large vessels enter our waters without our permission, it would not be difficult for the Canadian Armed Forces to keep things under control. If the situation got more serious, a [CF-18 jet fighter aircraft] with a bomb would be entirely capable of targeting such a vessel.⁷⁷

According to Mario Pelletier, the CCG’s Deputy Commissioner of Operations, who “still spends a lot of time up there” in the Arctic, “the biggest threat right now” comes “from people’s perception that it’s opening up, that there’s less ice.” In his view, “that’s not true.” As he explained:

While the ice is melting, that means more dangerous ice, the multi-year ice coming down and filling up the waterways, and it makes it very challenging. That’s a huge threat. People see all those articles and think, “Oh, it’s open water. We can go with a small boat with the jet skis.” The cruise [ship] industry has been racing to get there, and once they get there, they see very difficult conditions. We’re spread out because if there is a search and rescue, we need to respond to that.⁷⁸

That being said, if climate change trends continue, the situation could change dramatically in the near future. “Once the ice melts,” Commodore (Retired) Sing said, “there will be a lot more people up there.”⁷⁹ Jeffery Hutchinson, the CCG’s Deputy Commissioner of Strategy and Shipbuilding, agreed. “Melting ice means more traffic,” he warned. “More and more ships will venture through those waters.”⁸⁰ And this increased traffic will include surface warships and submarines, Vice-Admiral (Retired) Robertson predicted. “As there’s more open water, you’re going to see more activity from navies,” he said. “Navies will use the Arctic in the same manner they use any other ocean in the world” and “in that regard ... there’s going to be a need for enhanced surveillance and communications capability.”⁸¹

7. Organized Crime, Piracy and Terrorism at Sea

Several witnesses spoke about how trans-national criminal and terrorist networks pose a serious threat to maritime security of almost all coastal states as well as global commerce at sea. Organized crime and terrorism directly threaten the stability of many regions of the world and challenges the ability of many local governments to maintain order within their borders and maritime domains. There is also growing evidence of ties

76 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

77 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

78 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

79 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

80 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

81 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

between terrorists and criminal organizations in the maritime domain. As a DND official emphasized, “most terrorist activities that take place in maritime areas are connected with criminal groups and terrorist financing.”⁸² Terrorists, for example, have been working with organized crime groups to smuggle into countries by sea illegal people as well as weapons, explosives, and other illicit materials that could then be used to conduct terrorist attacks against local infrastructures and populations.⁸³

Canada is not immune to terrorist attacks in the maritime domain. Although most maritime terrorism incidents have occurred overseas, “there is always a risk of a terrorist attack in Canada,” Stephen Burt noted, “and that could take various shapes, including by sea.”⁸⁴ A potential terrorist attack on merchant ships, tankers or offshore oil facilities in Canadian waters or against port facilities, for instance, could cause serious loss of life, undermine the country’s trade, paralyze the economy, and even result in the temporary shutdown of borders. Andrea Charron, Assistant Professor of Political Science at the University of Manitoba and Director of the Centre for Security Intelligence and Defence Studies at Carleton University, alluded to this when she appeared before the Committee. In her view, maritime threats are “a growing concern” for Canada, pointing to the fact that maritime traffic has been increasing in Canadian waters in recent years. Particularly worrisome to her are the “go-fast boats, the tiny little whalers that can be very destructive, but are not required by law to have a vessel identification system.” These small crafts can be used by criminals and terrorists for all sorts of illicit activities in our home waters, and could even be used to conduct terrorist attacks against shipping and strategic shore-based infrastructures.⁸⁵

The threat of maritime terrorism is an important one. There have been terrorist attacks in the maritime domain in the recent years, and there will likely be others in the future. The threat is real, DND’s Assistant Chief of Defence Intelligence emphasized. He explained that “there have been several cases of terrorist attacks in ports and in essential passages, for example, in areas like the Strait of Malacca,” which “are very narrow canals that ships have to pass through.”⁸⁶ Ships in ports and coastal waters are particularly vulnerable to terrorist attacks. Terrorists, for example, are known to have used high speed boats laden with explosives to launch suicide attacks against warships and commercial ships. Such was the case when terrorists bombed the American destroyer USS *Cole* in Yemen in 2000 and the French oil tanker MV *Limburg* in 2002.⁸⁷ More recently, on 30 January 2017, a remotely-controlled “unmanned bomb boat” operated by Yemeni Houthi rebels struck the Royal Saudi Navy frigate *Al Madinah* off the coast Yemen. The attack killed several sailors and caused heavy damage to the Saudi

82 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

83 Lombardi, [The Future Maritime Operating Environment](#), p. 29.

84 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

85 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

86 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

87 Lombardi, [The Future Maritime Operating Environment](#), p. 30.

warship.⁸⁸ In recent years, terrorists have also attacked warships with anti-ship missiles. For example, Navy Captain (Retired) Harry Harsch informed the Committee that in October 2016 United Arab Emirates (UAE) and U.S. warships operating in the Red Sea have “come under attack from Yemeni [Houthi rebel] forces firing anti-ship missiles of Chinese origin adapted to attack warships in international waters.”⁸⁹ There have also been terrorist attacks against shore-based infrastructures, as was the case in 2008 when terrorists launched sea-based attacks on Mumbai, India, or when a Jihadist group raided a naval dockyard at Karachi in Pakistan in 2014.⁹⁰

Some witnesses also spoke about the issue of piracy. There has been growing attention in recent years to the problem of piracy near maritime choke points in politically unstable regions of the world, particularly in and around failed and failing states. Piracy off the coast of Somalia, in particular, was very problematic a few years ago, as Navy Captain (Retired) Harry Harsch reminded the Committee, prompting intervention from the international community. Canada and allied countries responded by deploying warships to conduct counter-piracy operations in the area. The impact of piracy in that region was global. “Before the piracy became under control,” Captain (Navy) Harsch explained, “very large ships were being routinely attacked, routinely captured, and the down-range effect in North America was an immediate spike in the price of fuel simply because of the fact that tankers, to avoid the threat, had to go the long way around and avoid the Suez Canal.”⁹¹ Although the piracy threat to shipping will likely persist in many regions of the world, Stephen Burt believed that it is a problem that can be controlled by naval forces. “Piracy is an issue,” he told the Committee. “It has been an issue, obviously, off the Horn of Africa” and “it is an issue presently in the Strait of Malacca, off Indonesia.” But piracy “is an issue that can be managed both by navies and by the private sector in terms of protecting their own ships as they move through some areas where piracy is rampant.”⁹²

8. Cyber Threats in the Maritime Domain

Cyber threats to shipping were also addressed in the course of this study. The “primary cyber threat” in the maritime domain, explained DND’s Assistant Chief of Defence Intelligence, “is the threat to merchant vessels,” which are “more vulnerable to hacking” than warships because they tend not to be designed with “cybersecurity in mind” and often use “more outdated software and more dated systems.” In his view, there are still many vessels on the oceans that are not equipped with the necessary up-to-date

88 “Saudi Frigate Survives Attack off Yemen,” *Jane’s Defence Weekly*, 8 February 2017; [“Navy: Saudi Frigate Attacked by Unmanned Bomb Boat, Likely Iranian,”](#) *USNI News*, 20 February 2017.

89 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Navy Captain (Retired) Harry Harsch). For more information on those missile attacks, see [“Officials: 3 U.S. Warships off Yemen Following Attack on UAE Ship,”](#) *USNI News*, 4 October 2016; [“USS Mason Fired 3 Missiles to Defend from Yemen Cruise Missiles Attack,”](#) *USNI News*, 11 October 2016; [“Pentagon Pledges to Respond in ‘Appropriate Manner’ After New Yemen Missile Attack on USS Mason,”](#) *USNI News*, 12 October 2016; “USN Destroyers Attack Yemeni Targets after Taking Fire,” *Jane’s Defence Weekly*, Vol. 53, No. 42 (19 October 2016), p. 4.

90 Lombardi, [The Future Maritime Operating Environment](#), pp. 29-30.

91 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Captain (Navy) (Retired) Harry Harsch).

92 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

software and hardware to protect them against cyber threats. This situation presents a range of security challenges. According to him, cyber-attacks against merchant vessels could result in the “loss of an ability to track a course that can result in lost goods or environmental crises of one kind or another” and the “risk of manipulating a vessel’s automatic identification system or electronic charts, depending on what systems they’re using.” It can also result in serious financial losses for companies, depending on how systems are manipulated.⁹³

That being said, warships are not invulnerable to cyber threats. “There are certainly nations out there, Russia and China primarily, that have the capability to affect a range of systems” aboard warships, he indicated. “It is a known threat” and one that is taken “very seriously” by the CAF and, more specifically, the RCN when it “designs or upgrades” its systems. “Keeping, as much as possible, ahead of that threat curve” is imperative from a national security standpoint.⁹⁴

9. Maritime Challenges and Threats to Canada

While the threat of naval confrontation with another country on the high seas appears remote, according to Joel Sokolsky,⁹⁵ Canada nonetheless faces a number of threats in the maritime domain. Many of those threats emanate from criminal and terrorist activities.⁹⁶ Canada must remain alert to illicit activity off its coasts and in its maritime approaches.

The proliferation of weapons of mass destruction, espionage, unauthorized or illicit activities by hostile foreign ships, submarines and aircraft, and the sea-based conventional and nuclear ballistic and cruise missile capabilities of countries such as China and Russia also pose a threat to our country, as the Assistant Chief of Defence Intelligence at DND emphasized.⁹⁷ Several witnesses also expressed concern with the rapid development of new and more advanced naval weapon systems worldwide and the threat this poses to Canadian shipping and the defence of Canada’s maritime interests at home and abroad. “Nowadays, threat weapons are faster, stealthier, longer-range and more effective,” Commodore (Retired) Daniel Sing told the Committee. “The proliferation and improvements of submarines, mines, anti-ship torpedoes, anti-ship missiles, and cruise and ballistic missiles, in particular, represent increasing potential to do harm, directly or indirectly, to North America. Such evolving threats should not be discounted and preventive and/or protective measures need to be considered and implemented.”⁹⁸

Canadian warships operating on the high seas, in particular, must cope with a range of technologically-advanced naval systems. “The threat environment facing Royal

93 Ibid.

94 Ibid.

95 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Joel Sokolsky).

96 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

97 Ibid.

98 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

Canadian Navy assets deployed abroad is dynamic and varies by region,” noted Mr. Burt. Our naval forces “face a number of challenges and threats from both traditional state actors and non-state actors.”⁹⁹ This includes the rapid development and diversification of naval fleet capabilities worldwide, the emergence of more advanced surface warships and submarines, and the constant appearance of increasingly sophisticated and deadly anti-ship cruise and ballistic missile systems, torpedoes, and naval mines. Unmanned systems (aerial, surface and sub-surface) also pose a serious threat to ships because of their “ability to physically damage a target, conduct surveillance, perform electromagnetic attacks, and deploy and/or neutralize naval mines,” among other things.¹⁰⁰

NAVAL READINESS AND THE DEFENCE OF CANADA’S MARITIME INTERESTS

The defence of Canada and its interests in the maritime domain rests on naval readiness. Key to naval readiness is the ability to monitor threats in the maritime environment (maritime domain awareness) as well as the ability to deter or defeat those threats (maritime control). In Canada, maritime domain awareness is a whole-of-government effort that involves assets and personnel from several federal government departments and agencies, including the RCN and the CCG. Maritime control, on the other hand, rests almost entirely on the armed forces and, more specifically, on the readiness of the RCN, its warships and its sailors. Maintaining naval readiness, therefore, means investments in both maritime domain awareness as well as maritime control.

1. Maritime Domain Awareness in Canada

Canada is a maritime nation with significant interests in the maritime domain due to the size of its coastline, its EEZ and its maritime imports and exports. Canada’s coastal assets, therefore, have serious implications from a national security perspective, given that Canadian naval forces must therefore defend one of the largest ocean estates in the world. Monitoring such a huge maritime domain poses a considerable challenge from a situational awareness standpoint. In this respect, maritime domain awareness, which Andrea Charron defined as “the understanding of anything in the maritime environment that could adversely affect security, safety, the economy, or Canada’s environment”¹⁰¹ is key to Canadian naval readiness. It is “about understanding what’s taking place above, on, and below the seas” in Canada’s maritime estate, emphasized Vice-Admiral Lloyd.¹⁰² Although maritime domain awareness is “often overlooked” in conversations on naval readiness in Canada, it is crucial to the defence of Canada and its maritime approaches. “When one considers readiness, knowing your environment, the actors, activities, and potential threats approaching North America, is essential,” emphasized Ms. Charron.¹⁰³ It is an ongoing challenge that is dependent on access to state-of-the-art surveillance

99 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

100 Ibid.

101 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

102 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

103 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

technology and on open communication, intelligence sharing and interoperability between federal government departments and agencies, as well as foreign allies and partners.¹⁰⁴

Maritime domain awareness in Canada is achieved through the use of a wide range of different assets and technologies, which include aircraft, ships, submarines, satellites, radars, sensors, and various other systems.¹⁰⁵ While responsibility for “marine security” in Canada rests with Transport Canada, the marine security portfolio involves no less than 17 different federal government departments and agencies, each with different mandates in the maritime domain. They include the CAF and DND as well as the Canada Border Services Agency (CBSA), the CCG, the Department of Fisheries and Oceans (DFO), the Royal Canadian Mounted Police (RCMP) and many other organizations. “There are a lot of players,” noted Stephen Burt.¹⁰⁶

An important example of Canada’s whole-of-government, system of systems approach to maritime domain awareness can be found in the Marine Security Operations Centres (MSOCs) initiative. Established in 2004, Canada’s three interdepartmental MSOCs monitor marine activities and potential threats to Canada’s east and west coasts and the Great Lakes–St Lawrence Seaway. Located in Halifax, Nova Scotia; Victoria, British Columbia; and Niagara, Ontario, MSOCs are operational 24/7 and are managed by Transport Canada. They are staffed by personnel from the RCN as well as the CBSA, the CCG, the DFO, the RCMP and Transport Canada. These partner organizations fuse and share information in order to develop an accurate and complete picture of the various activities taking place in Canada’s maritime domain. In particular, the MSOCs monitor the thousands of ships that operate in Canadian waters each day with the help of information supplied by aircraft, ships, satellites, radars, and other technologies.¹⁰⁷ No fewer than 2,000 ships are tracked by the MSOCs daily.¹⁰⁸ The CCG provides close to 80% of the maritime vessel traffic information processed by the MSOCs.¹⁰⁹ The CCG collects most of this data through its Long-Range Identification and Tracking (LRIT) system, which identifies and tracks vessels transiting within 2,000 nautical miles of Canada’s shores.¹¹⁰ According to Vice-Admiral Lloyd, the MSOC network has significantly improved maritime domain awareness in Canada and can be regarded as a success story. “Many navies around the world are looking at our [MSOCs] as a model by which they can look after the safety, security and sovereignty of their nations,” he emphasized.¹¹¹

104 Ibid.; NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

105 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

106 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

107 Ibid.; NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

108 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

109 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

110 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson and Mario Pelletier).

111 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

Maritime domain awareness and security also involves cooperation and information sharing with the U.S. through NORAD. NORAD's maritime warning function was established in 2006. Andrea Charron described how that function works as follows:

[It] involves, first, the processing, assessing, and disseminating of intelligence and operational information related to the approaches to North America. Second, it involves developing a comprehensive shared understanding of the activities in the NORAD common operating picture. Third, it requires warning and advising of maritime threats against North America.¹¹²

NORAD's maritime area of operation is global, emphasized Ms. Charron, which “provides Canada with more information and far earlier warning than national systems alone can provide.”¹¹³

Maritime domain awareness also involves support from various other U.S. organizations, such as the U.S. Coast Guard, the U.S. Navy and the U.S. Department of Homeland Security. It also includes information sharing with other foreign allies and international organizations, such as the Five Eyes intelligence community (Australia, Canada, New Zealand, the United Kingdom (U.K.) and the U.S.) and the North Atlantic Treaty Organization (NATO).¹¹⁴

2. Maritime Control

Maritime control is equally important to the defence of Canada. Its importance was stressed by Commodore (Retired) Daniel Sing, who stated that: “In order to exercise sovereignty, a nation must first know what is going on in, near and, at times, far away from its sovereign territory, be it on land, on and below the seas, and in the air,” which is normally achieved through surveillance and domain awareness. It must also be able to exercise control over its area of responsibility and have the capacity to respond with “mobile assets” to “incidents or challenges, potential or actual, in a timely fashion.”¹¹⁵

The RCN is Canada's main instrument of maritime control and response to threats in the maritime domain. The Navy exercises a “reasonable degree of sea control on, above, and below the ocean surface,” wherever its ships and submarines are tasked to operate, emphasized Commodore (Retired) Daniel Sing. Once an “actionable surveillance picture has been generated,” he explained, “a mobile response asset or assets [ships and/or submarines] can be deployed—if not already deployed—to further refine the picture and/or to take whatever action might be warranted.” Responses to threats in the maritime domain normally take one of two forms. “Either the assets are called into action from their home base,” he explained, “or they are already at sea and therefore are able to respond more quickly.” The advantage of using RCN ships and submarines, he emphasized, is that

112 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

113 Ibid.

114 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

115 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

they can be deployed with no or little support and remain on site for significant periods of time.¹¹⁶

3. The State of the RCN

The mission of the RCN is to generate combat-capable, multipurpose naval forces to defend Canada's maritime interests at home and abroad.¹¹⁷ According to Commodore (Retired) Sing, the RCN is "principally responsible for: monitoring Canada's ocean estate and approaches; when necessary, asserting and defending Canada's maritime sovereignty; and, as directed by the government, contributing to international peace and security."¹¹⁸ Like the Canadian Army and RCAF, the RCN is often referred to as a "force generator" within the CAF. As such, it is responsible for organizing, training, and equipping forces that are generally employed operationally by the operational commands of the CAF, such as Canadian Joint Operations Command (CJOC) and Canadian Special Operations Forces Command (CANSOFCOM). As force employers, CJOC and CANSOFCOM essentially "employ" the forces organized, trained and equipped by the "force generators" (army, navy and air force) and direct them on operations at home and abroad.¹¹⁹

Rear-Admiral Art McDonald referred to the RCN as "a rapidly deployable combat-capable force of first resort capable of producing technology-enabled, people-delivered naval outcomes from the sea, in home waters with other government departments, and on far-distant shores in the world with friends and allies."¹²⁰

Naval readiness is key to the operational success of the RCN at home and abroad. Naval readiness includes the readiness of individual sailors, the readiness of ships and submarines, and the operational readiness of naval forces. It is "a dynamic condition that fluctuates with changes in the crew and the status of machinery and systems," as Rear-Admiral John Newton explained.¹²¹ It is a complex balancing act on which rests the effectiveness and efficiency of the RCN. Without the right number of trained sailors and the right mix and quality of naval assets and supporting services, the Navy could face reduced fleet capabilities.¹²² Canada's ability to respond to threats in the maritime domain depends on the readiness of its naval forces, as Navy Captain (Retired) Harry Harsch explained.

Readiness is multifaceted, but it really boils down to having a fleet that is capable of deploying at short notice, in some cases measured in hours, to bring meaningful effect to any given task as assigned by the Government of Canada. It encompasses personnel, material, technical, and combat readiness. This can range from the traditional ready duty

116 Ibid.

117 DND, "[About the RCN](#)."

118 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

119 NDDN, [Canada and the Defence of North America: NORAD and Aerial Readiness](#), p. 37.

120 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

121 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

122 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

ship sailing literally within hours to conduct a search and rescue operation or to support other government departments in enforcing Canadian laws. It can also include deploying within days to provide humanitarian assistance or disaster relief ... Readiness also means combat-ready ships forward deployed around the world working in NATO task groups or with our other partners and allies, and it also means the capability to deploy a naval task group with as little as 10 days' notice in support of a host of complex operations. In the first instance, readiness means having a capable, balanced, and flexible fleet of ships, submarines, and aircraft as well as effective, shore-based facilities from which to base them.¹²³

Maintaining readiness is no simple task and must take into account the multi-year operational cycle of each surface warship and submarine. The cycle includes “periods given to heavy maintenance, upgrades, crew building, training, trials, and finally operations,” as Rear-Admiral John Newton explained. “This is a complex blending of materiel and personnel resources, fiscal capacity, time, commitments to missions, assignments to national task groups, reserves, and inevitable rest and recovery following operations.”¹²⁴ In other words, not all surface warships and submarines in the fleet are at the same stages of readiness at any given time. As the RCN indicated in its recently-published *Leadmark 2050: Canada in a New Maritime World* strategic document (2016), “for every combatant [ship or submarine] deployed there are several others at various points in their operational cycle, moving in and out of Canada’s maritime industry [for periodic and intensive periods of maintenance and refit] as well as through the Navy’s materiel, technical and individual and collective training systems.”¹²⁵ As a case in point, Vice-Admiral Lloyd told the Committee that only 10 of the RCN’s 12 Kingston class MCDVs were “available for service” at any given time, with one per coast always in refit and maintenance.¹²⁶

Several witnesses maintained that the RCN was in a better state of naval readiness today than it was over the last decade.¹²⁷ According to David Perry, Senior Analyst at the Canadian Global Affairs Institute, the RCN has just “turned a corner” and is “coming out of one of the lowest periods of fleet availability ... in post-war history” now that the modernization and life-extension of its fleet of 12 Halifax class frigates, which began in 2010, was completed in November 2016. With the return of HMCS *Toronto*, he noted, the “RCN is now back to a normal frigate readiness cycle with significantly enhanced warships.” Similarly, he pointed to the fact that over the last two years, the RCN’s 4 Victoria class submarines, which have also undergone modernization and life-extension in recent years, “reached the level of operational availability that was originally envisioned.” With both its frigate and submarine fleets, he noted, the RCN “has effectively regained a reasonable level of operational capability.” In his view, the Navy is “presently in pretty good shape” in “terms of present fleet readiness.”¹²⁸ Rear-Admiral John Newton echoed this

123 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Navy Captain (Retired) Harry Harsch).

124 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

125 DND, [Leadmark 2050](#), p. 42.

126 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

127 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

128 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

view. The Halifax class frigate modernization and life-extension project was “an exhaustive effort” that put “an entire class of warships, the principal combatants” of the RCN, almost “completely out of service,” he reminded the Committee. In that period, he explained, the “readiness of the entire Royal Canadian Navy declined.” But today, the situation is different now that all 12 frigates have been modernized and life-extended and have returned to service. The RCN’s modernized Halifax class frigates are “in the top tier of military capabilities on this planet,” he told the Committee. Rear-Admiral Newton had similar praises for the Victoria class submarines, pointing to the fact that all have been “modernized with key elements of maritime capability,” which includes some of the most advanced sonar and weapon systems in the world.¹²⁹

4. Aging Fleet and Capability Gaps

The RCN fleet is rapidly aging, regardless of recent efforts to modernize and extend the life of the 12 Halifax class frigates and 4 Victoria class submarines.¹³⁰ In March 2017, HMCS *Athabaskan*, the last of the Navy’s four Iroquois class destroyers, was decommissioned after 44 years of service.¹³¹ HMCS *Athabaskan* was the RCN’s oldest surface warship and “not deployable” for some time.¹³² As for the Navy’s 12 Halifax class frigates, they were commissioned more than 20 years ago, between 1992 and 1996. The oldest of those frigates is now a quarter century old. The RCN’s 12 Kingston class maritime coastal defence vessels (MCDV) are almost as old; they were commissioned into the RCN between 1996 and 1999. The youngest surface warship currently serving in the RCN is the MCDV HMCS *Summerside*, which was commissioned in July 1999 and is now almost 18 years old. No other surface warships have since been built for the RCN.¹³³ The RCN submarine force is equally old. Its four Victoria class submarines, which were built between the late 1980s and early 1990s, were originally commissioned into the British Royal Navy (RN) more than 20 years ago. Canada purchased those submarines second

129 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

130 DND, [“Backgrounder: Halifax-Class Modernization/Frigate Life Extension \(HCM/FELEX\),”](#) 29 November 2016; DND, [“On Time and Under Budget: Government of Canada Marks Major Milestone in a Multi-Billion Dollar Defence Procurement,”](#) 29 November 2016; DND, [“Royal Canadian Navy Submarine: Fleet Status,”](#) 26 January 2016.

131 The Iroquois class originally consisted of four destroyers. They were built by Davie Shipbuilding in Lauzon, Quebec, between 1969 and 1973 and were commissioned into the RCN between 1972 and 1973. All four destroyers have now been decommissioned (HMCS *Huron* in 2005; HMCS *Iroquois* and HMCS *Algonquin* in 2015; and HMCS *Athabaskan* in 2017). Saunders, *Jane’s Fighting Ships 2016-2017*, p. 106; DND, [“HMCS Athabaskan Takes Final Salute after 44 Years of Dedicated Service,”](#) 10 March 2017.

132 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

133 The 12 Halifax class frigates were built by Saint John Shipbuilding in Saint John, New Brunswick (9 ships) and Marine Industries Ltd. in Sorel, Quebec (3 ships) between 1987 and 1996. The 12 Kingston class MCDVs were built by Halifax Shipyard in Halifax, Nova Scotia, between 1995 and 1999. Saunders, *Jane’s Fighting Ships 2016-2017*, pp. 104-107.

hand from the RN in 1998 and re-commissioned them into the RCN between 2000 and 2004, 13 to 17 years ago.¹³⁴

Efforts at recapitalization are not providing timely results to overcome an aging RCN fleet. While three new naval ship projects have been announced in recent years through the National Shipbuilding Strategy (Arctic/Offshore Patrol Ships, Joint Support Ships, and Canadian Surface Combatants) these vessels will not be commissioned until at least the 2020s, raising concerns about the current and future risks of reduced fleet capability as older ships are retired before new ones are ready.

Capability gaps are already being encountered by the RCN. The Iroquois class destroyers HMCS *Iroquois* and HMCS *Algonquin* were decommissioned in May and June 2015, followed by the Protecteur class supply ships HMCS *Protecteur* and HMCS *Preserver* in May 2015 and October 2016.¹³⁵ Their decommissioning left the RCN with no supply ships and only one destroyer (HMCS *Athabaskan*, which has since been decommissioned, in March 2017).¹³⁶ According to the RCN, the premature retirement of those ships has created a gap in command and control, air defence and at-sea replenishment capabilities. “The need to retire four of our ships before their replacements had arrived no doubt hurt us, from both a capacity and a capability standpoint,” Vice-Admiral Mark Norman, the former Commander of the RCN, admitted in his outgoing speech in July 2016. “This was out of necessity and certainly not by design or intent ... We now have a gap that urgently needs to be closed.”¹³⁷ In his view, the “situation” was “completely avoidable” and could have been mitigated if “tough decisions” related to risk management and the recapitalization of the RCN fleet not been repeatedly “put off” in “the interest of short-term expediency.” As a result, he explained, “the RCN has gotten notably smaller,” adding that there has been a 25% reduction in the afloat capacity of the fleet with acute losses in key warfighting capabilities, in particular Area Air Defence and underway sustainment.¹³⁸ This loss of capability to refuel and to defend against air attacks has decreased the readiness of the RCN.

134 The four Victoria submarines were built in the United Kingdom by Vickers Shipbuilding for the British Royal Navy as the Upholder class. The first submarine was ordered in 1983, followed by the other three in 1986. All four submarines were commissioned in the Royal Navy between 1990 and 1993, but all were laid up in 1994 as a result of post-Cold War defence budget cuts in the United Kingdom. The four submarines were re-branded as the Victoria class when they were purchased by Canada. Saunders, *Jane's Fighting Ships 2016-2017*, pp. 102-103.

135 DND, “[Royal Canadian Navy's Transition to the Future Fleet](#),” 19 September 2014; DND, “[The End of an Era](#),” 16 April 2015; DND, “[HMCS Iroquois Takes Final Salute After Nearly 43 Years of Dedicated Service](#),” 1 May 2015; “[HMCS Protecteur Concludes 46 Years of Service – Ceremony Held at CFB Esquimalt](#),” *Ottawa Citizen*, 14 May 2015; “[HMCS Algonquin Paid Off](#),” *CFB Esquimalt Lookout*, 15 June 2015; DND, “[HMCS Preserver Payed Off After 46 Years of Dedicated Service](#),” 21 October 2016; DND, “[No Sadness, Only Celebration: HMCS Preserver Paid Off After 46 Years](#),” 3 November 2016.

136 DND, “[HMCS Athabaskan Takes Final Salute after 44 Years of Dedicated Service](#),” 10 March 2017.

137 DND, “[Vice-Admiral Mark Norman – Haul Down Speech](#),” 21 July 2016.

138 Ibid.

As a result, Commander (Retired) Ken Hansen noted, the “Navy is now in transition” and “suffering from a poorly planned and executed renewal process.” As he explained:

Ship numbers and types, operational capabilities, and experience levels are unusually low. Old helicopters [CH-124 Sea King] provided by the RCAF, no sustainment ships, and retired destroyers have diminished the Navy to a local defence force. While it has added new capabilities to the frigates and the submarines, and new helicopters [CH-148 Cyclone] are very soon to arrive, the Navy is far less ready to engage in distant, long duration, and complex military operations.¹³⁹

Commander (Retired) Hansen holds the view that the RCN has “reasonable readiness and capabilities” to handle “local defence for short durations against a low-level threat” and is “capable of local operations and tasks supporting other government departments and agencies in the safety and security sphere,” but “will have great difficulty” contributing to “long-range, large capacity or high-intensity operations” with its reduced fleet. The fleet is simply too small to do so, he told the Committee. In his view, the RCN has ceased to be a “medium power global force projection navy” when it withdrew from service its Protecteur class supply ships, which provided the support, supply and sustainment logistics needed to conduct long-duration, long-range, high-intensity naval operations.¹⁴⁰ Michael Byers, professor of political science at the University of British Columbia, shared Commander (Retired) Hansen’s point of view. “We do not have a world-class navy,” he argued. “We have 12 beautiful, very capable, refitted frigates,” but the Victoria class “submarines are 30 years old” and the Kingston class MCDVs are about 20 years old and have been “deemed unworthy” of a mid-life refit. “That’s our navy right now,” he emphasized.¹⁴¹

Since the retirement of its supply ships and destroyers, the RCN has been working hard to close some of the capability gaps created by those losses. The complete loss of an at-sea replenishment capability has been particularly difficult on the RCN, which has been forced to rely on foreign navies for supply ship assistance (for example, through Mutual Logistic Support Arrangements, MLSAs, with the navies of Chile and Spain).¹⁴² In order to mitigate the command and control capability gap created by the retirement of the destroyers, the RCN has outfitted the first four of its recently-modernized Halifax class frigates with command and control equipment. However, according to Vice-Admiral Lloyd, the RCN will not be able to mitigate its long-range air defence capability gap “until the first Canadian Surface Combatants enter service around the middle of the next decade.”¹⁴³

139 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

140 Ibid.

141 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

142 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd). For more information on the Mutual Logistics Support Arrangements (MLSA) with the Chilean and Spanish navies, see DND, “[Backgrounder: Auxiliary Oiler Replenishment Capability](#),” 7 March 2016.

143 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

Mr. Byers echoed the importance of air defence capabilities, stating: “We don’t have any destroyers right now. We need that capability.”¹⁴⁴

According to the Naval Association of Canada, the loss of capabilities resulting from the recent retirement of the RCN’s destroyers and supply ships is not the least of its problems. The organization told the Committee that the Navy also faces a number of other capability gaps. At the request of the Committee, the Naval Association of Canada provided the following list of current maritime capability gaps faced by the RCN, which appear in no particular order of priority:

- No ability to generate remote, wide-area, persistent, real-time undersea surveillance of Canadian waters and approaches;
- Waning ability to generate focussed, local-area, 24/7, real-time undersea surveillance, at home and abroad;
- No ability to exercise sea control under the ice;
- Waning ability of surface combatants to conduct effective undersea control;
- Lost ability to independently provide adequate local air defence of naval ships deployed near or into harm’s way, owing to the forced de-commissioning of old air defence destroyers;
- Waning ability to be a meaningful NATO and U.S. partner in a tense or crisis situation at sea;
- Waning ability to provide meaningful leadership of allied naval operations in a tense or crisis situation;
- Lost ability to independently support naval combatants deployed far from home base, be it in Canadian, international or far-way waters, owing to the forced de-commissioning of old underway replenishment ships;
- No ability to defend against ballistic missiles which could target North America, especially those which might be fired from submarines;
- Lack of capacity to survey and / or clear port approaches if threatened by mines;
- Lost ability to conduct deep sea-bed diving and recovery operations (HMCS *Cormorant* was retired in 1997);

144 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

- Lost ability to conduct forward-looking, at-sea, defence-related research and experimentation (defence research vessel *Endeavour* was retired in 1999 and the last research vessel, *Quest*, has just recently been retired);
- Inadequate ability to operate in the littorals, especially in a threat environment abroad; and
- Little ability to support operations ashore from the sea.¹⁴⁵

According to the Naval Association of Canada, the RCN is a naval force in decline that faces significant capability gaps, mostly due to lack of funding and slow progress made with the recapitalization of its aging fleet. Vice-Admiral (Retired) Robertson was particularly concerned with the RCN's loss of capabilities and the long-term impact this will have on naval operations. "The Navy's capabilities and capacities have eroded steadily over the past 20 years," he noted, "increasingly compromising its ability to defend Canada or to act as a force for good abroad."¹⁴⁶

A regrettable observation is that over the last 20 years a succession of governments and eight parliaments have been unable to sustainably resource defence. The most clear sign of this has been that this G7 nation, with all its maritime interests at home and abroad, has seen its replenishment ships — two of them — and its destroyers —three [of them] — age into their mid-forties before being forced out of commission; not merely without relief, not with a gap, but without governments having even entered into contracts to build their replacements. The Navy's success of the last 20 years was due to investments in the fighting fleet that defended Canada made decades before ... The ability of this government and those that follow to live off these legacy investments is rapidly coming to a close.¹⁴⁷

As a result, he said, the RCN has a much smaller fleet today than it used to have 20 years ago and now has gaps in its "long-held capabilities." As he explained:

Canada no longer has the ability to independently control events at sea due to the loss of its task group air defence capability. It no longer has the ability to independently sustain deployed task forces abroad and must rely on others for at-sea refuelling and logistics support, even in our own home waters. Consequently, Canada is unlikely to be able to conduct a prolonged multi-rotation response to international events, nor is it likely to be offered the significant leadership opportunities at sea that such a response enables, particularly in complex operations of the kind we partake in repeatedly, including after 9/11 supporting our American allies for several years in the Middle East.¹⁴⁸

Vice-Admiral (Retired) Robertson believes that the situation will get worst, unless the federal government invests more money in the development of Canada's naval forces. In his view, increased investment in the RCN is the only way to avoid reduced fleet

145 Information provided by Jim Carruthers (President, Naval Association of Canada), "Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence," 24 October 2016.

146 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

147 Ibid.

148 Ibid.

capability in the future and ensure that the Navy can become, once again, a “balanced, multi-purpose, and combat-capable maritime force.” At “current budget levels,” he warned, “you can anticipate the RCN’s fighting fleet being further reduced over the coming 15 years ... toward a figure ... of just nine surface combatants, which would be a 40% cut from the 15 [originally planned], while the submarines and the air force’s maritime patrol aircraft will not likely be affordable and will not likely be replaced.”¹⁴⁹ This “much smaller and unbalanced future force,” he explained, “would consequently not be adequate to national need, especially given the rapid changes under way in the global maritime order.” This “smaller fleet” would not only make it more difficult for the RCN to “contribute meaningfully to continental and international operations,” it “would not be suitable or adequate for the vast challenge of defending our three-ocean home waters.”¹⁵⁰ Jim Carruthers, president of the Naval Association of Canada, concurred and went even further: “Any force that sees the termination of submarines or patrol aircraft, both of which provide crucial capabilities ... while also reducing overall capacity would be smaller and unbalanced to a degree that it would not be able to defend Canada at home or defend our interests abroad.”¹⁵¹ For Vice-Admiral (Retired) Robertson, “the question isn’t whether Canada will successfully build warships; we always have. The question is whether we’ll build warships with the capabilities and in the numbers required for the rising challenges” of the future.¹⁵²

Other witnesses expressed similar concerns. Navy Captain (Retired) Harry Harsch, for example, told the Committee that the Navy League of Canada is particularly concerned “with the steady erosion of the [RCN] fleet, in terms of both capabilities and numbers.” In his view, this is problematic from an operational perspective: “it seems that just as the number and complexity of operations involving naval forces, such as multi-functional and multinational operations conducted in support of UN mandates, are increasing, Canada’s ability to deal with them is waning as a result of reduced capacity.”¹⁵³ Like the Naval Association of Canada, the Navy League of Canada holds the view that Canada requires “a balanced, multi-purpose, and combat capable fleet ... to protect Canadian sovereignty and interests” at home and abroad.¹⁵⁴ “The readiness of our Navy is predicated on having a flexible fleet based on the right numbers and types of ships, with the right support networks and well-trained and experienced sailors and aviators who are provided with the right level of support,” emphasized Navy Captain (Retired) Harsch.¹⁵⁵ Commodore (Retired) Daniel Sing concurred. “Without the establishment and continuous maintenance of ready to deploy, ready to act, capable, and effective Canadian naval and maritime air forces, purposely designed to operate against current and future threats in Canadian,

149 Ibid.

150 Ibid.

151 Information provided by Jim Carruthers (President, Naval Association of Canada), “Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence,” 24 October 2016.

152 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

153 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Captain (Navy) (Retired) Harry Harsch).

154 Ibid.

155 Ibid.

international, and far-away waters,” he told the Committee, “Canada's intertwined national interests of peace and security and economic prosperity will be at risk.”¹⁵⁶

5. Recruitment and Training Issues

The RCN is also facing personnel recruitment and retention issues. According to Vice-Admiral Mark Norman, the former Commander of the RCN, the Navy has “seen alarming reductions in both [its] establishment and in [its] effective strength” in recent years.¹⁵⁷ These reductions were confirmed by his successor, Vice-Admiral Ron Lloyd. Asked what the “biggest challenge facing the Navy [is] right now,” Vice-Admiral Lloyd responded that it was “people.” The RCN, he explained, is “having challenges in terms of recruiting.”¹⁵⁸ This was confirmed by Rear-Admiral Art McDonald when he told the Committee that in “the last few years” the RCN has “faced a recruiting challenge,” adding that the Navy is “trying to address that now.”¹⁵⁹ The problem is evident with Naval Reserve recruitment. Although the official establishment of the Naval Reserve is fixed at approximately 5,000 members, Commodore Marta B. Mulkins, Commander of the Naval Reserve, told the Committee that the “current strength is closer to 3,100 right now.”¹⁶⁰

The RCN has also been having problems retaining personnel. “We were actually putting our sailors to sea too long,” Vice-Admiral Lloyd admitted, “We were putting them in a position of having to choose between their family and the Navy ... If I had to choose between the Navy or my family, I'd choose my family, so why should they be any different?”¹⁶¹ One problem identified pertained to “attach postings” and the high operational tempo over the past few years. As Vice-Admiral Lloyd explained:

In an attach posting, we take you from one ship and move you to another ship, or we take you out of your shore posting and send you to a ship that needs that skill set to go to sea. Some people had been attach-posted, or taken away from their family at short notice, up to five times. Once again, that's problematic.¹⁶²

Corrective measures have been implemented to help redress the recruitment and retention situation. The RCN has “instituted strategies to better recruit reservists, to better track ... sailor's sea/shore ratio, and to bring [the] training system into the 21st century,” Vice-Admiral Lloyd told the Committee.¹⁶³ The RCN is also modernizing its culture, tackling issues of conduct and behaviour within its ranks, including sexual misconduct. A new Code of Conduct for RCN men and women was recently released and is currently

156 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

157 DND, “[Vice-Admiral Mark Norman – Haul Down Speech](#),” 21 July 2016.

158 Beth Brown, “Taking the Helm: An Interview with VAdm Lloyd, the New Commander of the Royal Canadian Navy,” *Esprit de Corps*, Vol. 23, No. 8 (September 2016), p. 21.

159 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

160 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 9 February 2017 (Commodore Marta B. Mulkins).

161 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

162 Ibid.

163 Ibid.

being implemented.¹⁶⁴ “Our job ... is to make sure that the Navy is a rewarding career, make sure that sailors are valued, make sure that they can work and live in an harassment-free environment, make sure that their contributions are valued, and that their mobility upward through rank and challenge is assured by fair processes,” explained Rear-Admiral John Newton. “We are taking a number of steps to make sure that a career is manageable, that tempo isn’t too high, that training occurs at the right time for a person, that people aren’t posted too much, and that benefits are available to them for their deployments.”¹⁶⁵

Training is another challenge for the Navy, particularly now that there are capability gaps in the fleet. Naval forces need their personnel to practise their skills on a regular basis in order to remain fully operational. The recent loss of certain capabilities (for example, at-sea replenishment and air-defence capabilities) is creating hurdles for some naval personnel to practice their trades. In order to mitigate that problem, the RCN has made personnel exchange arrangements with allied navies in order for Canadian naval officers and non-commissioned members with certain key skills to obtain training and experience in spite of existing capability gaps.¹⁶⁶

The RCN is also moving forward with the largest revitalization of its training system in more than a quarter of a century.¹⁶⁷ The goal of the initiative was to design and develop a naval training system that “would be more cost-effective, relevant and capable of meeting the demands of the 21st century.”¹⁶⁸

Already, the Navy is seeing results from these efforts to improve the situation. Training times are seeing “reductions by as much as 30%,” Rear-Admiral McDonald explained to the Committee, enabling the Navy “to get sailors readied and employed faster, with a commensurate boost in enthusiasm and morale.”¹⁶⁹ Today, approximately 10% of RCN members are undergoing individual training on any given day. As Rear-Admiral McDonald told the Committee, “the efficacy and effectiveness of our individual training system is key to our readiness capacity.”¹⁷⁰

Several witnesses emphasized the importance of training and encouraged the RCN to continue investing in the high standard of training and professionalism of its personnel. According to Robert Huebert, it is largely because of the “flexibility that goes into the training and capabilities” of our naval forces that RCN frigates are permitted to be integrated into U.S. aircraft carrier battle groups and other naval battle formations, such as Combined Task Force 150 (CTF-150).¹⁷¹ Contributing to the RCN’s “ability to lead and be

164 Ibid.

165 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

166 DND, “[Backgrounder: REGULUS Program](#),” 7 March 2016.

167 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

168 DND, “[Background: Future Naval Training System](#),” 4 February 2016.

169 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

170 Ibid.

171 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

interoperable” with other naval forces on operations is the quality of Canadian sailors, Vice-Admiral Lloyd said, and this is largely attributable to the RCN’s high standards of training. “If our sailors are not the best in the world,” he added, “then they are amongst the best in the world.” He has every confidence that any mission assigned to the RCN will be executed to the highest standards by its sailors.¹⁷²

Every effort should be made to invest in training and to prepare Canadian sailors for the future fleet that will be built in the coming years, emphasized Robert Huebert and Andrea Charron.¹⁷³ The Committee heard how the RCN is planning to do just that. “Part of each of the major capital projects that are going to deliver over the next little while will have a significant training component delivered in there,” explained Rear-Admiral McDonald. “We’re now working to synchronize and are having the preliminary discussions with industry about what technologies we could take advantage of.”¹⁷⁴

6. The State of the Canadian Coast Guard

In Canada, the federal government maintains two sizeable fleets of ships, one civilian and one military. The military fleet is owned and operated by the RCN. The CCG, on the other hand, operates the civilian fleet. Each of these military and civilian fleets has its own roles and responsibilities, particularly in the area of national security. Whereas the “Navy operates a combat-capable, multi-purpose fleet to support Canada’s effort to participate in security operations around the world,” explained Mario Pelletier, the CCG’s Deputy Commissioner of Operations, “the Coast Guard operates a multi-purpose civilian fleet that supports economic prosperity while contributing to the safety, accessibility and security of Canadian waters.”¹⁷⁵

The CCG is a “Special Operating Agency” within the Department of Fisheries and Oceans (DFO).¹⁷⁶ It has a mandate for marine search and rescue, icebreaking, aids to navigation, marine pollution responses, and marine communications and traffic management, among other things. In contrast to the U.S. Coast Guard and other coast guards around the world, the CCG is not a branch of the armed forces, nor is it a paramilitary or law enforcement organization. Moreover, unlike many foreign coast guards, the CCG does not operate armed ships. This is unsurprising considering that the CCG does not have a direct mandate for maritime security, though it does support the RCN as well as other federal government departments and agencies that have a law enforcement and security mandate, particularly the CBSA, DFO, the RCMP and Transport Canada.¹⁷⁷ According to Mr. Pelletier, the CCG contributes to marine security by “providing ships and helicopters to security and law enforcement agencies, using ship surveillance systems and expertise to identify on-water threats in Canadian waters and [maritime] approaches, and

172 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

173 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron and Robert Huebert).

174 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

175 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

176 Canadian Coast Guard (CCG), “[Who We Are and What We Do](#).”

177 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson and Mario Pelletier).

collaborating with security partners to define priorities, identify gaps, and improve the domestic and international maritime security regime.” It also collaborates with security organizations through its participation in the MSOCs.¹⁷⁸

The CCG and RCN maintain a close working relationship.¹⁷⁹ The two organizations are in constant communication and regularly share information. Their ships and personnel also frequently work together at sea on everything from marine search and rescue to routine surveillance of Canadian waters, not to mention maritime security exercises and sovereignty patrols in the Arctic.¹⁸⁰

However, similar to the RCN, the CCG is facing problems of its own. The “Coast Guard has been going through a very deep dive in ... finances,” Jeffery Hutchinson told the Committee. “We’ve been in critical financial straits for several years now.”¹⁸¹ And the fleet has been suffering as a result.

The CCG fleet currently consists of 117 vessels,¹⁸² which includes 43 large ships, notably icebreakers, offshore patrol ships, and multi-tasked ships.¹⁸³ Unfortunately, many of those vessels are old and will need to be replaced in the coming years in order for the CCG to maintain certain capabilities.¹⁸⁴ The aging state of the CCG fleet was confirmed in the *Canadian Transportation Act (CTA) Review* report, which was submitted to the Minister of Transport in December 2015 and tabled in Parliament in February 2016.¹⁸⁵ The report noted that the CCG “fleet is one of the oldest in the world and urgently requires renewal (individual ships average nearly 34 years of age).”¹⁸⁶ It emphasized that more than 29% of the CCG’s large vessels were more than 35 years of age and approximately 60% of its small vessels were more than 20 years old. According to the report, approximately 88.6% of the large vessels and 48.6% of the small vessels of the CCG fleet require significant repairs and refurbishment.¹⁸⁷ Given these statistics, the report further noted: “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.”¹⁸⁸ The CTA Review report recommended that the federal government significantly

178 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

179 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

180 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson and Mario Pelletier).

181 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

182 Public Services and Procurement Canada (PSPC), [“National Shipbuilding Strategy: February 2012-December 2015 Status Report,”](#) 17 June 2016, p. 1.

183 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

184 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

185 Transport Canada, [“Canada Transportation Act Review – Report,”](#) 22 July 2016; [Pathways: Connecting Canada’s Transportation System to the World, Volume 1](#), December 2015, pp. 220–223, 230–231; [Pathways: Connecting Canada’s Transportation System to the World, Volume 2 – Appendices](#), December 2015, p. 228.

186 [Pathways, Volume 1](#), p. 222.

187 *Ibid.*, p. 221.

188 *Ibid.*, p. 222.

increase funding for the CCG to maintain its fleet and purchase new ships, particularly icebreakers.¹⁸⁹

According to Jeffery Hutchinson, the aging state of the CCG fleet is having an impact on Coast Guard operations. “We’re losing ship days because we have vessels out of service, and that makes ship maintenance a high priority,” he told the Committee.¹⁹⁰ What the CCG seeks, according to Mr. Hutchinson, is to become “financially stable.” It needs resources to do the recruitment and the training of its personnel and to maintain its ship, helicopters, and infrastructures, he emphasized. But above all, it needs more money to acquire new vessels and recapitalize its aging fleet.¹⁹¹

THE RECAPITALIZATION OF CANADA’S NAVAL FORCES

Key to the future readiness of Canada’s naval forces is the recapitalization of Canada’s Navy and Coast Guard. In recent years, the federal government has launched a number of ship projects to renew the aging fleets of the RCN and CCG, all of which are to be delivered through the National Shipbuilding Strategy (NSS) over the next three decades. This involves almost 40 large ships, ranging from science vessels and support ships to polar icebreakers and surface combatants. A number of small ships are also expected to be built in that period. The construction of the first large ships began in 2015. The CCG expects delivery of the first of its vessels in 2017 and the RCN in 2018. Shipyards in British Columbia, Quebec and Nova Scotia are all busy working on ship projects for the RCN and CCG, and no less than 492 companies across Canada have thus far received contracts and subcontracts related to the NSS.¹⁹² The NSS is not only helping renew the aging fleets of the RCN and CCG, it is also reviving Canada’s strategic naval industrial base.

1. The National Shipbuilding Strategy

Launched in 2010 by the federal government, the NSS (known as the National Shipbuilding Procurement Strategy, or NSPS, before March 2016)¹⁹³ is a continuous long-term shipbuilding plan to renew the fleets of the RCN and CCG over the next 30 years. The NSS is subdivided into three components: a large-ship construction program (ships of more than 1,000 tonnage displacement); a small-ship construction program (ships of less than 1,000 tonnage displacement); and a ship repair, refit and maintenance program.¹⁹⁴

189 Ibid., p. 231.

190 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

191 Ibid.

192 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Lisa Campbell).

193 PSPC, “[News about the National Shipbuilding Strategy: A New Name for the Strategy.](#)”

194 Martin Auger, [The National Shipbuilding Procurement Strategy: A Five-Year Assessment](#), Background Paper, Publication No. 2015-35-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 15 June 2015, pp. 1-21; Martin Auger, [Status Update on the National Shipbuilding Strategy Since June 2015 \(Revised\)](#), General Distribution Paper, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 29 November 2016, pp. 1-23.

The large-ship construction program is the largest and most expensive component of the NSS. It aims to deliver up to 38 new ships of more than 1,000-ton displacement to the RCN and CCG over the next decade. The RCN will receive about 60% of those vessels (23 ships) and the CCG 40% (15 ships). The large-ship construction program is subdivided into a combat package and a non-combat package. In 2011, the federal government selected Irving Shipbuilding's Halifax Shipyard of Halifax, Nova Scotia, and Seaspan's Vancouver Shipyards of Vancouver, British Columbia, to deliver the combat package and non-combat package, respectively. In 2012, the federal government signed umbrella agreements with the two selected shipyards to build large ships.¹⁹⁵ These are not contracts, explained Lisa Campbell, PSPC's Assistant Deputy Minister (Marine and Defence Procurement). These are long-term agreements that define the relationship between the Government of Canada and the shipyards for the next 20 to 30 years and set the parameters for the negotiation of ensuing contracts.¹⁹⁶ That being said, the federal government has awarded a number of contracts to the selected shipyards since the umbrella agreements were signed.¹⁹⁷ Below is a brief summary and status update of the various large combat and non-combat ships to be constructed by the two selected shipyards in the coming decades, based on testimony obtained from witnesses in the course of this study.

The combat package of the NSS currently consists of 21 ships for the RCN, to be built in Halifax:

- *Arctic/Offshore Patrol Ships (6 Ships of the Harry DeWolf Class)*

Construction of the first Arctic/Offshore Patrol Ship (AOPS), HMCS *Harry DeWolf*, commenced in September 2015,¹⁹⁸ followed by the second ship in August 2016.¹⁹⁹ The Committee was told that the production of the first two AOPS was well underway. The first ship is expected to be delivered to the RCN in 2018. According to Irving Shipbuilding, the sixth AOPS should be completed by the summer of 2022.²⁰⁰ The company told the Committee that there is going to be a production gap of about 18 months between the AOPS and Canadian Surface Combatants projects. Production work on the AOPS will "start to wind down" in the fall of 2019, Irving Shipbuilding explained, but construction of the Canadian Surface

195 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 2-4; Auger, *Status Update on the National Shipbuilding Strategy*, pp. 1-4.

196 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Lisa Campbell).

197 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 5-7; Auger, *Status Update on the National Shipbuilding Strategy*, pp. 4-6, 12-13; PSPC, ["National Shipbuilding Strategy: February 2012-December 2015 Status Report"](#), 17 June 2016, p. 4.

198 Irving Shipbuilding, ["Irving Shipbuilding Begins Construction of First Arctic Offshore Patrol Ships \(AOPS\) for Canada"](#), 1 September 2015.

199 Irving Shipbuilding, ["Statement from Irving Shipbuilding about AOPS Progress"](#), 7 September 2016.

200 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy).

Combatants is only expected to begin in 2021. The company is currently considering options to mitigate that production gap and avoid layoffs.²⁰¹

- *Canadian Surface Combatants (15 ships)*

The Canadian Surface Combatants (CSC) project will replace the RCN's fleet of Iroquois class destroyers and Halifax class frigates. The project is currently under development. Canada will select "an existing warship design to modify" rather than continuing with the "previous approach, which consisted of selecting a Warship Designer and a Combat Systems Integrator to work together to custom design the Canadian Surface Combatant."²⁰² A Request for Proposal to select an existing warship design and design team was released to industry in October 2016. The 12 companies that had already been prequalified for the now-cancelled Warship Designer and Combat Systems Integrator competitions have been invited to submit proposals. The federal government expects the Canadian Surface Combatants design to be selected by the summer of 2017.²⁰³ It is anticipated that Irving Shipbuilding and the selected design team will begin working together in the fall of 2017.²⁰⁴ Rear-Admiral (Retired) Patrick Finn believes that the Canadian Surface Combatants build contract will be awarded in 2019.²⁰⁵ Construction of the warships is expected to begin around 2021²⁰⁶ and to last until the 2040s.²⁰⁷

The non-combat package consists of 17 ships for the RCN and the CCG, all of which are to be built in Vancouver:

- *Offshore Fisheries Science Vessels (3 ships for the CCG)*

Construction of the first Offshore Fisheries Science Vessel started in June 2015,²⁰⁸ followed by the second vessel in March 2016.²⁰⁹ Seaspan told the Committee in February 2017 that the first ship was about 65% complete with the second one approximately 20% to 25% complete.²¹⁰ Construction of the third ship commenced

201 Ibid.

202 Government of Canada, "[News Release: Government Announced Streamlined Procurement Approach to Accelerate Delivery of Canadian Surface Combatant Vessels](#)," 13 June 2016.

203 Government of Canada, "[News Release: Competitive Process Launched to Select Design of Canadian Surface Combatant](#)," 27 October 2016; PSPC, "[Speaking Notes for National Shipbuilding Strategy Technical Briefing on Canadian Surface Combatant Request for Proposal](#)," 27 October 2016.

204 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy).

205 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

206 PSPC, "[National Shipbuilding Strategy: February 2012-December 2015 Status Report](#)," 17 June 2016; NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy).

207 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

208 Seaspan, "[Seaspan's Vancouver Shipyards Celebrates Start of Construction on First NSPS Vessel](#)," 24 June 2015.

209 Seaspan, "[News Release: Seaspan's Vancouver Shipyards Starts Construction on Second Offshore Fisheries Science Vessel \(OFSV\)](#)," 29 March 2016.

210 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

that same month.²¹¹ The company maintains that it is committed to delivering the first ship to the CCG in 2017, with the two others in 2018.²¹²

- *Offshore Oceanic Science Vessel (1 ship for the CCG)*

In February 2017, Seaspan told the Committee that “planning, engineering, and long-lead equipment purchasing are ongoing” for this project, adding that the contract for “basic design development” was signed with the federal government in December 2016.²¹³ According to the company, there will be a “short-term gap” of about 10 months between construction of the Offshore Fisheries Science Vessels and the Offshore Oceanic Science Vessel.²¹⁴

- *Joint Support Ships (2 Ships of the Queenston Class, with the option of a third, for the RCN)*

The Joint Support Ships (JSS) will replace the RCN’s two Protecteur class supply ships, which were decommissioned in 2015 and 2016. The JSS design is based on “a mature German design, the Berlin class” of support ships, Rear-Admiral (Retired) Finn told the Committee.²¹⁵ Work is currently underway to finalize the design and get everything ready for production at Seaspan.²¹⁶ This work not only entails bringing the “design to a production-ready state,” Rear-Admiral (Retired) Finn explained, but also acquiring “all of the material and long lead items” so that “when we sign the build contract, there’s no delay.” In his opinion, the signing of that contract is about 12 to 14 months away.²¹⁷ While Seaspan is planning to begin construction of the first JSS sometime in late 2018,²¹⁸ Rear-Admiral (Retired) Finn expects the cutting of steel to start in 2019.²¹⁹ DND expects the first ships to be delivered about 36 months later. According to the latest schedule, the two JSS are expected to be delivered in 2021, with the first ship at the beginning of the year and the second one at the end. According to Jonathan Whitworth, Seaspan’s Chief Executive Officer, the JSS will be “the largest ships ever built in western Canada.”²²⁰ No decision has yet been taken with regards to a third JSS. “We’re still in the world of two with an option for a third,” Rear-Admiral (Retired) Finn said,

211 Seaspan, “[Minister LeBlanc Oversees Progress on National Shipbuilding Strategy](#),” 16 February 2017.

212 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

213 Ibid.

214 Ibid.

215 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

216 Seaspan, “[Government Takes Final Step before Building Joint Support Ships](#),” 28 February 2017.

217 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

218 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

219 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

220 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

adding that it is up to the RCN and DND to decide “what it is they want to invest in next.”²²¹

- *Polar Icebreaker (1 ship for the CCG)*

Work on the Polar Icebreaker, the CCGS *John G. Diefenbaker*, will begin after the JSS project.²²² It is not known at this stage when exactly construction of the ship will begin, but it is expected to be delivered to the CCG around 2021.²²³ According to the CCG, the Polar Icebreaker will be able to operate “everywhere in the Canadian Arctic at all times, even in December or January.”²²⁴

- *Medium Endurance Multi-Tasked Vessels (5 ships for the CCG)*

- *Offshore Patrol Vessels (5 Ships for the CCG).*

Seaspan told the Committee that the two above-mentioned ship projects will follow the Polar Icebreaker. “This program and the vessel concept or concepts are still under discussion between Seaspan” and the CCG, the Committee was told by Mr. Whitworth.²²⁵ However, according to Jeffery Hutchinson, the CCG is planning to combine those two ship projects into a single ship project, which is “already funded” and referred to as the “new class.” The CCG is “seeking to design perhaps one of the most capable coast guard vessels yet to be built” under that project, Mr. Hutchinson explained. The new vessels will be “icebreaking-capable” and will be used for a wide range of tasks, including aid to navigation, pollution control, emergency response, and towing. This ship project, the Committee was told, will take the CCG “shipbuilding program into the mid-2020s.”²²⁶

Over the past five years, Halifax Shipyard and Vancouver Shipyards have been actively engaged in the process of upgrading, expanding and preparing their facilities for production.²²⁷ Irving Shipbuilding told the Committee that it has invested over \$360 million “to construct state-of-the art facilities with the best equipment” available to manufacture warships for the RCN in Halifax.²²⁸ This includes a \$260 million non-repayable loan from the provincial government of Nova Scotia to upgrade the company’s shipbuilding

221 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

222 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

223 PSPC, “[National Shipbuilding Strategy: February 2012-December 2015 Status Report](#),” 17 June 2016.

224 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

225 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

226 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

227 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 1-5.

228 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (James D. Irving).

facilities.²²⁹ Likewise, Seaspan indicated that it has spent \$170 million of its “own money” on shipyard infrastructure in Vancouver.²³⁰

Great efforts have also been invested by the two companies in the recruitment of skilled workers and the expansion of their workforces.²³¹ Training has also been a priority at both Halifax Shipyard and Vancouver Shipyards. Irving Shipbuilding and Seaspan both told the Committee that they have made arrangements with local technical colleges and universities to train their workforces. They have also set up special training programs within their own facilities to train workers in specialized trades.²³²

As a result of these above-mentioned investments in infrastructure and personnel, Halifax Shipyard and Vancouver Shipyards commenced construction of the first ships to be built under the NSS large-ship construction program in 2015.²³³ Work on those ships is progressing and hundreds of companies across Canada, many of them small and medium enterprises, are benefiting from it through subcontracts.²³⁴

The NSS is contributing to the resurgence of the shipbuilding and marine industry in Canada and providing work to businesses from coast to coast. PSPC reported in June 2016 that the federal government had awarded almost \$4.4 billion-worth of NSS contracts to the Canadian shipbuilding and marine industry between February 2012 and December 2015.²³⁵ As Christyn Cianfarani, president of the Canadian Association of Defence and Security Industries (CADSI), a national organization that represents the interest of more than 800 defence and security companies across Canada, explained, the “economic impact stands to grow as new contracts are signed.” She pointed out that the total through-life estimated cost of the NSS large-ship construction program, which includes ship acquisition costs as well as personnel, operations, in-service support and maintenance costs over 25 to 30 years, is believed to be worth more than \$111 billion. This figure does not include estimated through-life costs associated to the small-ship construction program and to the ship repair, refit and maintenance program of the NSS over the same time period.²³⁶

Many witnesses who appeared before the Committee in the course of this study spoke of the NSS as a sound plan to recapitalize the RCN and CCG fleets and to revitalize

229 Government of Nova Scotia, “[Province Invests in Jobs, Infrastructure, and Training Through Shipbuilding Contracts](#),” 30 March 2012; “[Shipbuilding Loan Waived if Irving Creates 4,000 Jobs](#),” *CBC News*, 15 March 2013.

230 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

231 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy and Jonathan Whitworth).

232 Ibid.

233 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 1-5.

234 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy and Jonathan Whitworth).

235 PSPC, “[National Shipbuilding Strategy: February 2012-December 2015 Status Report](#),” 17 June 2016, p. 4.

236 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani). For a breakdown of the \$111 billion estimated through-life costs of the NSS large-ship construction program as well as the estimated costs of the small-ship construction program and the ship repair, refit and maintenance program of the NSS, see Auger, [The National Shipbuilding Procurement Strategy](#), pp. 9-11.

the Canadian shipbuilding and marine industry. They believed that the federal government should stay the course with the NSS. CADSI, for example, “fully supports the principle and objectives of the NSS,” noted Ms. Cianfarani. In her view, Canada should “stick to” the NSS, which brings “predictability to federal vessel procurement” and an “end the boom-and-bust cycles that have characterized Canadian shipbuilding in the past.”²³⁷

Similar points of view were expressed by other witnesses. Asked if the federal government should stay the course with NSS, Joel Sokolsky said “yes.” David Perry provided the same answer, emphasizing that the NSS was “a good idea in principle.” So did Michael Byers, who believed that Canada should continue with the NSS and “stay tightly focused,” resisting the “temptation to politicize” the strategy and “to turn this into a large-scale industrial boondoggle.”²³⁸ Representatives of Irving Shipbuilding and Seaspan were also of the opinion that the NSS was a sound shipbuilding plan. The “NSS is the right strategy,” noted Jonathan Whitworth. It is “building ships, rebuilding an industry, and creating jobs and economic activity across the country.”²³⁹ Likewise, Commodore (Retired) Eric Lerhe spoke of the NSS as a sound “continuous shipbuilding program” to eliminate boom and bust cycles in the shipbuilding industry. In his view, Canada needs to maintain course with the strategy, regardless of the time it takes. He reminded the Committee of the 19-year gap in naval shipbuilding that existed in Canada, from the end of the Canadian Patrol Frigate program in 1996 to the start of construction of the Arctic/Offshore Patrol Ships in 2015, and how few shipbuilding companies survived those “years of drought.” The industry had to rebuild capabilities, he emphasized, and this takes time.²⁴⁰

2. Naval Procurement Challenges

Many witnesses believed that the NSS could be improved. According to Spencer Fraser of Federal Fleet Service (FFS), the NSS “needs reform.” In his view, “if we don’t see reform in our shipbuilding policy, our naval readiness will continue to be challenged” by cost overruns and delays in the construction and delivery of much needed ships.²⁴¹

All of the RCN ship projects covered under the large-ship construction program of the NSS have been plagued with delays over the years. Mr. Fraser, in particular, referred to the Joint Support Ships project as a case in point.²⁴² The original Joint Support Ships project – which was announced in 2006 and called for three ships – was terminated by Public Works and Government Services Canada (PWGSC) in August 2008 on the grounds that the proposals received were not compliant with the Request for Proposal (the bids exceeded the budget provisions).²⁴³ DND revised the Joint Support Ships project,

237 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

238 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers, David Perry, and Joel Sokolsky).

239 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

240 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

241 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

242 Ibid.

243 DND, “[Canada First Defence Procurement – Joint Support Ship](#),” 26 June 2006; Public Works and Government Services Canada (PWGSC), “[Bidders fail to Meet Budget Requirements](#),” 22 August 2008.

which was re-launched in July 2010. The new program now called for two ships with an option for a third.²⁴⁴ The first JSS is now scheduled to be delivered in 2021 (instead of 2012, the delivery date set out when the original project was announced in 2006), representing a nine year delay.²⁴⁵ The delivery of the Arctic/Offshore Patrol Ships project has also been delayed by five years. The first ship was originally scheduled to be delivered in 2013 with project completion by 2019.²⁴⁶ The first ship is now scheduled to be delivered in 2018 with project completion set for 2024.²⁴⁷ Similar delays have been encountered with the Canadian Surface Combatants project. According to the original schedule, all 15 warships were to be delivered between 2021 and 2037.²⁴⁸ Today, construction of the first ship is only set to begin in the early-2020s²⁴⁹ with deliveries occurring between the mid-2020s and the early-2040s.²⁵⁰

Each of the RCN ship projects have also faced cost overruns over the years. As a case in point, the total through-life estimated cost of the Joint Support Ships project over a period of 25 years jumped from \$2.9 billion for three ships in 2006²⁵¹ to \$7.1 billion for two ships, with an option to procure a third, by 2015.²⁵² Similarly, the total through-life estimated cost of the Arctic/Offshore Patrol Ships project over 25 years jumped from approximately \$7.4 billion for six to eight ships in 2007²⁵³ to \$9.0 billion for six ships in 2015.²⁵⁴

Cost overruns and delays have also been encountered with CCG ship projects, as Mr. Fraser told the Committee.²⁵⁵ Between fiscal years 2014-2015 and 2015-2016, for

244 DND, "[Government of Canada to Acquire New Joint Support Ships](#)," 14 July 2010; DND, "[Canada Begins Joint Support Ships Procurement for the Canadian Forces](#)," 14 July 2010.

245 DND, "[Table 9: Status Report on Major Crown Projects for Fiscal Year 2006–2007](#)," *Departmental Performance Report 2006–2007*; NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

246 DND, "[Table 5: Status Report on Major Crown Projects](#)," *Departmental Performance Report 2007–2008*.

247 DND, "[Status Report on Transformational and Major Crown Projects](#)," *Report on Plans and Priorities 2017-18*.

248 DND, "[Status Report on Transformational and Major Crown Projects](#)," *Report on Plans and Priorities 2011-2012*.

249 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy).

250 DND, "[Status Report on Transformational and Major Crown Projects](#)," *Report on Plans and Priorities 2017-18*.

251 This included \$2.1 billion in acquisition cost and \$800 million in in-service support costs over 20 years. DND, "[Table 9: Status Report on Major Crown Projects for fiscal year 2006–2007](#)," *Departmental Performance Report 2006–2007*; DND, "New Release: Canada First Defence Procurement – Joint Support Ship," 26 June 2006; DND, "Backgrounder: Canada First Defence Procurement – Joint Support Ship," 26 June 2006.

252 This included \$2.6 billion in acquisition costs and \$4.5 billion in personnel, operations, in-service support, and maintenance costs over 25 years. Auger, [The National Shipbuilding Procurement Strategy](#), p. 10.

253 This included \$3.1 billion in acquisition cost and \$4.3 billion in personnel, operations, in-service support and maintenance costs over 25 years. DND, "[Table 5: Status Report on Major Crown Projects](#)," *Departmental Performance Report 2007–2008*; DND, "[Arctic/Offshore Patrol Ships](#)," 10 July 2007.

254 This included \$3.5 billion in acquisition cost and \$5.5 billion in personnel, operations, in-service support and maintenance costs over 25 years. Auger, [The National Shipbuilding Procurement Strategy](#), p. 10.

255 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

example, the estimated acquisition cost of the Offshore Fisheries Science Vessels was increased from \$244 million to \$687 million.²⁵⁶ Similarly, when the Polar Icebreaker project was announced in 2008, the ship was expected to be delivered in 2017 at an estimated cost of \$720 million.²⁵⁷ However, the delivery date had been pushed back to fiscal year 2021-2022 and the cost of the project increased to \$1.3 billion by 2015.²⁵⁸

It should be noted that the costs of most of the large-ship projects of the NSS are currently under review by PSPC and are expected to be increased in the near future.²⁵⁹ As Christyn Cianfarani told the Committee:

It's now conventional wisdom that those initial estimates, conducted in good faith years ago, are in need of upward adjustments. Warship inflation alone, which runs at 9% to 11% in the United States, has increased these numbers substantially. Furthermore, as any business person knows, the real cost of programs this complex becomes clear only when you get close to design and build, which we're only getting to right now in the project ... Going forward, the government should be flexible to adjust cost estimates over time, as assumptions alter due to changing variables. Neither industry nor government have much control at all over the price of steel, foreign exchange rates, or any other input cost variables, and certainly not the pace of technological advancement. These costs alone will have changed since the outset of the project.²⁶⁰

It is also important to note that there is no international standard for costing naval ships, making it hard to adequately compare naval shipbuilding costs in Canada with those in other countries. "There has always been confusion in ship costing terminology, a fact exacerbated by the inability or unwillingness of states to provide complete cost data on their warship acquisition," wrote Commodore (Retired) Eric Lerhe in a 2016 report on Canadian warship building costs. The fact is that countries include and/or exclude different things in their costing models. Commodore (Retired) Lerhe noted that although "many Western navies have adopted or partially adopted the NATO costing conventions contained in *Allied Naval Engineering Publication (ANEP) 41 – Ship Costing*," which was developed to "serve as a reference document to enable comparison of costs between nations," evidence indicates that there are still variations in naval ship costing between those navies.²⁶¹

Many of the witnesses heard in the course of this study believed that the RCN and CCG may not be able to purchase all of the ships they require for their future fleets if current naval procurement budgets are not increased. "The single biggest ... problem ... is

256 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 10-13.

257 Office of the Prime Minister, "[PM Announces New Polar Class Icebreaker Project to be Named after Former PM John G. Diefenbaker](#)," 28 August 2008.

258 Auger, [The National Shipbuilding Procurement Strategy](#), pp. 10-14.

259 PSPC, "[National Shipbuilding Strategy: February 2012-December 2015 Status Report](#)," pp. 6-8.

260 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

261 Eric Lerhe, [Fleet-Replacement and the 'Build at Home' Premium: Is It Too Expensive to Build Warships in Canada?](#), Conference of Defence Association Institute, July 2016, p. 4-5.

an inadequate supply of funding to recapitalize,” noted Commodore (Retired) Eric Lerhe.²⁶² David Perry agreed:

The shipbuilding file is of critical defence and industrial importance. It's a multi-decade program of work, worth at least \$40 billion just in the acquisition stage alone, and well over \$100 billion overall, depending on what time horizon you want to pick ... Despite this ... it's being managed as a group of individual projects and it's being resourced with what seems to be a penny-wise, pound-foolish approach that's treating this file just like any other matter of routine public administration ... One issue that needs to be handled better, in particular, is the cost ... It's known to be insufficient ... There are insufficient funds available to acquire the capabilities needed to deliver on existing defence policy and maintain the same basic type of navy that we have today.²⁶³

One key area of concern identified by witnesses pertained to the financial costs of the RCN's Canadian Surface Combatants, the largest and most expensive project currently pursued under the NSS. Most of them agreed that the estimated acquisition cost of \$26.2 billion for 15 Canadian Surface Combatants, plus another \$64 billion in estimated personnel, operations, in-service support and maintenance costs over 25 years,²⁶⁴ was inadequate and should be much higher. “I don't know anybody who is involved in the file who thinks we are going to get 15 [Canadian Surface Combatants] ... for a project budget of \$26.2 billion, regardless of what we do,” David Perry told the Committee. “So either that number changes or the allocation changes or we build something different ... We're not going to have 15 surface vessels unless that project budget changes somehow.” In his view, this is a sign of the need to “align the overall financial” resources allocated to the NSS.²⁶⁵

Other witnesses shared Mr. Perry's concerns. Although Commodore (Retired) Eric Lerhe believed that the National Shipbuilding Strategy should “live within its means,” he urged the federal government “to make sure that [the RCN] get[s] something in the range of 15 ships.”²⁶⁶ According to James Boutilier, 15 Canadian Surface Combatants should be the bare minimum. He pointed out that this was actually less than the number of major surface combatants that the RCN possessed at the dawn of the 21st century, which was 16 (4 Iroquois class destroyers and 12 Halifax class frigates). “My anxiety ... is that frankly we are going to run out of money long before we get to 15,” James Boutilier shared with the Committee, adding that Canada “should be looking really more at 18 or 19 surface vessels.”²⁶⁷ In the view of most witnesses, there should be no compromises with the Canadian Surface Combatants fleet. They believe that the RCN requires a minimum of 15 to replace its destroyers and frigates and the federal government should stand ready to pay the bill.

262 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

263 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

264 Auger, [The National Shipbuilding Procurement Strategy](#), p. 10.

265 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

266 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

267 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

Lisa Campbell of PSPC reassured the Committee that the number of ships to be built through the NSS “has not changed at all,” and this would include the Canadian Surface Combatants. She emphasized that “those capabilities are still required” by the RCN and the CCG.²⁶⁸

However, regardless of the outcome, witnesses agreed that there should be better communication with the Canadian public about progress made with the NSS and how shipbuilding costs really function. James Boutillier, in particular, noted that the federal government has “failed abjectly” to “explain to the public what through-life accounting constitutes.” There should be better explanation of why the federal government does not only take into account the acquisition cost of a warship, aircraft, tank or other military hardware, but also takes into consideration the full-life cycle costs of those products over a 25 to 30 years period when it calculates the overall cost of defence procurement projects, which, of course, can make things look quite expensive, especially in the case of naval vessels. “I always say it's like buying a Honda Civic and being charged a third of a million dollars for it because you're calculating the value of your time behind the wheel 40 years from now,” Mr. Boutillier explained. In his view, “it really is incumbent upon” the federal government to “explain much more clearly why frigates cost billions” and why it is calculating the costs of “very complex weapon systems ... over a very long period of time.”²⁶⁹

3. Mitigating Capability Gaps

The decommissioning of the RCN's two *Protecteur* class supply ships in 2015 and 2016 before any replacements (i.e. Joint Support Ships) were available has generated an important at-sea replenishment capability gap within the Navy. It is clear that the RCN would not be in the current situation had the Joint Support Ships project, which had been originally launched more than 10 years ago, not been repeatedly delayed over the years or had HMCS *Protecteur* not been heavily damaged beyond repair by an engine room fire in 2014. The problem has forced the federal government to consider interim options to mitigate the Navy's at-sea replenishment capability gap until delivery of the Joint Support Ships in 2021, whose construction is only expected to begin next year, in 2018.

With that in mind, in November 2015, the federal government announced it had signed a \$587 million contract with Federal Fleet Services (FFS) to provide an interim Auxiliary Oil Replenishment (AOR) capability to the RCN in the coming years, pending delivery of the Joint Support Ships. The stop-gap project entails the conversion of a commercial container ship (MV *Asterix*) into an interim AOR ship at the Davie shipyard in Quebec City, Quebec, which will be leased to the RCN. The resulting Resolve class interim AOR vessel will be owned by FFS, which will provide at-sea services to the RCN. The “initial period of service delivery will be five years, with options to extend the period of

268 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Lisa Campbell).

269 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

service by up to five additional one-year periods.”²⁷⁰ In sum, the ship will be made available to the RCN for a period of 10 years through a public/private partnership. According to FFS, the federal government “possesses an option to buy the ship at the end of the 10 years.”²⁷¹

The Resolve class interim AOR ship conversion work began at the Davie shipyard in May 2016.²⁷² According to Alex Vicefield, Chairman of Chantier Davie Canada Inc., the process is not that complex. It literally implies “taking out the container holds” and “putting in tanks for fuel and accommodation,” he explained, adding that “It’s a lot of work in terms of some of the parts,” but nothing critical. The original engines will be kept in the ship.²⁷³ Mr. Vicefield told the Committee that as of January 2017 the project was “running 15% ahead of schedule” and the conversion work was “about 68% complete.” He said that Davie was on track to deliver the ship in September 2017.²⁷⁴ According to Spencer Fraser, Chief Executive Officer of FFS, there are approximately 550 people working directly on that project at Davie. The numbers vary from months to month, according to the work being done. FFS, on the other hand, is in the process of hiring the 100 people who will make up the ship’s crew.²⁷⁵

Converting commercial vessels for naval operations is not new. The U.K. and the U.S. have both done it in the past. “It’s innovative for Canada, and it’s an innovative thing to convert to an AOR,” noted Mr. Vicefield, “but to actually convert a commercial vessel for naval use is nothing new.”²⁷⁶ Mr. Fraser called the interim AOR project “the most commercially innovative naval program that Canada has ever executed.” As he explained:

It’s a fast-tracked, privately financed, and cost-effective solution. We simply don’t get paid a cent until we deliver and the price is fixed. It’s an entirely new way of procuring ships whereby the contractor takes the entire risk of delivering the capability to the Navy, a system that is scalable and can be adopted for all of Canada’s auxiliary and non-combat fleet.²⁷⁷

“This is not a typical ... shipbuilding program,” added Mr. Vicefield. “The interesting thing here ... is that we take the entire risk of this program. The government doesn’t pay us a dollar for the ship until we deliver it. We’ve privately financed the actual delivery of the ship, and then we will lease it to the government.”²⁷⁸ That being said, there are penalties if

270 Government of Canada, “[Equipping the Navy with an Interim Auxiliary Oil Replenishment Capacity](#),” 30 November 2015. See also PSPC, “[National Shipbuilding Strategy: February 2012-December 2015 Status Report](#).”

271 Federal Fleet Services (FFS), “[Resolve Class AOR](#),” 2016.

272 Davie, “[Davie Shipbuilding Marks the Steel Cutting for First Resolve-Class AOR with a Major Celebration](#),” 24 May 2016; FFS, “[First Cutting of Steel for the Resolve-Class AOR](#),” 24 May 2016.

273 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

274 Ibid.

275 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

276 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

277 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

278 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

Davie and FFS do not deliver the ship on time. If such a case were to transpire, Mr. Vicefield explained, the “contract states that the lease period would be reduced by the equivalent number of days to the days we would be late.” But he was confident that there would be no delays, reiterating the fact that the project was 15% ahead of schedule.²⁷⁹

FFS expects to begin providing services to the RCN in September 2017.²⁸⁰ The RCN is looking forward to integrating that ship into its fleet, Vice-Admiral Lloyd told the Committee. The Navy expects to start deploying the Resolve class interim AOR on naval operations by the end of 2017.²⁸¹ It should be noted that some RCN personnel are expected to serve aboard the ship. The Committee was told that the ship will be “crewed, steered, and the engines maintained and so on” by the FFS team, but the “Navy will do all the deck operations,” such as conducting replenishments at sea.²⁸²

According to Mr. Spencer, Canada’s Resolve class interim AOR ship project is a success story and is already attracting the attention of foreign naval forces. He said that three undisclosed allied nations are “looking at” the project and have expressed interest in acquiring this capability.²⁸³

Many witnesses supported the federal government decision to contract Davie and FFS to provide an interim AOR capability to the RCN. According to Michael Byers, it was the “correct decision” to take in order to close the Navy’s at-sea replenishment capability gap.²⁸⁴

4. Prioritizing the Canadian Surface Combatants

Notwithstanding these efforts, some witnesses indicated that they would like to see further progress made with the Canadian Surface Combatants project in particular, the most expensive and most complex listed in the NSS. It should be noted that combat ships such as the Canadian Surface Combatants are significantly more complex to build than non-combat ships.²⁸⁵ Efforts and costs invested in warships are typically 60% weapons and systems and 40% hull construction and outfitting.²⁸⁶ By contrast, the figures for non-combat ships are usually fixed at 20% systems and 80% hull construction.²⁸⁷

279 Ibid.

280 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

281 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

282 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

283 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

284 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

285 John Brikler, Denis Rushworth, James Chiesa, Hans Pung, Mark Arena, and John Shank, [Differences between Military and Commercial Shipbuilding](#), RAND Corporation, 2005, pp. 20–90.

286 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

287 Secretary of State for Defence (United Kingdom), [Defence Industrial Strategy](#), December 2005, p. 73.

While most witnesses agreed that the Canadian Surface Combatants project needs to be expedited, a number of witnesses commented on the type of capabilities that those warships will need to have. According to Vice-Admiral (Retired) Drew Robertson, these warships will need to be at the cutting-edge of naval technology. It is important that these warships be “ready to deal with the challenges of not just today but of the future as well,” he explained. He pointed to the fact that the Canadian Surface Combatants will be “built 7 [to] 10 years from now” and “will not be modernized until mid-life.” What is required is “not simply a replacement of one capability in the outgoing ships with the same one, but something looking to the challenges of the future.” Whatever “exists today has to be extrapolated to what the threat will be a decade-plus hence.”²⁸⁸ In Michael Byers’s opinion, Canada should acquire the best technology available for the Canadian Surface Combatants: “We do need new surface combatants. Let’s make sure they’re good, well-equipped, high-technology surface combatants that can participate in combat situations in 20 or 30 years. Don’t compromise on these vessels.”²⁸⁹ As a case in point, the Canadian Surface Combatants will require up-to-date software and hardware systems capable of resisting to the latest cyber threats. As Stephen Burt pointed out, China, Russia and other potentially hostile nations are known to possess cyber capabilities that can affect warships at sea, and those capabilities will probably be more sophisticated in the future. In his view, it will be imperative that the systems aboard the Canadian Surface Combatants be as resilient as possible and that the ship be capable of defending itself against cyber-attacks.²⁹⁰

As Commander (Retired) Ken Hansen explained, because producing a sophisticated, state-of-the-art warship will be costly, difficult choices will have to be made in the coming years with regard to certain new and emerging technologies and whether or not they should be embedded in the design. “The cost for technologies that are coming is going to be breathtakingly high,” he told the Committee. “We’re talking about things now like charged particle laser weapons, robotic drone swarms, and anti-ballistic missile defence systems. The cost of these things is so prohibitively high that they cannot be afforded as a common standard of capability.”²⁹¹

Still, Commander (Retired) Hansen would like to see the following key capabilities imbedded in the Canadian Surface Combatants:

I’m looking for a ship that has a fairly good size and what’s called low design density. The more complexity you pack into the hull, the higher the complexity goes, which makes it more expensive to maintain, repair, and upgrade. I want a fairly big ship that’s got reserve space for future expansion and one that can exploit this concept of modular technology, so that you could improve it without taking the whole ship out of service ... I’m looking for an out-of-the-box solution when it comes to the future combat ship.²⁹²

288 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

289 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

290 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

291 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

292 Ibid.

Some witnesses also encouraged the RCN to incorporate modularity into the Canadian Surface Combatants. Commander (Retired) Hansen defined modularity as the ability to reconfigure a warship for various missions by “load[ing] capability [i.e. modules] in and out of a common frame [i.e. standardized ship hull].” Each module is adapted for specific missions (for example, mine warfare or anti-submarine warfare) and outfitted with different equipment and weapon systems. In his view, modularity results in cost savings and represents the future in warship design and construction. The “modules are what’s expensive and what is valuable,” he emphasized. “The hull of the ship itself is not.” He pointed to the Danish shipbuilding industry as an example in the field of warship modularity: “The Danes are very smart when it comes to modularity, using best commercial practices and standards for engineering. They are able to cut costs quite significantly ... and [achieve] flexibility.”²⁹³ Robert Huebert agreed, pointing out that other Scandinavian countries have incorporated modularity into their navy and coast guard ships. As a case in point, he noted that the Norwegians “can make their coast guard vessels the equivalent of a naval combatant by the usage of modularity in terms of missile systems, torpedo systems, and so forth.”²⁹⁴

In order to accelerate delivery, Michael Byers and other witnesses encouraged the federal government to make the procurement process less complicated, and reduce costs by pursuing off-the-shelf solutions. In particular, he saluted the federal government’s decision to buy a foreign “off-the-shelf warship design for the Canadian Surface Combatants and encouraged it to “stick with [its] plan.” “Do not let industrial lobbies in Canada take you in a different direction,” he warned the Committee. “That’s how you get ships fast. That’s how you get money out the door.”²⁹⁵ In his view, Canada should avoid “Canadianizing” the design.

In his opinion, “Canadianizing” an off-the-shelf design would only complicate the process and possibly “stretch the procurement for additional unnecessary years,” forcing compromises in terms of some of the capabilities to be imbedded in those vessels. “This could turn into a disaster.”²⁹⁶

For his part, David Perry urged caution, arguing that there is no such thing as off-the-shelf in the realm of warships:

The whole idea about off-the-shelf or developmental is a false dichotomy, I think. Those things don't exist in reality. As far as I'm aware, other than boots and socks, the only thing we've bought off-the-shelf, in terms of a big project, has been the C-17. Everything else is a kind of degree of developmental, degree of modification, so it's about doing it wisely, being conscious about what trade-offs you're making, because it won't go as fast and will introduce more risk, but the other side would be that you could get either/or a requirement more closely aligned to what the Navy needs as well as more Canadian

293 Ibid.

294 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

295 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

296 Ibid.

defence industrial involvement. The government needs to pick and decide what it wants.²⁹⁷

However, not all witnesses praised the federal government's decision to go with an off-the-shelf design. Some, like Commander (Retired) Ken Hansen, would have preferred that Canada develop its own design. In his opinion, the adoption of an off-the-shelf design will "put limits on the kinds of Canadianization that can happen" and will be "extraordinarily expensive to modernize and Canadianize."²⁹⁸

5. Improving the National Shipbuilding Strategy

The federal government remains committed to the NSS and is trying to improve it. Lisa Campbell of PSPC identified five key areas of improvement by the federal government, which she summarized as "strengthening governance, building internal capacity, improving cost estimates, monitoring progress and ensuring value for money, and increasing transparency and accountability." PSPC, she said, is currently implementing those enhancements.²⁹⁹ "All of these aspects of the National Shipbuilding Strategy need improvement," noted David Perry.³⁰⁰ However, witnesses urged the federal government to consider additional improvements.

One area in need of improvement, the Committee was told, has to do with predictability and stability in funding for NSS projects.³⁰¹ According to Jonathan Whitworth, current project budgets are old and outdated, having been "developed and codified ... in a bygone era, long before the vessel requirements had been agreed to, and even longer before enough engineering work had been performed to properly estimate the labour, time, and materials required to build the subject vessels."³⁰² The result is all too predictable: almost all NSS projects have been plagued with cost escalations, as mentioned earlier. In his view, there needs to be more predictability and stability in funding. In his view, Canada should reconsider how it costs naval projects. As he explained:

We believe that to peg performance against the build contract and not against the nominal indicative cost estimate required to get through Treasury Board initial project approval many years — in some cases five to eight years — before a project may begin, and many more years before enough is known about the vessel's requirements, is not a fair representation of either the government's or the contractor's competence to manage a budget. We can change the public perception by changing the federal government's approval process and timelines.³⁰³

297 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

298 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

299 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Lisa Campbell).

300 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

301 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

302 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

303 Ibid.

Another area of improvement would be to transform the NSS into a continuous shipbuilding program that provides work to the Canadian shipbuilding and marine industry well beyond the 2030s and 2040s. “The purpose of avoiding ... boom and bust is to actually rotate [shipyards] onto another ship” project as soon as one is completed, explained Ms. Cianfarani.³⁰⁴ In other words, Canada should be continuously planning for future ship projects. Witnesses pointed to the fact that all of the NSS ships will need to be eventually replaced, so the sooner the federal government and industry start thinking about those future projects, the better prepared they will be when the time comes to build those replacement vessels. It would also keep the shipbuilding industry busy with a continuous flow of federal government work. Robert Huebert explained the advantage of having a constant and ongoing shipbuilding strategy as follow:

The only way the Americans, the Japanese, and the French have been able to do this is by having a shipbuilding strategy that says: “We will have one hull that is constantly being built. We will constantly be upgrading the technology, keeping in mind that we want to be able to retroactively retrofit” ... It is an ongoing, never-ending process. From today's economic industrial perspective ... the shipbuilding strategy ... needs to be thought of as an ongoing process.³⁰⁵

According to several witnesses, the main problem with the NSS is that it lacks shipbuilding capacity. At the moment, only two shipyards have been selected to deliver the large-ship construction program of the NSS. However, some witnesses believed that having a third shipyard involved in that program would be beneficial from a production standpoint. According to John Schmidt of FFS, there is spare capacity within the Canadian shipbuilding industry that could be used for future NSS work or other shipbuilding projects. In particular, he pointed out that Davie, one of the largest shipyards in Canada, is still “left unused.”³⁰⁶ While he admitted that Davie was bankrupt when the NSS was launched in 2010, the Committee was told that the Quebec shipyard was purchased in 2012, that it no longer faces financial difficulties today, and that it now has the capacity to build seven ships at any one time. Davie employs about 1,200 people and has CVs from another 2,700 people, many of them skilled workers with 10 to 30 years of shipbuilding experience.³⁰⁷ Irving shipbuilding and Seaspan representatives maintained that there is not enough ship construction work for the Navy and Coast Guard to sustain more than two shipyards under the NSS.³⁰⁸ Davie representatives were of the opinion that there was “enough work for everyone.”³⁰⁹

Other large-ship projects for the RCN and CCG are expected to be announced in the coming years and Davie would like an opportunity to bid on those projects. The CCG, for example, will need to replace its icebreaker fleet in the coming years and Davie has expressed interest in producing such vessels. “I totally think there's room for three

304 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

305 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

306 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (John Schmidt).

307 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

308 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy and Jonathan Whitworth).

309 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

shipyards,” David Perry told the Committee, adding that the NSS “only covered certain types of fleets” when it was introduced seven years ago. “It didn’t cover everything,” he said. “When [the federal government] did the assessment looking at the packages of work for the two yards [Irving and Seaspan], I don’t believe that encompassed all the potential fleet replacement.”³¹⁰

Many witnesses also pointed to the need to improve decision-making and accountability.³¹¹ In their view, the problem not only applies to the NSS, but to defence procurement at large in Canada. In the view of several witnesses, Canada’s multi-departmental approach to defence procurement and, by extension, to naval procurement, is problematic from a decision-making and accountability perspective. There are too many decision-makers, they implied, and this, as a result, is slowing down the process. As Kevin McCoy, president of Irving Shipbuilding, explained:

I would say that one thing that does work against the system here is having authorities and responsibilities distributed through very many departments, rather than having what I’m used to, which is a single accountable officer, particularly for a program as huge as the Canadian Surface Combatant — someone who can push things forward, rather than debating over them for a very long period of time.³¹²

In his view, what is needed is a “single project manager” to coordinate the NSS, adding that at the moment...

It’s very much a distributed process in which we will sit across the table from Industry Canada, Department of National Defence, the Navy, PSPC, and the Department of Justice and negotiate everything from technical requirements to contract requirements, and it takes a while to churn the consensus through the system.³¹³

As he explained, in a shipbuilding project, inflation is a “real killer” to a ship cost, “so you need speed in decision-making.”³¹⁴ In order to fix the problem, he believes that Canada should “look at the models used in the U.K. and the U.S. that have a single leader accountable for delivering the program within all the constraints.”³¹⁵ Jonathan Whitworth agrees. “A single point of accountability is very important,” he said, adding that shipyards “unfortunately can’t build ships with masses of people all making a decision.”³¹⁶ This was reiterated by Scott Jamieson: “A single point of accountability needs to have the responsibility for the strategy as well as for making the individual program successful.”³¹⁷

310 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

311 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

312 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Kevin McCoy).

313 Ibid.

314 Ibid.

315 Ibid.

316 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

317 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Scott Jamieson).

Many witnesses stated that centralizing the defence procurement in Canada under a single point of accountability (a single government organization led by a single minister accountable to Parliament) would be helpful in many respects. In particular, such centralization would speed up the decision-making process and ensure greater accountability for individual defence procurement projects, especially those to be built in the coming years under the NSS.³¹⁸ It should be noted that in several countries worldwide, defence procurement is centralized under a single government organization that reports to a single ministerial authority. Such is the case in Australia, France and the U.K.³¹⁹ In Australia, for example, defence procurement is centralized under a single organization, the Capability Acquisition and Sustainment Group (CASG), which was created in 2015 and is part of the country's Department of Defence. CASG reports directly to Australia's Minister for Defence, explained Peter Jennings, Executive Director of the Australian Strategic Policy Institute (ASPI). However, Mr. Jennings noted that at the political level, the Minister for Defence shares responsibility for defence procurement and defence industrial policies with the Minister for Defence Industry. Both of those ministers, Mr. Jennings explained, "sit in Cabinet" and through a "process of osmosis, reach agreement on priorities in industry construction."³²⁰ Many witnesses believed that Canada should abandon its multi-departmental approach to defence procurement and take a similar approach. It need be told that Canada is no stranger to defence procurement centralization. In fact, defence procurement was centralized under a single federal government department for most of the 1940s to 1960s, first through the Department of Munitions and Supply and then the Department of Defence Production. Canada might want to revisit those past models and consider whether the decision taken in the 1960s to adopt a multi-departmental model is still relevant in the 21st century.³²¹ According to James Boutilier, "you have to have someone in charge" of defence procurement. "Someone has to hang by their thumbs if they don't deliver. Now when the thing goes down the tubes, everyone looks around for who's responsible. No one's responsible ... We have to have much clearer lines of responsibility."³²² In his opinion:

we really have to address this question of defence acquisition ... We have created a Gordian knot in which everyone is included but no one is responsible. The process is frankly, in my estimation, dinosaurian. It's multi-layered, it's sclerotic, and it simply does not deliver.³²³

Michael Byers agreed, suggesting that defence procurement be centralized under the DND and made the sole responsibility of the Minister of National Defence. As he explained:

318 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth and Kevin McCoy).

319 Martin Auger, [Defence Procurement Organizations: A Global Comparison](#), Background Paper 2014-82-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 14 October 2014.

320 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 14 February 2017 (Peter Jennings).

321 Martin Auger, [The Evolution of Defence Procurement in Canada](#), Background Paper 2016-09-E, Parliamentary Information and Research Service, Library of Parliament, Ottawa, 4 February 2016.

322 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

323 Ibid.

I would get [Public Services and Procurement Canada, or PSPC] out of defence procurement, put all the responsibility on the defence minister ... and then insist that the minister is responsible for questioning every single statement of operational requirements ... If you follow my suggestion and give it to the Department of National Defence, then the people responsible for procuring the equipment are friends and colleagues of the people who will actually be using that equipment and desperately want that equipment ... You still need oversight, and especially at the stage of the definition of the statement of operational requirements, because that's where things slip up, right at the beginning, almost every single time. You can address that issue and provide oversight right at the beginning, and then let the men and women who are actually going to be using this equipment be part of the implementation process and not someone in [PSPC] who will never get on a ship or fly in a military aircraft.³²⁴

According to David Perry, we need to regard defence procurement differently from the rest of federal government procurement. As he explained:

I think, number one, there's a need to treat defence procurement ... like it's something that's important and it's something that's unique. We tend to treat it in a number of different ways. We hire procurement officials to run multi-billion dollar projects the same way we hire an administrator to run a line department on something that's relatively straightforward. We need to recognize that it's a different type of activity. You need a specialized skill set for it. You don't just wing it ... We should do what the private sector does, which is to go out and bring in and pay people with the right skill set so that they know what they're doing.³²⁵

In his view, the NSS is “a good idea in principle, but it doesn't make a difference if you don't actually hold anyone accountable.”³²⁶

INVESTING IN CANADA'S NAVAL FUTURE

While improving the NSS is important to deliver the future fleets of the RCN and CCG on time and on budget, witnesses highlighted other ways to improve the state of naval readiness in Canada and to enhance the capabilities of the country's naval forces in the coming years. Emphasis was placed on boosting the defence budget and increasing naval spending, investing in submarines, developing new naval capabilities, enhancing Arctic and maritime domain awareness and control capabilities, and fostering a strong shipbuilding industry in Canada.

1. Boosting the Defence Budget and Increasing Naval Spending

In the course of this study, several witnesses spoke about the need to increase Canada's defence budget and, more specifically, what it spends on its navy. At the NATO Summit in Wales (2014), Canada and its NATO allies made a commitment to move towards spending 2.0% of their Gross Domestic Products (GDP) on defence.³²⁷ At the moment, defence spending in Canada only meets approximately half of the NATO

324 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

325 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

326 Ibid.

327 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

target.³²⁸ In fiscal year 2015-2016, for example, Canadian defence spending amounted to more than \$18.6 billion.³²⁹

Several witnesses believed that Canada should be spending more money on defence and strive to reach the NATO target of 2.0% of GDP.³³⁰ The Naval Association of Canada, in particular, made this quite clear to the Committee. According to Commodore (Retired) Sing, “moving towards NATO’s aspirational target of 2.0% would be a good thing for this nation moving forward, no ifs, ands, or buts.” He sees no reason “why naval requirements and the requirements of other services in the Canadian Armed Forces could not be better satisfied” if Canada chose to do so.³³¹ According to Vice-Admiral (Retired) Robertson, “staying below 1% of GDP is going to mean a need to fundamentally rethink the defence of Canada.” The success of the RCN today, he emphasized, is largely attributable to the “legacy equipment that was purchased during a time when defence spending was indeed higher.” The problem, unfortunately, is that this equipment is getting old. “Everything that defends maritime security in this country is more than 20 years of age” and the Sea King maritime helicopters “are in their fifties at this point,” he noted. “Simply put, that average age means that we are headed for problems at the current funding levels.”³³² While the Naval Association of Canada believes that “there needs to be an increase in defence spending,” it told the Committee that “if the defence budget does not increase,” there would need to “be a transfer of resources within Defence to fund the capital acquisitions necessary to recapitalize the naval and air force fighting fleets that defend Canada and contribute to North American defence, especially the surface combatants, submarines and patrol aircraft.”³³³

Several witnesses pointed to the fact that Australia, a country significantly smaller than Canada with about one third less population, has increased its defence budget to almost 2.0% of GDP in recent years and is undergoing the largest recapitalization of its armed forces since the end of the Second World War in 1945.³³⁴ Witnesses challenged the argument that Australia must spend that money because it is “far closer to the dangers” of the Indo-Asia-Pacific region. “This is nonsense,” explained Commodore (Retired) Eric Lerhe. “Darwin [Australia] ... is [about] 4,050 kilometres from Beijing [China]. Vancouver, our biggest city close to there, is 4,500 kilometres from Beijing, a difference in distance from about here to Sudbury.”³³⁵

328 North Atlantic Treaty Organization (NATO), “[Defence Expenditure of NATO Countries \(2009-2016\)](#),” 13 March 2017.

329 Receiver General of Canada, [Public Accounts of Canada, 2015–2016](#), Volume II, p. 15.7.

330 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

331 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

332 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

333 Information provided by Jim Carruthers (President, Naval Association of Canada), “Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence,” 24 October 2016.

334 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

335 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

A similar argument was made by Vice-Admiral (Retired) Drew Robertson, who reminded the Committee that Canada, like Australia, is an “Asia-Pacific nation” with important trade and partnerships in that region and, therefore, “has an interest in what happens there.” The problem, however, is that many Canadians do not regard their country as an Asia-Pacific nation, he explained. Unlike Australia, which “knows it’s an Asia-Pacific nation, somehow Canada doesn’t have that central in its mind.” Few Canadians realize, he added, that the sailing “distance from Melbourne [Australia] up to the middle of the East China Sea is about one day shorter than the distance from the East China Sea to Vancouver.” In other words, Australia is almost as far from that region as Canada. Yet Australia is spending significantly more than Canada on defence and is significantly enhancing its naval capabilities in response to growing tensions in the Indo-Asia-Pacific region.³³⁶ In fact, Australia is in the process of building a navy that will eventually consist of 12 submarines, 2 amphibious assault ships, 3 anti-air warfare destroyers, 9 anti-submarine warfare frigates, 12 offshore patrol ships, and 2 supply ships.³³⁷ So why is Australia spending more on defence and its navy than Canada, pondered Vice-Admiral (Retired) Robertson? The common answer is “because of the neighbourhood Australia lives in.” In his view, that justification does not stand. If “they’re 10 days away from that neighbourhood” and “we’re 11 days away” from it and “our trade passes through it,” he wondered, should Canada not be as concerned as Australia about Asia-Pacific security?³³⁸

A number of witnesses believed that Canada should emulate the Australian example and raise its defence budget to 2.0% of GDP.³³⁹ According to James Boutilier, the Australian experience “demonstrates that it’s doable.”³⁴⁰ Indeed, this is not an unfeasible target, considering that Canadian defence spending stood at 2.0% of GDP at the end of the Cold War, in 1990.³⁴¹

Peter Jennings, Executive Director of the Australian Strategic Policy Institute (ASPI) was able to answer many of the questions related to why Australia is investing so much money in its navy and how its government is able to garner public support for spending close to 2.0% of its GDP on defence. Australia has long based its defence policy on the principle of “self-reliance.” Though it counts the U.S. as its closest military ally, its geographic distance from the world’s superpower leaves it vulnerable and unable to completely depend on its assistance if a crisis situation were to arise. Of course, Canada has a different geographic and, therefore, strategic reality with respect to the U.S. Mr. Jennings added that there is also a “more ingrained sense of threat in terms of

336 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

337 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 14 February 2017 (Peter Jennings); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

338 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

339 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

340 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

341 SIPRI, “[Military Expenditure by Country as a Share of GDP, 1988-2015](#),” February 2017.

Australian community perceptions,” emphasizing that “Australia feels the hot breath of Asia on its neck.”³⁴²

David Perry did not agree that raising the defence budget to 2.0% of GDP was necessary. In his opinion, Canada should strive to raise its defence spending to 1.3% of GDP, which would represent “a \$5 billion to \$6 billion increase overall” to the defence budget, noting that to reach the 2.0% of GDP target, the federal government would have to be willing and able to find another \$21 billion to spend on defence.³⁴³ That being said, Mr. Perry told the Committee that “the most important metric” would be “to look at what the government actually wants the armed forces to do and calibrate the budget against that rather than an arbitrary target.”³⁴⁴

Both Mr. Perry and Commodore (Retired) Eric Lerhe³⁴⁵ agreed that Canada should try to increase the percentage of the defence budget spent on equipment from about 13% to 20%, as per NATO guidelines. As Mr. Perry explained:

The Navy especially, but DND more broadly, in the future will simply not be able to keep doing the same types of things it does now without an increase to its funding for capital equipment. Canada made a commitment to the NATO alliance to spend 20% of its defence budget on new equipment and research and development, but for the last several years has spent only about 13%. Additional capital spending of roughly \$1.5 billion per year would more or less close this gap and increase the overall share of GDP that Canada spends on defence.³⁴⁶

That being said, several witnesses were of the opinion that a larger share of the defence budget should go to the RCN. At the moment, the Navy’s overall annual budget only amounts to approximately \$2 billion, as Vice-Admiral Lloyd told the Committee.³⁴⁷ This is not enough money, noted many witnesses. Asked what “critical thing” Canada needed from a naval readiness standpoint, David Perry responded “money.” He explained that “if there isn’t more money ... the Navy is going to lose capability and lose readiness over time,” adding that “without increased funding, the government will not be able to do the same things in the future that it does today.”³⁴⁸ In his opinion, “one of the most needed outcomes of the Defence Policy Review” for the RCN is “clear direction from the government about what it expects [it] to be able to do and the resources needed to achieve it.”³⁴⁹ James Boutilier agreed, noting that Canada should be moving faster with the shipbuilding file and allocate more resources for the recapitalization of the RCN. “There’s a need for dramatic urgency,” he said, and “there’s a need for more money.”³⁵⁰ Commodore

342 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 14 February 2017 (Peter Jennings).

343 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

344 Ibid.

345 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

346 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

347 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

348 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

349 Ibid.

350 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

(Retired) Daniel Sing concurred, emphasizing that “combat-capable naval ships and submarines, and maritime aircraft and their sophisticated sensors, weapons, and communications equipment, are not inexpensive” to acquire and operate. In his view, spending on the RCN is akin to buying insurance: “You have to pay for it up front, you don’t know when you will ever need to use it to its full capacity, and you can’t readily acquire some or more when a crisis suddenly emerges.”³⁵¹

However, not all witnesses believed that the Navy needed more money to pay for its recapitalization. Michael Byers, for example, told the Committee that it was “not a question about getting more money.” In his view, it’s merely a question of fulfilling the plans originally set out in the National Shipbuilding Strategy “as quickly as possible, and doing so in the most efficient way to actually deliver vessels ... to the Royal Canadian Navy.”³⁵² The main problem is inflation in shipbuilding, which, according to the Canadian Marine Industries and Shipbuilding Association, can be as high as 10% per year.³⁵³ According to Mr. Byers, the Navy does not need more money. It just needs to get its naval procurement projects moving faster. “Every delay pushes up the cost, because the inflation in shipbuilding is so very high,” he warned. So the faster those ships are built and delivered to the RCN, the less costly they will be and the more savings will be made for the Navy.³⁵⁴

2. Investing in Submarines

The importance of submarines was repeatedly heard over the course of this study. The global proliferation of submarines, in particular, was of high concern to many witnesses. “Countries around the world continue to make significant investments in submarines,” noted Stephen Burt. “These are seen as an important capability by many countries around the globe who invest heavily in making sure that they have them and who watch very carefully when their neighbours get them. It is a system of importance. It is a system that is being invested in heavily ... and it is a system that our Navy is going to run into when they deploy around the globe. It is an important maritime capability.”³⁵⁵

Several witnesses spoke about submarine proliferation in the Indo-Asia-Pacific region.³⁵⁶ Of the 499 submarines operated by 39 navies worldwide in 2016, no less than 219 were owned by 12 Indo-Asia-Pacific nations.³⁵⁷ And of the 220 or so additional submarines that were either under construction or on the order books at about the same time, more than 100 were for Indo-Asia Pacific navies.³⁵⁸ According to James Boutillier,

351 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

352 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

353 Canadian Marine Industries and Shipbuilding Association (CMISA), [Defence Policy Review 2016: Striving for an Intelligent, Cohesive and Sustainable Marine Industrial Policy](#), June 2016, p. 8.

354 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

355 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

356 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

357 IISS, *The Military Balance 2017*, pp. 29-479.

358 Saunders, ed., *Jane’s Fighting Ships, 2016–2017*, pp. 2–1006.

“submarines have become over the past quarter century the coin of the realm” in the Indo-Asia-Pacific region. China has about 60 submarines, he emphasized, “and they’re building them probably two to three times as fast as the Americans are.” Even “tiny, bankrupt, reclusive North Korea,” he added, “has some 70 submarines, albeit midget and small, but nonetheless sufficient, particularly because they’re now in the process of attaching ballistic missiles to their submarines.”³⁵⁹

The importance of the submarine-launched torpedo threat to shipping was emphasized by Commodore (Retired) Lerhe. Torpedoes are much more dangerous for warships than anti-ship missiles, he explained. “Missiles ... damage ships,” he said. “Heavy-weight torpedoes from submarines always sink them.”³⁶⁰ It need be noted that submarines have fired heavyweight torpedoes in anger at ships on only three occasions over the last half century (1971, 1982, and 2010), but all of their targets were sunk with heavy loss of life.³⁶¹ Other witnesses emphasized the threat posed by submarine-launched conventional and nuclear ballistic missiles and cruise missiles, and how those sea-based systems are a threat to North America. Stephen Burt emphasized the fact that “submarines with these systems conduct regular patrols, primarily in the European theatre but also in the High Arctic and the North Atlantic, with these assets having an occasional presence in the Canadian Exclusive Economic Zone.”³⁶²

The majority of witnesses held the view that submarines were an important capability for the RCN and that Canada should invest in them. According to Vice-Admiral (Retired) Drew Robertson, “submarines are fundamental to the effectiveness of the Canadian Navy and the Canadian Forces, and they’re essential for sovereignty.” In his view, there is a reason why there is a proliferation of submarines around the world and why countries, large and small, are investing in their submarine capabilities. As he explained:

That’s in part because the platforms are exceptionally capable at looking after the defence of territorial waters ... More broadly, it’s their stealth and lethality that make them the dominant platform at sea for deterrence, for war fighting, and for independent operations, whether that’s for intelligence collection or war fighting by themselves ... The mere presence or belief that a submarine is in a region is enough to change the operational thinking of adversaries and make them reconsider their plans ... There is no platform at sea that so worries or creates fear in an adversary’s mind as submarines.³⁶³

Rear-Admiral John Newton held a similar view on submarines:

359 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

360 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

361 During the Indo-Pakistani War (1971), the Pakistani submarine PNS *Hangor* torpedoed and sunk the Indian frigate INS *Khukri*. During the Falklands War (1982), the British nuclear-powered submarine HMS *Conqueror* torpedoed and sunk the Argentine cruiser ARA *General Belgrano*. More recently, in 2010, the South Korean corvette *Chon An* was sunk by a torpedo launched from a North Korean submarine. Richard Scott, “Damn the Torpedoes: Defending against the Heavyweight Threat,” *Jane’s International Defence Review*, Vol. 48 (March 2015), pp. 42-43.

362 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

363 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

Submarines are an incredible force-multiplying capability in any navy, for any country. One submarine equals 30 submarines as far as the adversary is concerned ... The uncertainty of where the vessel is, what the nature of its mission is, its ability to remain stealthily deployed—these all demand many resources from an adversary to detect, localize, and track, and all the while the submarine is going about its very specific mission.³⁶⁴

Several witnesses emphasized the stealthy, silent nature of submarines. “A surface ship cannot compete against a submarine,” explained Commodore (Retired) Eric Lerhe, adding that “a surface ship is 100 times noisier than a submarine.”³⁶⁵ This makes it extremely hard to detect a submerged submarine, explained Commodore C.P. Donovan, the RCN’s Director General of Naval Forces Development. As he elaborated:

The location of submarines is very difficult to detect. Even if they're just outside a harbour, and are not in the immediate vicinity of the threat, the threat is unaware of that fact. The submarine sends out a signal that encourages the threat to think twice or three times before doing anything hostile, because it cannot identify the submarine's location.³⁶⁶

The stealthy nature of submarines not only makes them ideal weapons for deterrence and naval combat, but also for intelligence-gathering.³⁶⁷

All of the RCN officials heard in the course of this study praised the capabilities of Canada’s Victoria class submarines. “Canada has one of the most modern submarines in the world, at the top tier of submarining in the global naval powers,” Rear-Admiral John Newton told the Committee. He emphasized the fact that the Victoria class submarines are fitted with the same sonar suite as the Virginia class nuclear submarines of the U.S. Navy, which he labelled “the most advanced sonar in the world.” They are also armed with Mark 48 torpedoes, which he described as the “most advanced and destructive” submarine “weapons system on the planet.”³⁶⁸ According to Vice-Admiral Ron Lloyd, Commander of the RCN, “very few Canadians appreciate the fact that some of the western world’s most advanced technologies are in our submarines.” In his view, submarines are a significant asset for the RCN.³⁶⁹

Our submarines provide us an opportunity to access not only the decision-making table but the exceptionally classified aspects of anti-submarine warfare ... Our submariners are doing great work on behalf of Canada and Canadians every day, but unfortunately, because of the classification of what they're doing, much like our special forces, there's not a lot we can share in an unclassified environment.³⁷⁰

364 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

365 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

366 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Commodore C.P. Donovan).

367 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 3 November 2016 (Stephen Burt).

368 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

369 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

370 Ibid.

Similar views were expressed by other witnesses. Vice-Admiral (Retired) Drew Robertson, for example, emphasized the fact that the Victoria class submarines are “capable boats by design” that incorporate some of the best American and British submarine technology available worldwide.³⁷¹ According to Rear-Admiral Art McDonald, the Navy still has “some very good use left in the Victoria class” submarines.³⁷² Rear-Admiral (Retired) Patrick Finn, DND’s Assistant Deputy Minister (Materiel), agreed. He told the Committee that DND was, in fact, planning on keeping the Victoria class submarines operational for “about 10 to 12 additional years” and was presently investigating “to what extent [it] could prolong those submarines’ lifespans” to “2030, and even beyond” and how it could “increase their current capacity” in the future. At the moment, there are no replacement plans, he noted.³⁷³

However, some witnesses expressed concern over the fact that there is no federal government approved and funded project underway to replace the Victoria class submarines in the future.³⁷⁴ If Canada wants to replace its submarines, explained Commodore (Retired) Lerhe, it should “start planning now” and provide the funds necessary for the purpose.³⁷⁵

But according to Michael Byers, before the federal government starts investing in new submarines, it should question whether or not its Navy really needs a submarine force and, if so, what it hopes to accomplish with it in the long run. “I think the question needs to be asked,” he told the Committee. In his view:

We either have a modern, highly capable submarine program or we stop this charade we have right now of pouring money into a hole and getting vessels that are not 21st century [Victoria class submarines] ... We are just stringing out old vessels, pretending to have a submarine capability ... For the same amount of money that has been spent over the course of the last decade, we could have three or four brand new German-made submarines with under-ice capability. We missed that opportunity by stringing along these old Victoria class vessels ... We clearly don’t need old submarines.³⁷⁶

Overall, the majority of witnesses agreed that Canada should remain in the submarine business and invest in its submarine capabilities in the coming years.³⁷⁷ Robert Huebert was one of them and gave the Committee three reasons why Canada needs submarines:

Why we need submarines relates first of all to ... domain awareness. The only way that our allies and friends will share information in terms of what their submarines are finding

371 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

372 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

373 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

374 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe and Commander (Retired) Ken Hansen); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

375 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

376 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

377 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

and doing is if we have submarines. If we don't have submarines, we don't have shared undersea water domain awareness.

Second, we need to have that independent capability [for deterrence and sovereignty purposes]

[...] The third factor ... is that into the future, given the nature of where torpedo capabilities are going, the only way that you are going to defend against a submarine with a torpedo that has a 100-mile ... range at speeds almost approximating those of surface missiles is by having your own submarine. Having a surface vessel means you're just going to be a floating target at some point for submarines, given where technology is going. If you want to defend against submarines, you need to have submarines yourself.³⁷⁸

Mr. Huebert held the view that “what Canada needs is the best capability of responding to a submarine threat, which means submarines of our own.” The continued global proliferation of submarines and, more specifically, the expansion of submarine capabilities in China and Russia, should be enough of an incentive for Canada to invest in its submarine force, he added. In his view, “it is imperative that we maintain a submarine capability.”³⁷⁹ Commander (Retired) Ken Hansen concurred. “For combat platforms, the submarine is the weapon system of the future,” he told the Committee. “We need ... to shift our focus over to the submarine fleet and use the surface fleet more or less in a support role.”³⁸⁰

Although most witnesses agreed with Mr. Huebert that Canada should invest in submarine capabilities and move forward with the replacement of its Victoria class submarines, there was disagreement between them as to how many submarines Canada should operate in the future. According to Vice-Admiral (Retired) Robertson, “that's an issue of consideration of what the government wishes to accomplish in the future and at what cost.”³⁸¹ Yet this did not discourage witnesses from suggesting numbers. According to the Naval Association of Canada, the RCN should, as a minimum, operate 4 submarines.³⁸² However, some witnesses were of the opinion that Canada should operate more than 4 submarines in the future, alluding again to the fact that Australia, a country significantly smaller than Canada, currently owns 6 submarines and is planning on replacing them with 12 submarines in the coming years.³⁸³ Commodore (Retired) Eric Lerhe, in particular, pointed to the fact that Canada, the country with the longest coastline in the world, currently operates the same number of submarines as Singapore, a country with “a coastline no longer than that of municipal Toronto.” In his opinion, 4 submarines is too “close to the bare bones” for Canada. With one submarine in refit, one in training and

378 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

379 Ibid.

380 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

381 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

382 Information provided by Jim Carruthers (President, Naval Association of Canada), “Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence,” 24 October 2016.

383 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

one available on each coast at any given time, “it would take only one small hiccup and a coast is left without a submarine.” The “bare minimum” for Canada is 6 submarines, he said.³⁸⁴

Regardless of numbers, witnesses agreed that whatever submarine platform Canada decides to acquire to replace the Victoria class submarines should be capable of operating under ice in the Arctic. “Our submarines ... should be outfitted with air-independent propulsion to work the ice edge,” emphasized Commander (Retired) Hansen.³⁸⁵ While some witnesses believed that nuclear-powered submarines would be ideal to operate under the ice, they quickly dismissed that option as unrealistic for financial reasons. Robert Huebert, for example, pointed to the fact that Canada investigated the possibility of acquiring nuclear submarines on at least two occasions in the past, but ultimately abandoned the idea because of the high costs involved.³⁸⁶ “It has always been that cost factor that has been the killer,” Mr. Huebert told the Committee, adding that the problem would probably be the same today if Canada were to consider, once again, acquiring a fleet of nuclear-powered submarines.³⁸⁷

Several witnesses were of the opinion that Canada’s next-generation of submarines could and should be constructed in Canada.³⁸⁸ “I do think the industry could gear up to provide technologies, components, or a labour force in order to undertake the build of submarines in this country should we so desire,” explained Christyn Cianfarani.³⁸⁹ But some witnesses disagreed, arguing that doing so would be uneconomical. “I think for surface ship construction, there’s no difficulty here” because Canada currently has shipbuilding capabilities, Commander (Retired) Hansen explained. However, a submarine building capability would have to be developed from scratch and that could be costly. There is also the issue of numbers. Canada requires too few submarines to make domestic production economically viable. Even if the federal government were to double the size of the RCN submarine force to 8 submarines in the future, he said, it would still be difficult to “sustain a steady, continuous building program at a single shipyard for submarines.”³⁹⁰

384 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

385 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

386 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert). The first attempt occurred between 1958 and 1968. The second attempt occurred in the 1980s when the federal government announced in the 1987 Defence White Paper plans to acquire a fleet of 10 to 12 nuclear-powered submarines for the RCN. For more information, see, for example, DND, *Challenge and Commitment: A Defence Policy for Canada*, 1987, pp. 52-55; S. Mathwin Davis, “It Has All Happened Before: The RCN, Nuclear Propulsion and Submarines, 1958-1968,” *Canadian Defence Quarterly*, Vol. 17, No. 1 (Fall 1987), pp. 34-40; S. Mathwin Davis, “Le Mieux est l’Ennemi du Bien: The Nuclear-Powered Submarine Programme,” *Canadian Defence Quarterly*, Vol. 18, No. 1 (Fall 1988), pp. 47-56.

387 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

388 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

389 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

390 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

3. Developing New Naval Capabilities

In the course of this study, several witnesses believed that the RCN should invest in new capabilities in order to be more effective and efficient worldwide. Vice-Admiral (Retired) Drew Robertson, in particular, would like the RCN to have two new and important capabilities in the future, namely the ability to conduct precision strikes against land-based targets and to defend its warships and military forces ashore against ballistic missiles.

If you're looking for precise capabilities that would be required, the only thing that the Navy doesn't have that would be contemplated and is common in other navies ... would be the ability to conduct precision strikes ashore ... We would be looking, however, to have a greater capability to influence events ashore, mostly in support of Canadian forces. We are also considering the potential of having a ballistic missile defence. This is not a strategic ballistic missile defence; this is a theatre capability. It's an anti-air problem, effectively, to be used to defend an area where Canadian forces operating just ashore were attacked by short-range or medium-range ballistic missiles from enemies.³⁹¹

In his view, those two capabilities are not only “desirable,” they are “necessary for the effectiveness of the [Canadian] Armed Forces in the long term.” But they would come at a high price. “Those cost money,” explained Vice-Admiral (Retired) Robertson. Considering that at the moment “there isn't enough money for the replacement of the fleet that exists,” he emphasized, additional funds would have to be invested in the RCN in order to provide it with a precision strike and ballistic missile defence capability.³⁹² Whether such capabilities could be integrated into the Canadian Surface Combatants or would have to be met through the acquisition of a new class of warships remains to be determined.

Some witnesses also believed that the RCN should enhance its logistical support capabilities. In the opinion of Commander (Retired) Ken Hansen, the Navy “should be putting a lot more money into enlarging the logistical and repair capacities on either coast.” Too often, he explained, has the RCN been “left unable to operate” due to “lack of spare parts, trained people, and repair facilities.”³⁹³ In his opinion, the RCN needs to evolve from a “low-endurance, narrowly focused combat force” to a “truly ready, flexible, and reliable force.” To that end, it “needs to diversify, significantly expand its logistical capacity, and integrate its procurement processes into developing the national industrial base.”³⁹⁴ As he explained:

[In the short term] we should be looking to fill up the inventory of spare parts, supplies, ammunition, and information systems, so that what we have can be operated reliably and sustainably. In the medium term, we should be looking at the logistical facilities we need to move the fleet wherever it's required, and be able to support it through the Fleet Maintenance Facilities on either coast. In the long term, we should be looking at the fleet balance. I recommend a fifty-fifty split between combat capability and logistical support

391 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

392 Ibid.

393 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

394 Ibid.

capability because, if it's going to come to a shooting war, it's going to be at long range from those aforementioned bases of supply.³⁹⁵

In order to enhance the RCN's logistical support capabilities, Commander (Retired) Hansen, along with other witnesses, argued in favour of acquiring a large helicopter-carrying amphibious support ship that the Navy could use for humanitarian assistance, disaster relief, peace support, and other types of operations at home and abroad.³⁹⁶ According to Navy Captain (Retired) Harry Harsch, Canada need not acquire a large amphibious assault ship-type vessel. In his view, a multi-function support ship similar to the Royal Netherlands Navy's Rotterdam and Karel Doorman classes, the British Royal Fleet Auxiliary's Bay class, or the Royal Danish Navy's Absalon class would be "particularly useful" to the RCN. "The Navy League believes that such a capability would significantly add to the flexibility and the overall readiness of the RCN," he told the Committee.³⁹⁷ Commodore (Retired) Lerhe agreed, pointing to the fact that such a ship would provide "tremendous backup logistical support" to the RCN for humanitarian aid and disaster relief operations.³⁹⁸ A similar point of view was expressed by David Perry, who argued that Canada should acquire a "big honking ship of some kind" that "can provide humanitarian assistance [and] disaster relief."³⁹⁹

It should be noted that the RCN has been interested in operating such a ship for many years and recently reiterated its desire to do so in *Leadmark 2050*. In that document, the Navy expressed a wish to acquire in the coming years a large "Peace-Support Ship" to "broaden the fleet's ability and flexibility to conduct operations ashore, across a range of peace-support missions in relatively permissive environments, including humanitarian assistance and disaster relief." According to the RCN, "such a ship would act as a seabase, with features that include a substantial sealift capacity to move personnel, vehicles, force logistics and humanitarian materiel into theatre. There would be equipment to embark/disembark cargo as well as transfer cargo at sea, and deck space to accommodate and operate medium-or heavy-lift aircraft and landing craft." The RCN maintains that "such a vessel would likely be among the most heavily used assets in the future Canadian Armed Forces," being "deployed routinely to regions of strategic interest to Canada with a range of personnel and joint capabilities."⁴⁰⁰ That being said, Commodore C.P. Donovan told the Committee that "for the moment, this kind of vessel is not at the planning stage." As he explained: "Presently, there is no project or plan for such a vessel, because it depends on the direction the government wishes to take." If the federal government wants the CAF to be more actively engaged in peace support,

395 Ibid.

396 Ibid.

397 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Captain (Navy) (Retired) Harry Harsch).

398 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

399 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

400 DND, [Leadmark 2050](#), pp. 46-48, 58.

humanitarian aid and disaster relief, and other similar types of missions in the future, he noted, then the “capacities of a ship of that type” would be most useful.⁴⁰¹

Some witnesses pointed to the fact that amphibious support ships are expensive vessels to acquire and operate. As Commodore (Retired) Lerhe explained:

People always forget that it might cost \$2.5 billion for each ship—what you also need is another billion dollars' worth of troop-carrying or load-carrying [helicopters], at minimum, probably, of 10 per ship, and you need about half a million dollars' worth of hovercrafts for them. On the shopping list, then, is that each comes with a crew of 500, and an annual O and M [Operating and Maintenance] bill of about \$500 million for the two of them (i.e., operations and maintenance, gas, spare parts, and the like).⁴⁰²

In contrast, some witnesses believed not only that the RCN would benefit from such a new capability, but that it would be worth the cost. However, they were of the opinion that such a ship should not be acquired at the expense of other naval capabilities. In particular, Navy Captain (Retired) Harsch told the Committee that the acquisition of an amphibious support ship “should not come at the expense of combat-capable frigate-type ships, which have consistently and frequently proven their utility in more challenging operations.”⁴⁰³ Vice-Admiral (Retired) Robertson agreed. In his view, such a vessel would be “rather expensive” and should not be procured at the expense of new warships. As he explained:

An amphibious ship ... a humanitarian assistance ship, or a humanitarian assistance-peace support-disaster relief kind of ship ... is a national capability that's delivered and that integrates land, sea, and air capabilities to, in effect, deliver to shore in a foreign country. Each piece of that has its own costs, as does bringing it all together into a package and deploying at an operationally relevant level. In view ... of the shortfall in defence capabilities and defence spending, I think that pushes the discussion of an amphibious capability far off into the future. One needs to have the basic capabilities first before one moves beyond that.⁴⁰⁴

Nonetheless, he believed that an amphibious support ship would be a useful addition to the RCN fleet. He alluded to the fact that Australia purchased “two such ships” (Canberra class) recently in order to enhance its naval capabilities in the Indo-Asia-Pacific region. Canada could, if it wanted, emulate the Australian example and acquire such a capability, if more money was invested in the RCN.⁴⁰⁵ Commodore (Retired) Lerhe agreed, arguing that Canada should acquire, in addition to its two Joint Support Ships, two large amphibious support ships, which he referred to as humanitarian aid and disaster relief (HADR) ships.⁴⁰⁶

401 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Commodore C.P. Donovan).

402 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

403 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Captain (Navy) (Retired) Harry Harsch).

404 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

405 Ibid.

406 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

In the course of this study, a number of witnesses also suggested that the RCN's at-sea replenishment capabilities be enhanced and expanded, with solving the problem of at-sea replenishment within the RCN as a key priority. Commodore (Retired) Lerhe and other commentators urged the federal government to make progress with the Queenston class Joint Support Ships (JSS) project, whose delivery is only expected for 2021.⁴⁰⁷ Some witnesses also pointed to the fact that only two instead of three JSS are currently funded to be built for the Navy by Seaspan. It needs be recalled that the project calls for the production of two JSS with an option for a third. "The requirement is for three" JSS, Vice-Admiral Lloyd told the Committee, but "right now, the project is to deliver two, with an option for three. In terms of how we will mitigate the situation, we will continue to develop strategies, as we have, recognizing that we've had only two [Protecteur class supply ships] for quite some time now."⁴⁰⁸ Rear-Admiral McDonald reiterated the fact that the Navy's original requirement was for "three replenishment ships." It is clear that having three JSS would give the RCN "flexibility," in case something happened to one of the ships. It would ensure that at least one support ship be always operational on both the east and west coasts of Canada. It would also provide the Navy with a "significantly enhanced capability."⁴⁰⁹ Some witnesses reminded the Committee that in addition to the two JSS the federal government has also ordered a Resolve class AOR ship from the Davie shipyard in Quebec. In other words, three at-sea replenishment vessels are currently on the order books.

That being said, a number of witnesses pointed to the fact that Canada should operate more than three support ships. The Naval Association of Canada, for example, told the Committee that the RCN should operate at least four at-sea replenishment support ships "as a minimum."⁴¹⁰ Other witnesses agreed, pointing to the fact that Canada could increase the at-sea replenishment capability of the RCN to 4 ships by having Davie construct a second Resolve class AOR ship.⁴¹¹ According to David Perry, this solution would ultimately provide the RCN with a fleet of 2 AORs and 2 JSS.⁴¹² The advantage of having a second Resolve class AOR ship built for the Navy is that it would allow Seaspan to prioritize construction of the Polar Icebreaker over the JSS in the near term, the Committee was told.⁴¹³ According to Michael Byers, this solution would help close the RCN at-sea replenishment capability gap faster, provide the CCG with an enhanced icebreaking capability sooner than expected, and ultimately provide the Navy with a fleet of "four supply ships, two for each coast, which means one can be in port being maintained

407 Ibid.

408 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

409 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral Art McDonald).

410 Information provided by Jim Carruthers (President, Naval Association of Canada), "Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence," 24 October 2016.

411 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser and Alex Vicefield); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers and David Perry).

412 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (David Perry).

413 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser and Alex Vicefield); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

and refitted while the other is operational.” It would also provide work to a third Canadian shipyard, Davie, thereby building capacity within the shipbuilding industry.⁴¹⁴ However, according to Seaspan, it would be difficult to prioritize the Polar Icebreaker over the JSS considering the more advanced stage of the latter ship project. “Planning, engineering, and long-lead equipment purchasing are ongoing” for the JSS, Jonathan Whitworth told the Committee, adding that the “functional design” of the ship was just approved a few months ago and that “procurement of long-lead items continues with the propulsion system integrator, which has already been down-selected.” In his view, the “federal government must stay the course.”⁴¹⁵

Finally, witnesses encouraged the federal government to invest in the RCN’s coastal defence capabilities. To that end, the Naval Association of Canada recommended that the federal government extend the life of the RCN’s 12 Kingston class MCDVs in order “to retain much needed fleet capacity for domestic and continental security missions” and fund a project to replace those ships with 12 new and more advanced “coastal patrol ships, with mine countermeasures capabilities.”⁴¹⁶ It should be noted that RCN requirements highlighted in *Leadmark 2050* call for a fleet of 12 Canadian Coastal Patrol Ships to replace the Kingston class MCDVs.⁴¹⁷ Other witnesses agreed. For instance, the need to increase the Navy’s coastal defence capabilities was stressed by Michael Byers, who reminded the Committee that Canada has the longest coastline in the world and, therefore, should think about strengthening the RCN’s “offshore patrol capacity.” In his view, the new Arctic/Offshore Patrol, with a top speed of only 17 knots, will “not be particularly suited for the Atlantic Ocean in winter.” Mr. Byers held the view that the federal government should not extend the life of the RCN’s 12 Kingston class MCDVs. “Our [MCDVs] were deemed unworthy of a mid-life refit,” he told the Committee, “and they can only sail at 15 knots.” Rather, he suggested that the federal government launch a project to replace the MCDVs and look into acquiring a fleet of “purpose-built offshore patrol vessels” for the RCN.⁴¹⁸

4. Enhancing Arctic and Maritime Domain Awareness and Control Capabilities

As already mentioned, the surveillance of Canada’s Arctic region and maritime estate is a system that involves several federal government departments and agencies as well as a wide range of assets and technologies, which include aircraft, ships, submarines, satellites, radars and other monitoring tools.

However, in the course of this study, several witnesses identified gaps in Canada’s Arctic and maritime domain awareness capabilities. In their view, Canada needs to invest

414 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

415 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

416 Information provided by Jim Carruthers (President, Naval Association of Canada), “Naval Association of Canada Supplemental Input to the House of Commons Standing Committee on National Defence,” 24 October 2016.

417 DND, [Leadmark 2050](#), pp. 45-50, 58.

418 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

in new and more advanced surveillance technologies in order to improve domain awareness and enhance the country's ability to respond to new and emerging threats. A number of suggestions were made by witnesses as to how to improve and expand the maritime domain awareness system in Canada and to enhance surveillance in the Arctic. According to many witnesses, Canada needs to invest in space-based technologies, unmanned systems, undersea sensors, maritime patrol aircraft, icebreakers, among other things. As Commodore (Retired) Eric Lerhe emphasized, the defence of Canada and the maintenance of Canadian sovereignty relies on surveillance on, above, and beneath the seas.⁴¹⁹

Many witnesses highlighted the importance of satellites for the surveillance of Canada's Arctic and maritime zones. Commodore (Retired) Lerhe and Commander (Retired) Ken Hansen both emphasized the value of Canada's RADARSAT satellite for tracking ships in Canadian waters.⁴²⁰ "The RADARSAT system is a very useful tool," Commodore (Retired) Daniel Sing told the Committee, emphasizing that it is a highly-valuable system for monitoring activities in the Arctic. "The Americans are very interested in that technology that largely contributes to the image they have of what is happening in the North," he added.⁴²¹

Most witnesses look forward to the RADARSAT Constellation of three satellites, which is expected to be launched into space in 2018. This network of three satellites is expected to significantly enhance Canada's domain awareness capabilities and will permit persistent surveillance of the country's Arctic and maritime domains.⁴²² "We need the full constellation of RADARSAT," emphasized Commander (Retired) Hansen.⁴²³ But some witnesses believed that Canada's needs more than three satellites. Michael Byers was one of them. RADARSAT Constellation is "phenomenal technology" that will serve Canada for the next 15 to 20 years and improve "surveillance of Canada's maritime zones and Arctic zones." That being said, he holds the view that "we need more than three [satellites] in that constellation." He suggested that the RADARSAT Constellation project be funded for and expanded to six satellites. He also urged Canada to increase funding for the Polar Communication and Weather Satellite project, which involves a number of federal departments and agencies, including DND.⁴²⁴

Some witnesses also highlighted the advantages of using unmanned aircraft systems (UAS), or drones, for Arctic and maritime domain awareness. DND, in particular, is moving forward with the Joint Unmanned Surveillance and Target Acquisition System (JUSTAS) project, which seeks to provide the CAF with a UAS capability for persistent

419 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

420 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe and Commander (Retired) Ken Hansen).

421 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

422 Canadian Space Agency (CSA), "[RADARSAT Constellation](#)."

423 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

424 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers). See also CSA, "[Polar Communication and Weather Mission \(PCW\)](#)."

airborne intelligence, surveillance and reconnaissance, which is expected to enhance Arctic and maritime domain awareness in Canada.⁴²⁵ But DND does not expect JUSTAS to be available anytime soon. According to the latest version of its *Defence Acquisition Guide*, the JUSTAS contract is only expected to be awarded between 2022 and 2024 with final delivery of the system occurring between 2024 and 2036.⁴²⁶

In contrast, Vice-Admiral (Retired) Robertson urged caution and pointed to the limitations of UAS for maritime domain awareness, particularly for detecting submarines. Although UAS “carry radar, which can be useful for detecting only periscopes or submarines' raised masts,” he explained, “they do not have acoustic capabilities, and that's what one really needs at sea ... That's how you detect something” underwater.⁴²⁷ Another system would have to be acquired for underwater surveillance.

In this context, the Committee learned that the RCN has plans to procure “shipborne unmanned vehicles” for “maritime intelligence, surveillance and reconnaissance (ISR)” purposes in the maritime domain. These plans include the procurement of unmanned vehicles systems capable of operating in “all three maritime dimensions” [i.e., above, on and under water].⁴²⁸ “In general, uninhabited vehicles, unmanned vehicles, and autonomous vehicles are clearly in the future of most navies around the world,” Commodore C.P. Donovan told the Committee. “We have looked to the future and we currently have ... procurement projects under way to deliver systems that are autonomous or remotely operated in nature.”⁴²⁹ The RCN, in particular, is interested in acquiring a tactical intelligence, surveillance and reconnaissance UAS that could be operated from its modernized Halifax class frigates as well as future warships, such as the Arctic/Offshore Patrol Ships and the Canadian Surface Combatants.⁴³⁰ Investing in unmanned systems is the right thing to do, noted some witnesses, arguing that drones are the wave of the future and will be increasingly present in the battlespace in the coming years. “A whole world of drones in the sky, in the sea, on the surface, and so forth [is] fast coming up over the horizon,” emphasized James Boutilier.⁴³¹

Some witnesses also told the Committee that Canada should enhance its maritime aircraft capabilities. They pointed to the urgent need to replace the aging CH-124 Sea King maritime helicopters operated by the RCAF aboard RCN warships, which were procured in the 1960s, with the new CH-148 Cyclone. It should be noted that Cyclone deliveries to the RCAF have been progressing slowly since it started in 2015. Up to March 2017, only

425 NDDN, [Canada and the Defence of North America: NORAD and Aerial Readiness](#), p. 53.

426 DND, [“Aerospace Systems Services: Joint Unmanned Surveillance and Target Acquisition System,”](#) *Defence Acquisition Guide 2016*.

427 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

428 DND, [Leadmark 2050](#), pp. 49, 58.

429 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Commodore C.P. Donovan).

430 DND, [“RCN Intelligence, Surveillance, Target Acquisition and Reconnaissance Unmanned Aircraft System,”](#) *Defence Acquisition Guide 2016*.

431 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutilier).

11 of the 28 Cyclones ordered had been officially accepted by the RCAF.⁴³² The last of the 28 helicopters is only scheduled to be delivered in 2021.⁴³³ “We’re delivering the Cyclone a little bit behind,” Rear-Admiral John Newton admitted, but it “is now reaching our decks.” He pointed to the fact that the “first deployment of a helicopter air detachment and a Cyclone helicopter occurred on the SPARTAN WARRIOR” naval exercise that took place off the eastern seaboard of North America between October and November 2016. The RCAF is still conducting tests with the helicopter and figuring out how to maintain it, fly it, and operate it from a warship. In fact, initial operational capability is only slated to occur in 2018.⁴³⁴ In other words, no Canadian warship is expected to deploy on operations with an operational Cyclone onboard before that date. Accordingly, the RCN will have to wait a few more years before it can count on a fully operational fleet of 28 Cyclones. According to DND, full operational capability is not expected until 2025.⁴³⁵

Other witnesses spoke about the state of the RCAF fleet of CP-140 Aurora patrol aircraft. The Aurora is a land-based aircraft that is used for anti-submarine warfare (ASW), intelligence, surveillance and reconnaissance (ISR), and a range of other missions in the maritime environment. The RCAF is currently upgrading and modernizing 14 of its 18 CP-140 Aurora patrol aircraft to extend their life until 2030.⁴³⁶ According to Rear-Admiral John Newton, the modernized Aurora is “nothing short of staggering.” He pointed to the fact that the aircraft has much greater range and can now detect ship and submarine targets much further away than it used to because of its new specialized radar and other technologies. “The internal-processing capability to see targets where you never could see them before, whether on the surface or underwater, is amazing,” he noted.⁴³⁷ The modernized Aurora will no doubt enhance Canada’s domain awareness capabilities in the Arctic and maritime domains. Despite this, some witnesses believe that Canada should consider increasing to 18 the total number of CP-140 Aurora patrol aircraft currently being upgraded and modernized. “We originally bought 18,” Commodore (Retired) Lerhe said, so “we should have 18 maritime patrol aircraft” modernized.⁴³⁸

A number of witnesses also emphasized the need to eventually replace the Aurora with a new and more advanced patrol aircraft. It should be noted that the RCAF is planning the eventual replacement of the Aurora with a new type of aircraft under the Canadian Multi-Mission Aircraft project. But no aircraft is expected to be selected soon. According to the latest version of DND’s *Defence Acquisition Guide*, the Canadian Multi-Mission Aircraft contract is only expected to be awarded to industry in 2025 with final delivery of the aircraft occurring sometime between 2026 and 2036.⁴³⁹ That being said,

432 DND, “[CH-148 Cyclone Procurement Project](#),” Modified 9 March 2017.

433 DND, “Status Report on Transformational and Major Crown Projects,” *Report on Plans and Priorities 2017–18*.

434 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

435 DND, “[CH-148 Cyclone Procurement Project](#),” Modified 9 March 2017.

436 DND, “[CP-140 Aurora Fleet Modernization and Life Extension](#),” Modified 10 January 2017.

437 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

438 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

439 DND, “[Aerospace Systems: Canadian Multi-Mission Aircraft](#),” *Defence Acquisition Guide 2016*.

Commander (Retired) Hansen held the view that Canada should be moving forward with the Canadian Multi-Mission Aircraft project and start actively looking for an Aurora replacement. He pointed to the fact that the project is “not funded” and that there is currently “no replacement plan” for the Aurora at DND.⁴⁴⁰ This was reiterated by other witnesses.⁴⁴¹ “We have found that we can push the lifespan of the Auroras,” noted Robert Huebert, but “we will need to eventually replace them.” In his view, Canada should purchase from 12 to 24 new long-range patrol aircraft through the Canadian Multi-Mission Aircraft project.⁴⁴²

Some witnesses also believed that Canada should invest in underwater sensors and surveillance technologies to detect illicit submarine activities in its maritime domain, particularly in the Arctic. The “need to conduct undersea surveillance must not be overlooked,” Commodore (Retired) Daniel Sing told the Committee. “Above-water surveillance technologies are mostly electro-magnetic in nature,” explained Commodore (Retired) Daniel Sing, “whereas below water, surveillance technologies are mostly acoustic in nature.”⁴⁴³ Satellites, radars, aircraft, ships and other similar assets and technologies are great to monitor and detect potential threats above and on the water surface, but they have their limitations when it comes to underwater surveillance. In order to have a proper understanding of the situation below the water surface, submarines, underwater sensors, sonars, and other types of technologies are required. Although witnesses generally agreed that the best way to detect a submarine is another submarine, other underwater surveillance system and technologies, such as autonomous or remote unmanned underwater vehicles or a network of undersea acoustic sensors, might also be available and could help obtain a more complete picture of what is taking place below the water and ice surface in Canada’s maritime domain.⁴⁴⁴

The need to enhance Canada’s Arctic capabilities was addressed by a number of witnesses. Some of them, in particular, spoke about the tyranny of distances in the Arctic and the challenges this poses for naval operations. It need be noted that Canada’s Arctic is a huge region that comprises some 40% of the country’s overall landmass and 75% of its coastline.⁴⁴⁵ “The distance from Esquimalt to Nanisivik [Nunavut] ... is about the same distance from Esquimalt to Japan,” Vice-Admiral Lloyd emphasized, adding that “to go from Halifax to Nanisivik is about the same distance as going from Halifax to London [U.K.]” Because of the long distances to cover, he said, the RCN must regard naval operations in the Arctic as “expeditionary” in nature. In his view, operating in the Arctic is “almost more demanding than deploying overseas.”⁴⁴⁶ The deep water docking and refuelling facility being built in Nanisivik will no doubt help improve the RCN’s and CCG’s

440 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commander (Retired) Ken Hansen).

441 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe).

442 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

443 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

444 Lombardi, [The Future Maritime Operating Environment](#), pp. 82-84.

445 NDDN, [Canada and the Defence of North America: NORAD and Aerial Readiness](#), p. 39.

446 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

ability to maintain a presence in Canada's Arctic waters. The naval base will serve as a staging area for naval vessels on station in the Arctic, such as the new Arctic/Offshore Patrol Ships, enabling them to re-supply, refuel, embark equipment and supplies, and transfer personnel. Construction of the Nanisivik Naval Facility began in July 2015 and is expected to be completed and operational in 2018.⁴⁴⁷ But some witnesses believed that more should be done to strengthen Canada's naval presence in the North.

Several witnesses highlighted the need to modernize and expand Canada's icebreaking capabilities in the Arctic. Reference was made to the fact that Russia is strengthening its icebreaking capabilities in the Arctic and other countries are doing the same.⁴⁴⁸ Canada currently operates a fleet of 15 aging icebreakers, all of which are owned by the CCG. This includes two heavy icebreakers and four medium icebreakers as well as nine light icebreakers (Medium Endurance Multi-Tasked Vessels).⁴⁴⁹ However, witnesses pointed to the fact that the NSS is currently only recapitalizing less than half of the CCG's large-ship fleet (15 of 43 ships) and that this involves the construction of only one heavy polar icebreaker. This is the CCGS *John G. Diefenbaker*, which will be built by Vancouver Shipyards in the coming years.⁴⁵⁰ Moreover, Jeffery Hutchinson told the Committee that the CCG is only planning to replace its other heavy and medium icebreakers after the mid-2020s. "Our icebreakers are old," he said, but they are "not about to roll-over and play dead. They're very capable ships" and the CCG can "keep them going until the mid-to-late 2020s." The downside is that in order to do so, most of those icebreakers will have to undergo major overhauls and upgrades in the coming years, which will put those ships "out of the water" for periods of 8 to 10 months. All of this will no doubt affect the CCG's icebreaking capabilities.⁴⁵¹

In order to mitigate this problem, in November 2016, the CCG issued a Request for Information (RFI) to industry, "seeking input from the marine industry on options for filling potential interim needs in the Canadian Coast Guard's delivery of icebreaking services pending the arrival of new vessels being built under the National Shipbuilding Strategy."⁴⁵²

447 Defence Construction Canada (DCC), "[DCC Puts Priority on Delivering Nanisivik Naval Facility Project](#)," *DCC at Work*, Vol. 14, No. 6 (February 2016); DND, "[Minister Fantino Officially Breaks Ground for Construction of the Nanisivik Naval Facility](#)," 17 July 2015; "Canada Starts Work on Arctic Naval Base," *Jane's Defence Weekly*, Vol. 52, No. 30 (29 July 2015), p. 12.

448 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier). A total of 18 countries worldwide operate icebreakers: Argentina, Australia, Canada, Chile, China, Denmark, Estonia, Finland, Germany, Japan, Latvia, Norway, Russia, South Africa, South Korea, Sweden, the United Kingdom, and the United States. In 2017, these countries own more than 90 heavy and medium icebreakers. In addition, another 30 heavy and medium icebreakers are under construction or expected to be built in the coming years. Russia possesses the world's largest fleet of icebreakers, which consists of 46 heavy and medium icebreakers, several of which are nuclear-powered. In addition, Russia has eleven icebreakers under construction and is planning to build another four. United States Coast Guard, "Major Icebreakers of the World," 1 May 2017.

449 CCG, "[Icebreaking Operations Services](#)"; Saunders, *Jane's Fighting Ships 2016–2017*, pp. 110–112.

450 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

451 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

452 Fisheries and Oceans Canada (FOC), "[News Release: Coast Guard Seeks Input on Potential Interim Options for Icebreaking and Towing](#)," 17 November 2016; FOC, "[Backgrounder: Request for Information – Canadian Coast Guard Icebreaking and Tow Capacity](#)," 17 November 2016.

Alex Vicefield told the Committee that the Davie shipyard has made a bid to the federal government, offering to convert a few existing civilian icebreakers recently built for the offshore oil and gas industry into interim polar icebreakers for the CCG. “Canada must fast-track the interim icebreaker program,” he urged. “The window is limited for securing a handful of the modern, powerful icebreakers that are currently available due to the downturn in the oil and gas industry.”⁴⁵³

That being said, increasing the size of the CCG icebreaker fleet could be beneficial. Having more icebreakers would “multiply our [CCG] presence in the Arctic,” admitted Mario Pelletier. The “more present we are,” he added, “the more coverage we can provide and the more intervention possibilities there are.”⁴⁵⁴

Some witnesses also raised the possibility of giving the CCG a security and law enforcement mandate, and arming its ships with guns, especially its icebreakers. According to Michael Byers, this would “take a serious burden off the Royal Canadian Navy with respect to the Arctic and coastal defence.”⁴⁵⁵ According to Andrea Charron, the time is right to “to have that conversation,” though she said she “would be very cautious about expanding” the mandate of the CCG “precipitously.” In her view, this should be done progressively so that it does not negatively impact on other vital functions of the CCG.⁴⁵⁶

Changing the mandate of the CCG and arming its ships is not a new idea. “Previous governments have considered arming the Coast Guard and providing it with the authority to enforce federal laws in Canadian waters,” Mario Pelletier told the Committee. In his view, arming CCG vessels “would be beneficial” for “operations such as fisheries patrols, drug interdiction, and sovereignty patrols in the Arctic.”⁴⁵⁷ That being said, Jeffery Hutchinson urged caution. The CCG does not have a “military culture,” he said, nor does it “truly have a para-military culture.” Its members, he added, “don’t have military training, although some of [the] training verges on para-military.”⁴⁵⁸ In his view, arming the CCG and changing its mandate would imply a major culture change and would take time. Mr. Pelletier agreed. In his opinion, a more “intermediate approach” would be to give the CCG “the power to implement certain regulations” and to be “able to enforce certain laws.”⁴⁵⁹

That being said, few witnesses were of the opinion that the CCG should be merged with the RCN.⁴⁶⁰ Sending a coast guard ship to respond to a particular threat sends a very different signal than a warship, which can “ratchet up the tension level a lot,” argued

453 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

454 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

455 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

456 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

457 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

458 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

459 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Mario Pelletier).

460 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (Michael Byers).

Andrea Charron.⁴⁶¹ She prefers a whole-of-government approach to maritime security that involves a separate navy and coast guard, as well as other federal government departments and agencies. In her view, Canada should not merge the Coast Guard and the Navy into “a new sort of hybrid” organization.⁴⁶² Robert Huebert agreed with Ms. Charron: “You don't want to simply mesh them together.”⁴⁶³ According to the CCG, merging the Coast Guard with the Navy would imply a drastic organizational transformation. It is simply not on the radar at the moment. As Jeffery Hutchinson explained:

From a realistic perspective, you're talking about a fundamental change to the Canadian Coast Guard for it to be able to fit into the military or within the DND context. I don't think we could suggest that by any measure that would be a short-term transition. It would have to be measured in years, possibly a decade or more. We're not discussing this internally.⁴⁶⁴

5. A Strong Defence Industrial Capability to Support Naval Readiness

A strong shipbuilding industry is vital for naval readiness. Naval forces, in general, are technologically savvy and heavily reliant on industry, not just for the construction of new ships and submarines, but also for the repair, overhaul, upgrade and maintenance of those capabilities over the years. Defence industrial preparedness is therefore of strategic importance to naval forces.⁴⁶⁵

“Canada has a long and impressive history in naval shipbuilding,” Christyn Cianfarani noted, and the Canadian shipbuilding industry is more than capable of supplying all of the vessels required by the RCN. It has done it in the past, she said, and it can certainly do so again in the future.⁴⁶⁶ It should be noted that since the Second World War (1939–1945), it has been the policy of the federal government to procure ships in Canada for the RCN, the CCG and other federal fleets. As a result, almost all of the ships acquired over the last 70 years for the RCN have been built domestically, with the exception of a handful of specialized vessels that were purchased from foreign sources of supply – types of vessels that the Canadian shipbuilding industry did not traditionally produce, such as aircraft carriers and submarines.⁴⁶⁷ The NSS is the latest iteration of this federal government approach to shipbuilding.

However, several witnesses believed that more should be done to strengthen naval industrial preparedness in Canada and the state of the Canadian shipbuilding industry. Several witnesses referred to the NSS as a sound strategy to renew the RCN and CCG fleets and to provide work to the shipbuilding industry, but noted that it was just that, a

461 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Andrea Charron).

462 Ibid.

463 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert).

464 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 8 December 2016 (Jeffery Hutchinson).

465 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

466 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

467 Auger, [The National Shipbuilding Procurement Strategy](#), p. 1.

government procurement strategy. What is missing, in their opinion, is an industrial strategy that would help foster the development of all sectors of the shipbuilding and marine industry in Canada and provide export opportunities.⁴⁶⁸

It should be noted that since the end of the Second World War, Canada has not exported a single warship, with the exception of a few Bay class minesweepers sold to France and Turkey in the 1950s.⁴⁶⁹ All attempts to promote Canadian-built warships on export markets have failed to generate sales. Between 1992 and 1994, for example, Saudi Arabia considered ordering three Halifax class frigates from Canada for the Royal Saudi Navy, but no deal ever materialized.⁴⁷⁰ In comparison, several foreign countries, notably France and Germany, have been particularly successful in exporting their surface warships and submarines around the world.⁴⁷¹

That being said, several witnesses believed that the NSS offers opportunities in the field of naval ship exports. A few of them were of the opinion that some of the RCN and CCG ship designs slated to be built in Canada in the coming years through the NSS could be exportable and might be sold to foreign navies and coast guards. There is no reason why Canada should not be as competitive as other countries in the naval ship export business, the Committee was told. Material costs and labour costs in Canada are just as competitive as those in Europe and elsewhere, witnesses emphasized. The key to export success in the naval ship business, they noted, is to produce simplified, general purpose ship designs that can be produced at a low cost and are suitable and adaptable to multiple naval forces.⁴⁷²

However, not all witnesses were of the opinion that Canada should only focus on exporting complete naval ships. According to Christyn Cianfarani, the NSS also offers great commercial opportunities for Canadian industry in the field of naval systems and technology.

Almost every country has unique requirements in terms of their warships. It's very uncommon to take a warship and sell it to another nation off-the-shelf ... What's valuable is what's inside that ship [for example, the sensor suite or combat systems] ... That is something that you can export to another nation. That would be the type of thing that you'd look at in terms of shipbuilding exportation.⁴⁷³

468 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

469 Six Bay class minesweepers were sold to the French Navy in 1954 and another four to the Turkish Navy in 1958. Ken Macpherson and John Burgess, *The Ships of Canada's Naval Forces, 1910-1993*, St. Catharines, Vanwell Publishing, 1994, pp. 173-179.

470 "Shipyard Woos Saudi Sales," *Bangor Daily News*, 9 September 1992; "Canada Eyes Saudi Market for Newly Designed Frigate," *Bangor Daily News*, 2 March 1994; "Saint John Shipyard Loses Saudi Contract," *Bangor Daily News*, 25 November 1994; DND, [Interdepartmental Review of the Canadian Patrol Frigate Project – Report on Security](#), 26 March 1999, p. A-3/10.

471 John Birkler, Denis Rushworth, James Chiesa, Hans Pung, Mark V. Arena and John F. Schank, [Differences Between Military and Commercial Shipbuilding](#), Santa Monica, RAND Corporation, 2005.

472 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser, John Schmidt and Alex Vicefield).

473 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

According to a recent study on the Canadian defence industry conducted by CADSI and Innovation, Science and Economic Development Canada (ISED), Canada has significant capabilities in the production of naval shipborne systems, naval ship structures and components, and even simulation technology, not to mention naval ship maintenance, repair, and overhaul. “Our strength in these capabilities is, in part, a legacy of previous naval vessel construction,” she emphasized. Many companies that were actively involved in the Canadian Patrol Frigate (CPF) and other Canadian naval shipbuilding projects of the 1990s are still operational today and have been successfully selling naval systems, ship components and other technologies to naval forces worldwide.⁴⁷⁴ “A lot of the companies that were created during the [Canadian Patrol] Frigate days are still surviving and thriving,” noted Spencer Fraser. Mr. Fraser and Commodore (Retired) Eric Lerhe referred to DRS Technologies in Ontario, L-3 MAPPS in Quebec, and OSI in British Columbia as examples. L-3 MAPPS is a world leader in the production of integrated platform management systems and other naval vessel control systems as well as naval simulators. The company has sold thousands of its naval systems into no less than 40 countries, the Committee was told. Among its customers are the U.S. Navy, the British Royal Navy and the Israeli Navy. Likewise, DRS Technologies has been exporting shipborne communications systems, sensors, and other naval technologies worldwide. Some of its systems have even been fitted into U.S. Navy nuclear aircraft carriers, Commodore (Retired) Lerhe pointed out. Similarly, OSI has been selling integrated warship bridge systems around the world.⁴⁷⁵ Its systems have been sold to 19 navies and integrated into more than 500 surface warships and submarines.⁴⁷⁶ It is clear based on the experiences of the above-mentioned companies that domestic ship projects such as those currently underway through the NSS can serve as a launch pad for exports.

Several witnesses referred to the recent decision by the New Zealand government to have two of its frigates modernized in Canada as a sound example of some of the export opportunities that exist for Canadian naval systems and technologies.⁴⁷⁷ In April 2014, Lockheed Martin Canada was awarded a contract to upgrade the combat management system of the Royal New Zealand Navy’s two ANZAC class frigates.⁴⁷⁸ The two warships will be fitted with the same combat management systems as installed in the RCN’s recently modernized Halifax class frigates. The ANZAC class frigates will be upgraded at Seaspan’s Victoria Shipyards in 2017.⁴⁷⁹ According to Rear-Admiral (Retired) Patrick Finn, this commercial achievement is testament to the success of the Halifax class frigate modernization and life-extension project and the kind of export opportunities that

474 Ibid. See also Canadian Association of Defence and Security Industries (CADSI) and Innovation, Science and Economic Development Canada (ISED), *State of Canada’s Defence Industry 2014*, pp. 17, 20 and 25.

475 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 20 October 2016 (Commodore (Retired) Eric Lerhe); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Spencer Fraser).

476 OSI, “[OSI Marine Systems: Customers](#).”

477 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

478 Lockheed Martin, “[New Zealand Ministry of Defence Awards Upgrade Program to Lockheed Martin Canada](#),” 2 May 2014; Lockheed Martin, “[Lockheed Martin Canada Earns Role to Upgrade New Zealand Frigates](#),” 23 May 2014.

479 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn); NDDN, [Evidence](#), 1st Session, 42nd Parliament, 2 February 2017 (Jonathan Whitworth).

exist for Canadian companies engaged in NSS work. He pointed to the fact that other countries are interested in the combat management system of Canada's modernized Halifax class frigates.⁴⁸⁰ In early 2017, for example, the Chilean government signed a contract with Lockheed Martin Canada for the mid-life upgrade of the Chilean Navy's three Type 23 frigates.⁴⁸¹ More export opportunities may emerge in the future as the RCN showcases the capabilities of its modernized Halifax class frigates on operations around the world in the coming years. "All navies wind up being used as showpieces for their own nation's industrial base," Vice-Admiral (Retired) Robertson reminded the Committee.⁴⁸²

CADSI believes that Canada should be more aggressive in promoting Canadian industry and defence products worldwide. According to Ms. Cianfarani, the problem in Canada is that we do not view our defence industry as a strategic asset, nor do we aggressively promote it and its products abroad. She used the Canadian Surface Combatants project as an example, noting that several foreign governments have sent some of their latest warship designs to Canada to showcase their countries' technologies and what their industries can do. As a "general rule, we don't go that far as a nation," Ms. Cianfarani explained. In her opinion, what Canada needs is a Defence Industrial Strategy "not unlike" the NSS that would encompass all sectors of the Canadian defence industry and would be focused on exports.⁴⁸³ She reminded the Committee that Canada's defence industry "can't survive on the domestic market alone," for it is simply too small. "We don't have enough volume in Canada alone to sustain the industry." Canadian defence companies need to export in order to be successful and competitive. Approximately 60% of Canadian defence industry revenues, she said, come from exports. In her opinion, a Defence Industrial Strategy would be of "strategic significance with regard to how we want to use our industry ... and how we want to deal with other nations," and would also help define "as a nation, what we will aggressively [market and sell] to other nations." A Defence Industrial Strategy would send a strong signal to the world that the Canadian government is ready to stand by Canada's defence industrial base and to help promote its products.⁴⁸⁴

A Defence Industrial Strategy tied to the NSS and focused on exports would be of great value to help promote and sell Canadian ships and naval systems and technologies in foreign markets, some witnesses told the Committee. It would provide the Canadian shipbuilding and marine industry with valuable work and help further reduce the prospect of future boom and bust cycles. It would not only contribute to the development of the defence industrial base in Canada, it would also help develop more Canadian expertise in the construction as well as the overhaul, repair and maintenance of complex and sophisticated naval ships and systems. The RCN would benefit from those investments.

480 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

481 Lockheed Martin Canada, "Canadian Solution Selected by the Armada de Chile for Frigate Combat Management System Replacement Program," 23 May 2017. See also "Chile Favours Lockheed Martin Canada for Frigate Mid-Life Upgrade," *Jane's Defence Weekly*, Vol. 53, No. 51 (21 December 2016), p. 10; "[Lockheed Martin Canada to Lead Chilean Frigate Upgrade](#)," *Jane's Defence Weekly*, 21 February 2017.

482 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Vice-Admiral (Retired) Drew Robertson).

483 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 29 November 2016 (Christyn Cianfarani).

484 Ibid.

All the more interesting, export sales would help reduce production costs in Canada, thereby resulting in savings for clients such as the RCN.⁴⁸⁵ It's all about economies of scale. "The more you build the same ships" or naval systems, explained Rear-Admiral (Retired) Patrick Finn, DND's Assistant Deputy Minister (Materiel), "the better you get at it" and "the more you drive your costs down." He used the Canadian Patrol Frigate (CPF) project of the 1990s as an example, noting that the "ninth ship was about half the cost of the first ship."⁴⁸⁶

CONCLUDING REMARKS AND RECOMMENDATIONS

The Committee is convinced that Canada is a maritime nation with significant interests in the maritime domain. However, many Canadians suffer from what Robert Huebert called "saltwater blindness."⁴⁸⁷ With large portions of our population living in our country's interior and with no regular contact with the sea, many people tend to "forget" that Canada is a maritime country, that its economy relies heavily on the maritime domain, and that maintaining a professional navy is in our national security and economic interests. "The general public awareness about the Navy is relatively low in general terms," explained Commodore (Retired) Daniel Sing. "The underlying principles about the need for the Navy and how the Navy contributes to the defence of Canada, the defence of North America, and international peace and security are, generally speaking, not well known by the public."⁴⁸⁸ According to Mr. Huebert, "Canadians often forget ... that Canada depends upon sea power and has been a naval power since at least the end of the Second World War." In his view, the main reason for this pertains to the fact that "our major elements of naval power reside in Victoria [British Columbia] and Halifax [Nova Scotia]." With the RCN fleet stationed on our country's eastern and western coasts, the majority of Canadians never get an opportunity to see their Navy at work and, as a result, they tend "to forget about the importance that naval capabilities play."⁴⁸⁹ As a result, the wider Canadian public tends to have little appreciation of what it is like to be part of a community with a naval presence. The result is all too predictable: Canadians don't truly understand what the Navy actually does for them and their country. That needs to change.

As the Committee learned in the course of this study, naval power is of paramount importance to the defence of Canada. Every day, the women and men of our Navy protect our country and its maritime interests at home and abroad. Canadians have much to be proud of. As Vice-Admiral Lloyd reminded the Committee, our Navy is one of Canada's "most flexible and persistent instruments of national power — in effect, our nations' first responders."⁴⁹⁰ When crises strike abroad, our Navy's sailors and warships are often first to deploy. They are the "vanguard of the government response to crisis," as Rear-Admiral

485 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 31 January 2017 (Alex Vicefield).

486 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 17 November 2016 (Rear-Admiral (Retired) Patrick Finn).

487 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert)

488 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 18 October 2016 (Commodore (Retired) Daniel Sing).

489 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 1 November 2016 (Robert Huebert)

490 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 27 October 2016 (Vice-Admiral Ron Lloyd).

Newton told the Committee.⁴⁹¹ From providing humanitarian aid and disaster relief in foreign lands and partaking in fisheries and sovereignty patrols off Canadian shores to conducting counter-terrorism, counter-piracy, counter-narcotics and maritime interdiction operations with coalition forces overseas, our Navy remains a globally deployable and versatile naval force that continues to protect Canada, its population and its maritime interests at home and abroad despite its current capability gaps. It must be reiterated that Canadian warships have been almost continuously deployed on naval operations at home and abroad since the terrorist attacks of 11 September 2001, putting enormous pressure on Canadian sailors and their families. And we are forever grateful for the sacrifices and commitments made by the women and men of the RCN over the years.

The Committee heard that it is in the national interest for Canada to have a modern, balanced, multi-purpose, globally-deployable and combat-capable navy that continues to be interoperable with the U.S., NATO allies, and the naval forces of other partner nations in the future. At the same time, the Navy must be renewed as an institution and must ensure that its personnel better reflect Canadian society and remain professional, highly-trained and ready to operate the Navy's future fleet. The readiness of Canada's naval forces depends on it.

If the 21st century really marks a new oceanic age, as some defence experts maintain, our country will need a strong naval force to defend its maritime approaches as well as its maritime trade and interests. Canadians should not forget that Canada is a maritime nation that is surrounded by three oceans and that possesses one of the largest maritime domains in the world, nor the fact that our globalized economy is heavily reliant on maritime trade and commerce. Challenges are bound to emerge as the international security environment remains uncertain and unpredictable. Our navy will need to be up to the challenge.

Our Navy must be a national priority. It is understood that the coming years will not be easy. Building warships takes time. It is also very expensive. We must not forget that we are building today the fleet of tomorrow and this must be done right. That being said, the RCN is facing serious capability gaps as it awaits delivery of its future fleet and this is a problem. It is therefore imperative that those gaps be closed at the earliest, which is why great efforts must be made to accelerate the recapitalization of the RCN. As James Boutillier told the Committee, there is a "need for dramatic urgency."⁴⁹² The women and men of the RCN deserve nothing less.

As such, the Committee makes the following recommendations to the Government of Canada to improve the naval defence of Canada.

491 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 22 November 2016 (Rear-Admiral John Newton).

492 NDDN, [Evidence](#), 1st Session, 42nd Parliament, 7 February 2017 (James Boutillier).

The Committee recommends:

Recommendation 1

That the Government of Canada recognize that the readiness of the Royal Canadian Navy is one of its key pillars in ensuring national sovereignty and security, while simultaneously being aware that the aggressive actions by Russia and China in the maritime domain pose a direct threat to Canada and its interests.

Recommendation 2

That at minimum the budget for the Navy be increased to ensure Canada can meet its domestic and international obligations, to allow recapitalization of our fleet, and to ensure that Royal Canadian Navy personnel have the training and equipment they need and the support they have earned.

Recommendation 3

That the Government of Canada reaffirm its commitment to its partners in NATO and ASEAN, and regularly participates in freedom of navigation patrols with the aforementioned partners.

Recommendation 4

That the Government of Canada implement a recruitment, retention, and training plan for the Royal Canadian Navy Reserves.

Recommendation 5

That the Government of Canada ensure adequate funding is in place for the recruitment, retention, and training of Royal Canadian Navy Regular Force personnel, in particular training for the new ships and systems being implemented by the National Shipbuilding Strategy.

Recommendation 6

That the Government of Canada continue to support and improve the National Shipbuilding Strategy, which was adopted with all-party support, and recognize that the Strategy, in its current form, represents a minimum requirement for the recapitalization of the Royal Canadian Navy.

Recommendation 7

That the Government of Canada recognize the need to ensure that the Canadian Surface Combatants include capabilities comparable to that of a modern guided missile cruiser or destroyer.

Recommendation 8

That the Government of Canada consider additional Canadian shipyards for supplementary and future work that compliments and supplements the work of the National Shipbuilding Strategy.

Recommendation 9

That the Government of Canada consider exploring the possibility of a centralized, single point of authority and accountability for defence procurement to increase transparency and procurement speed by eliminating distributed accountability.

Recommendation 10

That the Government of Canada begin the process of replacing Canada's submarine fleet with the intention of increasing the size of the fleet with submarines that have under-ice capabilities to operate in our unique maritime environment and to address the threats in our coastal waters.

Recommendation 11

That the Government of Canada exercise its option for a third Joint Support Ship to ensure continuous operational capabilities as envisioned in the original Joint Support Ships project of 2006.

Recommendation 12

That the Government of Canada keep the Resolve class interim auxiliary oil replenishment (AOR) ship operational in order to help close the Royal Canadian Navy's at-sea replenishment capability gap until a third Joint Support Ship is delivered, and that if there are significant delays, that a second Resolve class interim AOR ship be contracted.

Recommendation 13

That the Government of Canada immediately begin the process to procure 12 Canadian Coastal Patrol Ships for the Royal Canadian Navy under the National Shipbuilding Strategy.

Recommendation 14

That the Government of Canada increase the number of RADARSAT Constellation satellites from three to six in order to enhance surveillance capabilities in Canada's Arctic and maritime domains.

Recommendation 15

That the Government of Canada continue to support the advancement of drone technology integration for Arctic and maritime domain awareness with Canada's future naval fleet.

Recommendation 16

That the Government of Canada initiate and fund a procurement project to replace the RCAF fleet of CP-140 Aurora patrol aircraft with a new and more advanced type of multi-mission aircraft in the coming years.

Recommendation 17

That the Government of Canada recognize the need for an increased focus and doctrine related to Canada's naval capability and presence in the Arctic region.

Recommendation 18

That the Government of Canada take a leading role within the NATO Alliance in the specialization of Arctic sovereignty protection, in both capabilities and doctrine.

Recommendation 19

That the Government of Canada immediately complete the Nanisivik Naval Facility on Baffin Island.

Recommendation 20

That the Government of Canada immediately launch a plan to replace Canada's fleet of icebreakers to provide safe navigation to maritime traffic and protect Arctic sovereignty.

Recommendation 21

That the Government of Canada reaffirm the Canadian Coast Guard's status as an organization without naval or law enforcement responsibilities until such time that a study is conducted to ascertain the feasibility of incorporating it into the Royal Canadian Navy.

Recommendation 22

That the Government of Canada develop a Defence Industrial Strategy to support Canada's defence industry, encourage innovation and investments in defence research and development, actively promote Canadian defence products abroad, and provide export opportunities to Canadian companies, particularly those engaged in shipbuilding.

APPENDIX A

Combat Fleets of the World's Top 60 Navies (2016)

Countries	Surface Warships								Submarines	Total
	Power Projection Ships		Major Surface Combatants			Minor Surface Combatants				
	Aircraft Carriers	Principal Amphibious Ships	Cruisers	Destroyers	Frigates	Corvettes	Patrol and Coastal Combatants	Mine Warfare Vessels		
Asia-Pacific	6	26	9	74	190	122	1,455+	182	219	2,283+
Australia	0	3	0	0	11	0	15	6	6	41
Bangladesh	0	0	0	0	5	6	50	5	0	66
China	1	4	0	21	57	27	180+	41	57	388+
India	1	1	0	14	13	8	99	6	14	156
Indonesia	0	5	0	0	12	20	64	8	2	111
Japan	3	3	2	33	9	0	6	27	19	102
Malaysia	0	0	0	0	10	4	33	4	2	53
Myanmar	0	0	0	0	5	2	111	0	0	118
New Zealand	0	1	0	0	2	0	6	0	0	9
North Korea	0	0	0	0	2	0	383+	24	73	482+
Pakistan	0	0	0	0	10	0	16	3	8	37
Philippines	0	1	0	0	1	0	66	0	0	68
Singapore	0	4	0	0	6	6	29	4	4	53
South Korea	0	2	3	6	14	35	74+	10	23	167+
Sri Lanka	0	0	0	0	0	0	131	0	0	131
Taiwan	0	1	4	0	22	1	50	14	4	96
Thailand	1	1	0	0	9	7	77	17	0	112
Vietnam	0	0	0	0	2	6	65	13	7	93
Europe	4	15	5	69	109	79	449	234	145	1,109
Belgium	0	0	0	0	2	0	2	6	0	10
Bulgaria	0	0	0	0	4	0	3	6	0	13
Denmark	0	0	0	3	4	0	9	6	0	22
Finland	0	0	0	0	0	0	18	15	0	33
France	1	4	0	12	11	0	22	18	10	78
Germany	0	0	0	7	8	0	0	33	6	54
Greece	0	0	0	0	13	5	28	4	11	61
Italy	2	3	0	9	8	4	14	10	7	57
Netherlands	0	2	0	4	2	0	4	6	4	22
Norway	0	0	0	5	0	0	23	6	6	40
Poland	0	0	0	0	2	1	3	20	5	31
Portugal	0	0	0	0	5	5	18	0	2	30
Romania	0	0	0	3	0	4	21	11	0	39
Russia	1	0	5	15	12	48	47	45	62	235
Spain	0	3	0	5	6	0	23	6	3	46
Sweden	0	0	0	0	0	5	142	10	5	162
Turkey	0	0	0	0	18	6	47	15	13	99
Ukraine	0	0	0	0	1	1	3	1	0	6
United Kingdom	0	3	0	6	13	0	22	16	11	71
Americas	11	34	24	71	69	16	348	19	98	690
Argentina	0	0	0	5	6	3	13	0	3	30
Brazil	1	2	0	3	10	0	44	5	5	70
Canada	0	0	0	0	12	0	12	0	4	28

Countries	Surface Warships								Submarines	Total
	Power Projection Ships		Major Surface Combatants			Minor Surface Combatants				
	Aircraft Carriers	Principal Amphibious Ships	Cruisers	Destroyers	Frigates	Corvettes	Patrol and Coastal Combatants	Mine Warfare Vessels		
Chile	0	1	0	1	7	0	13	0	4	26
Colombia	0	0	0	0	4	1	53	0	4	62
Ecuador	0	0	0	0	1	6	3	0	2	12
Mexico	0	0	0	0	6	0	122	0	0	128
Peru	0	0	1	0	7	6	6	0	6	26
United States	10	31	23	62	8	0	57	11	68	270
Uruguay	0	0	0	0	2	0	15	3	0	20
Venezuela	0	0	0	0	6	0	10	0	2	18
Africa	0	3	0	2	26	10	255+	18	11	325+
Algeria	0	1	0	0	7	6	18	0	4	36
Egypt	0	2	0	1	8	2	58	14	4	89
Libya	0	0	0	0	1	0	11+	0	0	12+
Morocco	0	0	0	1	5	1	49	0	0	56
Nigeria	0	0	0	0	1	1	113	2	0	117
South Africa	0	0	0	0	4	0	6	2	3	15
Middle-East	0	0	0	3	14	22	365+	10	26	440+
Bahrain	0	0	0	0	1	2	10	0	0	13
Iran	0	0	0	0	5	2	237+	5	21	270+
Israel	0	0	0	0	0	3	50	0	5	58
Oman	0	0	0	0	3	2	10	0	0	15
Saudi Arabia	0	0	0	3	4	4	26	3	0	40
United Arab Emirates	0	0	0	0	1	9	32	2	0	44
Grand Total	21	78	38	219	408	249	2,872+	463	499	4,847+

Notes: The table only focuses on navies. It does not include references to vessels operated by coast guards; customs and border protection services; police forces and other law enforcement agencies; border guards, civil guards, revolutionary guards, and other types of paramilitary forces. Moreover, the table only includes surface warships and submarines. It does not include the various auxiliary non-combat ships owned and operated by those navies, such as auxiliary oil replenishment (AOR) ships, logistics and support ships, amphibious landing ships and landing craft, hospital ships, research and survey ships, training ships, rescue boats, diving tenders, harbour patrol craft, fireboats, tugs, and other similar types of vessels.

The "Principal Amphibious Ships" category only includes the following types of helicopter-carrying amphibious ships: Landing Platform Helicopter (LPH), Landing Helicopter Assault (LHA), Landing Helicopter Dock (LHD), Landing Platform Dock (LPD), and Landing Ship Dock (LSD). Other types of amphibious ships, such as Landing Ship Medium (LSM) or Landing Ship Tank (LST), are not included in the "Principal Amphibious Ships" category.

The "Patrol and Coastal Combatants" category includes all types of minor surface combatant vessels, with the exception of corvettes and mine warfare vessels. Included in this category are fast attack crafts, littoral combat ships, inshore and offshore patrol ships, coastal patrol ships, patrol boats, and other types of small armed combatant vessels.

Source: Table prepared using data from International Institute for Strategic Studies (IISS), *The Military Balance 2017*, pp. 27–548.

APPENDIX B

Major Shipbuilding Programs of the World (2016)

Countries	Surface Warships							Submarines	Total	
	Power Projection Ships		Major Surface Combatants			Minor Surface Combatants				
	Aircraft Carriers	Principal Amphibious Ships	Cruisers	Destroyers	Frigates	Corvettes	Patrol and Coastal Combatants			Mine Warfare Vessels
Asia-Pacific	4	10	0	90		45	162	27	104	442
Australia	0	0	0	3	9	0	12	0	12	36
Bangladesh	0	0	0	0	0	2	10	0	2	14
China	1	2	0	8	11	7	0	2	14	45
India	2	4	0	5	11	10	31	12	23	98
Indonesia	0	1	0	0	0	6	6	0	12	25
Japan	1	0	0	4	0	0	0	2	4	11
Malaysia	0	0	0	0	0	6	0	0	0	6
Myanmar	0	0	0	0	0	0	8	0	0	8
New Zealand	0	0	0	0	0	0	1	0	0	1
Pakistan	0	0	0	4		0	8	0	8	20
Philippines	0	1	0	0	3	1	33	0	0	38
Singapore	0	0	0	0	0	8	5	0	2	15
South Korea	0	2	0	3	11	0	35	5	19	75
Taiwan	0	0	0	4	8	0	11	6	4	33
Thailand	0	0	0	0	2	1	2	0	3	8
Vietnam	0	0	0	0	4	4	0	0	1	9
Europe	2	3	1	23	76	19	62	13	59	258
Denmark	0	0	0	0	0	0	1	0	0	1
France	0	0	0	11	0	0	0	0	6	17
Finland	0	0	0	0	0	0	0	1	0	1
Germany	0	0	0	0	10	0	0	0	0	10
Greece	0	0	0	0	6	0	2	2	1	11
Italy	0	1	0	0	5	10	0	0	1	17
Netherlands	0	0	0	0	2	0	0	0	4	6
Norway	0	0	0	0	0	0	1	0	6	7
Poland	0	0	0	0	0	1	0	3	3	7
Portugal	0	1	0	0	0	0	4	0	0	5
Russia	0	0	1	12	27	6	17	7	18	88
Spain	0	0	0	0	5	0	3	0	4	12
Sweden	0	0	0	0	0	0	18	0	2	20
Turkey	0	1	0	0	4	2	10	0	6	23
Ukraine	0	0	0	0	4	0	1	0	0	5
United Kingdom	2	0	0	0	13	0	5	0	8	28
Americas	2	10	0	66		4	125	0	38	245
Argentina	0	0	0	0	0	0	2	0	0	2
Brazil	0	0	0	0	5	4	25	0	7	41
Canada	0	0	0	15		0	6	0	0	21
Chile	0	0	0	0	0	0	2	0	0	2
Colombia	0	0	0	0	0	0	48	0	0	48
Mexico	0	0	0	0	0	0	37	0	0	37
Peru	0	2	0	0	0	0	2	0	0	4
United States	2	7	0	26	18	0	0	0	28	81

Countries	Surface Warships								Submarines	Total
	Power Projection Ships		Major Surface Combatants			Minor Surface Combatants				
	Aircraft Carriers	Principal Amphibious Ships	Cruisers	Destroyers	Frigates	Corvettes	Patrol and Coastal Combatants	Mine Warfare Vessels		
Uruguay	0	0	0	0	2	0	3	0	0	5
Venezuela	0	1	0	0	0	0	0	0	3	4
Africa	0	1	0	0	8	1	10	0	6	26
Algeria	0	1	0	0	3	1	0	0	2	7
Egypt	0	0	0	0	4	0	3	0	4	11
Nigeria	0	0	0	0	1	0	1	0	0	2
South Africa	0	0	0	0	0	0	6	0	0	6
Middle-East	0	0	0	0	9	7	36	0	11	63
Iran	0	0	0	0	5	0	4	0	10	19
Israel	0	0	0	0	0	0	4	0	1	5
Oman	0	0	0	0	0	0	1	0	0	1
Saudi Arabia	0	0	0	0	4	6	25	0	0	35
United Arab Emirates	0	0	0	0	0	1	2	0	0	3
Grand Total	8	24	1	272	76	395	40	218	1,034	

Notes: Figures pertain to surface warships and submarines that were under construction in 2016 as well as those that had been ordered or were projected to be ordered in the coming years. The table does not include figures on auxiliary non-combat ships, such as auxiliary oil replenishment (AOR) ships, logistics and support ships, amphibious landing ships and landing craft, hospital ships, research and survey ships, training ships, rescue boats, diving tenders, harbour patrol craft, fireboats, tugs, and other similar types of vessels.

Source: Table prepared using data from Stephen Saunders, ed., *Jane's Fighting Ships, 2016–2017*, IHS Global, 2016, pp. 2–1006.

APPENDIX C LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
<p>Naval Association of Canada</p> <p>VAdm (Ret'd) Drew Robertson</p> <p>Cmdre (Ret'd) Daniel Sing Director Naval Affairs</p>	2016/10/18	21
<p>Navy League of Canada</p> <p>Capt(N) (Ret'd) Harry Harsch Vice-President Maritime Affairs</p>		
<p>As an individual</p> <p>Cdr (Ret'd) Ken Hansen Science Advisory Committee Member Institute for Ocean Research Enterprise</p>	2016/10/20	22
<p>Cmdre (Ret'd) Eric Lerhe, Centre for the Study of Security and Development Dalhousie University</p>		
<p>Department of National Defence</p> <p>Cmdre C.P. Donovan Director General Naval Force Development Royal Canadian Navy</p> <p>VAdm Ron Lloyd Commander Royal Canadian Navy</p> <p>CPO 1 Michel Vigneault Royal Canadian Navy</p>	2016/10/27	24
<p>As an individual</p> <p>Andrea Charron Assistant Professor University of Manitoba Director of the Centre for Security Intelligence and Defence Studies at Carleton University</p> <p>Robert Huebert Associate Professor Department of Political Science University of Calgary</p>	2016/11/01	25
<p>Department of National Defence</p> <p>Stephen Burt Assistant Chief of Defence Intelligence Canadian Forces Intelligence Command</p>	2016/11/03	26

Organizations and Individuals	Date	Meeting
Department of National Defence RAdm (Ret'd) Patrick Finn Assistant Deputy Minister Materiel	2016/11/17	28
Department of Public Works and Government Services Lisa Campbell Assistant Deputy Minister Marine and Defence Procurement		
Department of National Defence RAdm Art McDonald Commander Maritime Forces Pacific and Joint Task Force Pacific Royal Canadian Navy RAdm John Newton Commander Maritime Forces Atlantic and Joint Task Force Atlantic Royal Canadian Navy	2016/11/22	29
Canadian Association of Defence and Security Industries Christyn Cianfarani President	2016/11/29	31
Department of Fisheries and Oceans Jeffery Hutchinson Deputy Commissioner Strategy and Shipbuilding Canadian Coast Guard Mario Pelletier Deputy Commissioner Operations Canadian Coast Guard	2016/12/08	33
Chantier Davie Canada Inc. Alex Vicefield Chairman Federal Fleet Services Inc. Spencer Fraser Chief Executive Officer John Schmidt Vice-President Commercial	2017/01/31	34
Irving Shipbuilding Inc. Scott Jamieson Vice-President Programs	2017/02/02	35

Organizations and Individuals	Date	Meeting
Kevin McCoy President J.D. Irving, Limited James D. Irving Co-Chief Executive Officer Seaspan Jonathan Whitworth Chief Executive Officer Seaspan ULC As an individual	2017/02/07	36
James Boutilier Adjunct Professor Pacific Studies University of Victoria Michael Byers Professor Department of Political Science University of British Columbia David Perry Senior Analyst Canadian Global Affairs Institute Joel Sokolsky Professor Department of Political Science Royal Military College of Canada		
Department of National Defence CPO 1 David Arsenault Chief Petty Officer Naval Reserve Royal Canadian Navy Cmdre Marta B. Mulkins Commander Naval Reserve Royal Canadian Navy Capt(N) Chris Ross Deputy Commander Naval Reserve Royal Canadian Navy	2017/02/09	37
Australian Strategic Policy Institute Peter Jennings Executive Director	2017/02/14	38

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* ([Meetings Nos. 21, 22, 24, 25, 26, 28, 29, 31, 33, 34, 35, 36, 37 and 38, 44, 45, 46, 49, 50, 51, 52 and 53](#)) is tabled.

Respectfully submitted,

Stephen Fuhr
Chair

NDP Supplemental Report on The Readiness of Canada's Naval Forces

The NDP supports the National Defence Committee report on Royal Canadian Naval and Naval Readiness but wishes to add a few supplementary observations.¹

New Democrats wish to highlight the importance of the committee's strong support for the National Shipbuilding Strategy. We believe that the National Shipbuilding Strategy (NSS) is absolutely critical to the long term success of the Royal Canadian Navy's recapitalization and modernization efforts. The NSS was approved with all-party support during the 41st Parliament as a means to ensure Canada maintains the naval capacity required to defend our sovereignty, meet our international commitments and maintain and enhance our search and rescue capacity. At the same time the NSS will ensure that a viable and vibrant Canadian shipbuilding industry continues to exist and that it does so without enduring recurring boom and bust cycles. While two shipyards, one on the East Coast and one on the West Coast, won the contracts for the NSS, the strategy is one that benefits the entire country. Sub-contracts have been signed with beneficiaries in all provinces and work has begun that, if cancelled would only further delay getting the ships and equipment the navy needs.

When it was adopted, the NSS was seen as meeting the minimum needs of the RCN. Recent deferrals of capital funding and changes to the number of ships to be built have put in question whether the NSS has now become a "ceiling" rather than a "floor" as originally intended. For example, the NSS was supposed to have provide three Joint Support Ships. This number has now been reduced by the Liberal government to two, with the idea of one ship for the east and one for the west. Yet with only two Joint Support Ships one coast or the other will be periodically left without a support ship due to maintenance and training requirements. New Democrats strongly support the committee's recommendation that three such ships be built.

There are additional naval capabilities required which were not included within the shipbuilding strategy, including projects like the replacement of the Kingston Class ships. These additional projects could be accomplished through contracts with other Canadian shipyards so that the two main NSS shipyards can continue focussing on their work under the Shipbuilding strategy. New Democrats will work with our colleagues in Parliament to ensure the Canadian Forces are properly equipped and that Canadian industry is the primary beneficiary from the recapitalization of the Canadian Forces.

New Democrats support providing necessary and reasonable increases to defence spending so that our Forces have the training and equipment they require to do the difficult and dangerous work we ask them to do on our behalf

¹ New Democrats regret the inclusion of the quotation by Peter Jennings at the end of paragraph 143 of the report.

and the support they have earned at the end of their service. New Democrats recognize that the Canadian Forces have a major role to play in promoting peace throughout the world. However, if Canada wishes to play a leadership role in promoting a more stable and secure world we must also address the causes of instability and conflict. For that reason New Democrats believe that there should be equal, dollar for dollar, increases in our international assistance budget to match defence spending increases. With both a strong military and a robust aid policy Canada can indeed play a leading role in helping build a safer world.