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The Canadian Surface Combatant

Lieutenant-Commander Robert Gilpin

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Exercise Solo Flight

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The Canadian Surface Combatant

Lieutenant-Commander Robert Gilpin

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EXERCIS SOLO FLIGHT – THE CANADIAN SURFACE COMBATANT: THE RIGHT SHIP FOR CANADA

INTRODUCTION

Russia and China have been challenging the democratic World order since the mid 2000s.¹ Chinese aggression in the South China Sea and Russia's annexation of Crimea and invasion of the Ukraine are overt challenges that have led policy makers to sound the alarm that great power competition has returned.² Russia and China challenging the post-Cold War international order has ushered in a new era with three major world powers that Canada must be prepared to compete in. A key area where great power competition will take place is on the world's oceans. Both Russia and China have demonstrated intent to use force or threat of force as a first measure to settle disputes between countries.³ This is evident through Chinese actions in the South China Sea. China has established that it does not recognize the oceans as being a global common and is willing to use military force to assert their claims.⁴

As Canadians watch in horror as the Russian military takes brutal and illegal action in Ukraine the conversation surrounding Canada's own military capabilities are appearing in the Canadian public discourse. Following the Russian aggression and a public outcry the Liberal Government announced it is increasing defence spending by \$8 billion over the next five years.⁵ The funding increase raises Canada's defence spending

¹ United States. Congressional Research Service, "Renewed Great Power Competition: Implications for Defense—Issues for Congress. CRS Report," 2020, 24, <https://go.exlibris.link/L3mzxCPZ>.

² United States. Congressional Research Service, 24.

³ United States. Congressional Research Service, 25.

⁴ Marta Hermez, "Global Commons and the Law of the Sea: China's Lawfare Strategy in the South China Sea," *International Community Law Review* 22, no. 5 (2020): 559–88, <https://doi.org/10.1163/18719732-12341447>.

⁵ Amanda Connolly, "Canadian Military Budget Will Grow by \$8B as Policy Review Seeks to Reset Defence Vision," *Global News*, April 7, 2022, <https://globalnews.ca/news/8743608/canada-budget-defence-spending-plans/>.

up to 1.5 percent of GDP. Although this falls short of the two percent required by NATO it is a clear message that national defence is a priority for the Government.

Great power competition and near peer rivalry requires a drastic shift in strategy for Canada's military. It will necessitate a change from counterinsurgency (COIN) operations to a renewed focus on high-end conventional warfare against a near peer. High-end conventional warfare is "large-scale, high-intensity, technologically sophisticated conventional warfare against adversaries with similarly sophisticated military capabilities."⁶ To fight and win Canada and its allies must continue to develop and produce high-end military equipment which includes advanced warships for the navy. The navy is critical to any nation's military power as it projects force and brings the fight to the adversary. A strong navy alone can deter Chinese and Russian aggression and if required win in a conventional fight before the enemy reaches North America. Canada must contribute to this fight and the recapitalization of the Royal Canadian Navy (RCN) will be critical to this endeavour.

Strong, Secure, Engaged (SSE), Canada's defence policy, makes it clear that the RCN must sustain the ability to operate across the spectrum of conflict and maintain the ability to deploy two naval Task Groups (TG). The TG is composed of four major surface combatants, a support ship, and a submarine when required.⁷ The defence policy also states that Canada will invest in 15 Canadian Surface Combatants (CSC) through the

⁶ United States. Congressional Research Service, "Renewed Great Power Competition: Implications for Defense—Issues for Congress. CRS Report," 2022, 18, <http://cfc.summon.serialssolutions.com/>.

⁷ Canada. Department of National Defence, "Strong, Secure, Engaged: Canada's Defence Policy," policies, September 22, 2017, <https://www.canada.ca/en/department-national-defence/corporate/policies-standards/canada-defence-policy.html>.

National Shipbuilding Strategy (NSS).⁸ The CSC is based on the British Type 26 Global Combat Ship (GCS) and will be fitted with American combat systems and weapons. The CSC will provide the ability required for the RCN to contribute to NATO and other allied communities to counter Russian and Chinese aggression through deterrence and conventional warfare. The ship will fulfill the wide-ranging missions assigned by the Government of Canada (GoC) and will be interoperable with NATO and Five Eyes countries. The Canadian variant of the Type 26 will bring the best value to Canada and provide the backbone of the RCN for the next 50 years. The CSC will provide the RCN with a capability rich ship and will be instrumental in rebuilding Canada's warship building industry.

It will be demonstrated that Canada should pursue a domestically built Type 26 warship to replace the aging Canadian Patrol Frigates and already retired area air defence destroyers. First, a brief history on the acquisition will be presented explaining the events that led the RCN to choose the Type 26 as the next major surface combatant. Following the history of the CSC project, the reason Canada requires a unique warship and cannot simply purchase an "off the shelf" design will be explained. Finally, the debate about which type of ship will provide the most value to Canadian taxpayers will be discussed. It will be proven that building a Canadian variant of the Type 26 is the best value for Canada despite other options that have a lower initial price tag or lower project risk associated with them.

BACKGROUND

⁸ Canada. Department of National Defence, 13.

To understand why Canada is in the process of fleet recapitalization a brief background is required. The Canadian Surface Combatant Project (formally the Single Class Surface Combatant Project) is the GoC effort to procure 15 major surface combatants to recapitalize the RCN Fleet. The CSC will replace the four retired *Iroquois*-class destroyers and 12 *Halifax*-class frigates. Although there have been several projects aimed at replacing these ships the modern CSC project was first announced in the Canada First Defence Strategy in 2008.⁹ This section will discuss Canada's National Shipbuilding Strategy (NSS) and the role the CSC Project will play in the revival of the warship producing capability of Canadian shipyards. Following the discussion of NSS, the CSC competition that led to the selection of the Type 26 will be described.

The NSS was created in 2010 by the GoC to equip the RCN and Canadian Coast Guard (CCG) with new ships to replace aging and retired ships. It is designed to restore Canada's shipyards by creating expertise in shipbuilding and complex project management.¹⁰ The main goals of NSS are to eliminate the "boom and bust" cycle of building large warships and to capitalize on the economic and technical benefits of building warships in Canada. Since the end of the construction of the *Halifax*-class in the mid 1990s Canada's warship building industry has been dormant.¹¹

To eliminate the "boom and bust" cycle the NSS established two shipyards to build future fleets for the RCN and CCG: Irving Shipbuilding Inc. (ISI) on the East Coast

⁹ Canada. Department of National Defence, "Canada First Defence Strategy" (National Defence and the Canadian Forces, 2008), 4, <https://go.exlibris.link/Lyk1q8KK>.

¹⁰ Canada. Public Services and Procurement Canada, "National Shipbuilding Strategy - Defence and Marine Procurement," April 13, 2016, <https://www.tpsgc-pwgsc.gc.ca/app-acq/amd-dp/mer-sea/sncn-nss/index-eng.html>.

¹¹ Ron Lloyd and David Perry, "The Canadian Surface Combatant: Capability and Context," *CE Think Tank Newswire*, 2021, <https://go.exlibris.link/hr4K0hN5>.

and Seaspan on the West Coast. By partnering with two shipyards the Government of Canada could promise several years of sustained shipbuilding.¹² ISI won the competition to build Canada's large vessels which are ships over 1,000 tons including the CSC.

To reduce the risk in the CSC procurement the RCN required the ship to be an "in service" design, modifying the combat capabilities as required to fit Canada's unique requirements.¹³ The GoC competition for the CSC contract combined the design of the ship and the integration of the combat systems into a single contract. This meant ISI would be the prime contractor to build the ships in Halifax with industry teams providing the hull design and combat systems integration for the future CSC.¹⁴ On December 1, 2017, three bids were submitted for the for the CSC. The first bid from Alion Canada proposed to build the Dutch *De Zeven Provinciën*-class Frigate. The second bid was based on the Spanish F-105 *Alvaro de Brazan*-class was from the consortium led by Navantia. The final bid from Lockheed Martin Canada in consort with BAE Systems put forward the British Type 26 – Global Combat Ship.¹⁵

The Government was expecting a fourth bid from Fincantieri-Naval Group for the Franco-Italian FREMM multipurpose frigate. Surprisingly, the Fincantieri-Naval Group did not submit a formal bid, however, they offered the GoC a contract for the FREMM outside of the formal bidding process.¹⁶ The French and Italian Governments offered to produce 15 warships for \$30B which was significantly less than the original project

¹² Ian Mack, "Launching the Canadian Surface Combatant Project," Canadian Global Affairs Institute, 2020, <https://go.exlibris.link/zhNhk3TY>.

¹³ Richard Shimooka, "No Other Option: Politics, Policy and Industrial Considerations in the Canadian Surface Combatant Program," *Macdonald-Laurier Institute Publication*, December 2021, 52.

¹⁴ Shimooka.

¹⁵ Shimooka, 25.

¹⁶ David Pugliese, "Liberals Reject Warship Proposal That Companies Said Would Save Taxpayers as Much as \$32B," *National Post*, December 5, 2017, <https://nationalpost.com/news/canada/liberals-reject-warship-proposal-that-companies-said-would-save-taxpayers-as-much-as-32b>.

budget of \$62B CAD. However, the first four ships needed to be built in Europe.¹⁷ The Fincantieri Group attempted to circumvent the bidding process because they felt the bidding process unfairly advantaged the Type 26 design from Lockheed Martin Canada and BAE.¹⁸ Four days after receiving the FREMM bid, the GoC declined the offer citing the unacceptable bid process used by the FREMM team. It is unfortunate that the FREMM was not considered in the CSC project as it is a capable design and was a serious contender for the CSC contract.

Following eleven months of bid evaluation by the GoC and RCN, the bid from Lockheed Martin Canada with BAE Systems for the Type 26 was selected on October 8, 2018. Immediately following the announcement Lockheed and BAE entered negotiations for the design contract, which was signed February 8, 2019 for \$185 million.¹⁹ The entire project was budgeted for \$60 billion for the design and build of 15 Type 26 Canadian variant ships. With the NSS selection of ISI as the prime shipbuilder of major surface combatants and the LM-BAE Type 26 selected the RCN was ready to design and eventually start cutting steel on a new surface warship.

With a background knowledge of the project, the Type 26 can be discussed as the best option for Canada. As reports on the CSC project predict budget increases and potential delays numerous journalist, academics, politicians, and naval officers are questioning the decision to proceed with the Type 26. The following section describes Canada's requirements for its next generation warship. The Type 26 will be compared with the FREMM and the Type 31 to prove that Canada should continue with the

¹⁷ Shimooka, "No Other Option," 26.

¹⁸ Pugliese, "Liberals Reject Warship Proposal That Companies Said Would Save Taxpayers as Much as \$32B."

¹⁹ Shimooka, "No Other Option," 29.

purchase of the Type 26. Although more expensive in upfront costs the benefits from the Type 26 far outweigh the small cost increase in the near term.²⁰

WARSHIPS THAT SPAN ALL LEVELS OF CONFLICT

Before launching into a comparison of extremely complex warships it is important to determine what missions Canada needs the CSC to conduct. This is defined in SSE and Leadmark 2050 which is the quasi-RCN policy and concept document. Although the Request for Proposals (RFP) for the CSC competition was not released the capabilities desired from the fleet of CSCs are clear based on SSE and Leadmark 2050. SSE states the NSS is a major priority for Canada. By partnering with two shipyards the “boom and bust” cycle can be avoided which will rebuild the corporate knowledge required for warship construction in Canada. This necessitates the CSC be built domestically by ISI which also benefits the Canadian economy.²¹ Second, SSE describes the RCN as a blue water navy that must deploy globally and be self-sustaining. A blue water navy is achieved through the proper mix of ships and submarines deployed as part of a naval Task Group (TG). A Canadian TG will be composed of four major surface combatants (*Halifax*-class or CSC), a joint support ship (JSS) and a *Victoria*-class submarine when required.²² To deploy two Canadian TGs Canada requires 15 CSCs, 2 JSSs, and 4 Submarines.²³

²⁰ Shimooka, “No Other Option.”

²¹ Canada. Department of National Defence, “Strong, Secure, Engaged,” 34.

²² Canada. Department of National Defence, 35.

²³ Canada. Department of National Defence, 35.

Leadmark 2050 builds on concepts described in SSE. It describes a Navy that is capable of high intensity combat with the ability to gain sea control²⁴ of an operating environment.²⁵ The RCN must be able to do five things in support of major military operations: gain access to the theatre for the Joint Force, protect Sea Lines of Communication (SLOCs), project power from the sea, contribute to the fight ashore through Command and Control (C2), intelligence, reconnaissance, and provide joint fires.²⁶ These elements are only possible with a high-end warship like the Type 26.

These two documents make it clear that Canada needs a high-end multipurpose frigate capable of fulfilling non-traditional roles. The CSC must be able to operate in all areas of naval warfare including anti-submarine warfare (ASW), anti-surface warfare (ASuW), anti-air warfare (AAW) including area-air defence (AAD), and land attack. Canada must build a ship that can fulfill roles normally associated with three distinct types of ships: frigates, destroyers, and cruisers.²⁷ The CSC will need to have an ASW bias while adding the weapons and sensors necessary to conduct area air defence and land strike missions. In addition to traditional warfighting roles the CSC will need to conduct humanitarian assistance and disaster relief (HADR) missions and maritime interdiction operations (MIO). The most influential capability in ship selection is the margin for

²⁴ Here, sea control is defined as the capacity of maritime forces to control events at sea through the latent or actual use of force. Sea control is not absolute: it is always considered in relation to an adversary, and it is usually limited in both time and space. It is a condition, created by the action of maritime forces, which permits the sea to be used for one's own purpose. See Canada. Department of National Defence, "Canada in a New Maritime World: Leadmark 2050" (National Defence, 2016)

²⁵ Canada. Department of National Defence, 26.

²⁶ Canada. Department of National Defence, 27.

²⁷ Generally, the type of ship refers to its size and capabilities. Frigates are typically ASW focused capable of limited AAW and are employed as escorts. Destroyers are more capable and are typically larger employed in all three areas of naval warfare with a focus on area-air defence. Cruisers provide the C2 element and are also capable of land strike. Modern warships are blurring the lines between these types of ships. When complete the Type 26 for Canada will blur the lines between Frigate and Destroyer with limited cruiser capability.

future growth. The CSC will be operational for over 50 years which will require the ship to be upgraded as technology advances. To meet the needs of future weapons and sensors the CSC must be a modern design with deck space and electrical power generation capacity to grow over the next five decades.²⁸ Consequently, the bid evaluation process selected the Type 26. It is optimized for ASW with abilities in all areas of warfare, has significantly larger growth margins when compared to competitors, and is the newest design.

The rising costs of the Type 26 and the British decision to decrease the number of Type 26 frigates purchased in favour of a cheaper, less capable Type 31 has raised questions in the Canadian naval and political communities. In response, the House of Commons Standing Committee on Government Operations and Estimates (OGGO) requested a costing analysis of the Type 26 from the Parliamentary Budget Officer (PBO). The report has generated a great deal of debate in the GoC, news, naval, and academic communities. The report provided the budget analysis on the full fleet of Type 26s which is estimated at \$77.3B. The report offered two other costing options for the new fleet that included the FREMM, Type 31, and a mix of Type 26s with either FREMM or Type 31.²⁹ The next section will describe why the Type 26 remains the best design for Canada despite the current skepticism surrounding the Project.

TYPE 26, SOMETHING ELSE, OR A MIX OF EVERYTHING?

²⁸ Lloyd and Perry, "The Canadian Surface Combatant: Capability and Context."

²⁹ Canada. Office of the Parliamentary Budget Officer, "The Cost of Canada's Surface Combatants: 2021 Update and Options Analysis" (Office of the Parliamentary Budget Officer, February 24, 2021), <https://www.pbo-dpb.ca/en/publications/RP-2021-040-C--cost-canada-surface-combatants-2021-update-options-analysis--cout-navires-combat-canadiens-mise-jour-2021-analyse-options>.

Since the report from PBO listed the price tag for a fleet of 15 Type 26 there are several Canadians calling for Canada to recompute the process to select a different warship.³⁰ Specifically, the opponents to the Type 26 believe that the Type 31 or the FREMM/*Constellation*-class would better suit Canada. The PBO report also suggests building a mix of Type 26 and Type 31 or FREMMs as a cost saving measure. Figure 1 shows the costing estimates from the report.

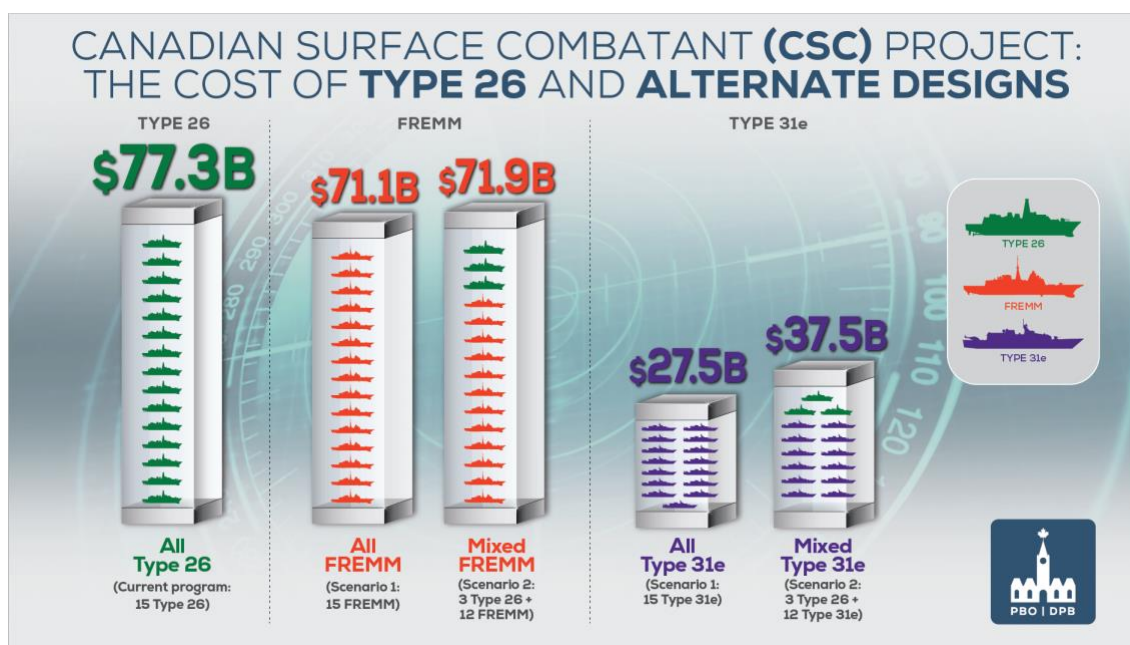


Figure 1: Cost of the Canadian Surface Combatant and Options

Source: Office of the Parliamentary Budget Officer, *The Cost of Canada's Surface Combatants: 2021 Update and Options Analysis*

First, this section will first describe the current design for the Canadian Type 26. Next, it will describe why a mix of warships is not ideal for a medium sized Navy like the RCN. The third and fourth sections will describe the shortcomings of the Type 31 and FREMM *Constellation*-class respectively when compared to the Type 26.

³⁰ The Hill Times, "Navy Desperately Needs New Ships, but Not at Any Price: Alan Williams," *The Hill Times* (blog), March 7, 2022, <https://www-hilltimes-com.cfc.idm.oclc.org/2022/03/07/navy-desperately-needs-new-ships-but-not-at-any-price-alan-williams/347462>.

Canada's Next Generation of Warship - The Global Combat Ship

As described above the Type 26 Canadian variant is designed to replace two classes of ship. The *Halifax*-class frigates and the retired *Iroquois*-class destroyers. The ship will be in service for at least 50 years from the time the first ship enters the water until the last ship is decommissioned. The current design of the CSC Type 26 incorporates more area-air defence and land attack capabilities. The weapons include Sea Ceptor, RIM-162 Evolved Sea Sparrow (ESSM), Standard Missile 2 (SM2), the Naval Strike Missile (NSM) and Tomahawk cruise missiles. This ship will also carry a formidable ASW suite with new torpedoes and feature the 3-dimensional SPY-7 phased array radar, as well as 127mm main gun system.³¹ CSC is an extremely capable ship with weapons that can support high-intensity operations. The CSC Type 26 is a capability rich platform with a significant advantage over its competitors due to its modern hull and marine systems.

The CSC Type 26 is 151.4 meters in length with a beam of 20.75 meters and displaces 7,800 tonnes seen in Figure 2. This ship is significantly larger than the *Halifax*-class at 4,750 tonnes. The key features of the Type 26 are in the propulsion system and reconfigurable mission bay. CSC is a state-of-the-art combined diesel-electric or gas propulsion system (CODLOG) which integrates the Rolls Royce MT30 gas turbine, four Rolls Royce MTU diesel generators and two GE electric motors. All the marine systems are raft mounted for extremely quiet operation which makes this ship ideal for ASW.³²

³¹ Joseph Trevithick, "Canada's New Frigate Will Be Brimming With Missiles," *The Drive*, November 13, 2020, <https://www.thedrive.com/the-war-zone/37506/canadas-new-frigate-will-be-brimming-with-missiles>.

³² Raghavi Joshi, "Canadian Surface Combatant," *Naval Technology*, accessed April 24, 2022, <https://www.naval-technology.com/projects/canadian-surface-combatant/>.

The CSC will also feature a large reconfigurable mission bay that can be modified to carry extra small boats (MIO focused mission), remotely piloted vehicle systems, or a more robust medical facility (HADR missions). The reconfigurable mission bay is unique compared to the FREMM and Type 31 and represents a key component that will serve a multipurpose warship well.

The CSC Type 26 will have the Canadian made Combat Management System (CMS) 330 from Lockheed Martin Canada. CMS330 will be the main software used to control the combat suite of the ship. CMS 330 will be combined with the US AEGIS combat system software which will allow for cooperative engagement with US and other allies who operate the AEGIS combat system software.³³ The use of CMS 330 which was developed by Lockheed Martin Canada during the *Halifax*-class modernization is important because Canada can retain the intellectual property (IP) of the ship which may be useful if export options are explored.³⁴

Overall, the Type 26 is going to be the most capable warship in the world when complete. The project is extremely complex and is the most difficult project Canadian industry and the GoC have ever embarked upon. The program does have significant risk which is mitigated through a number of different measures. Lockheed Martin Canada recently finished upgrading the *Halifax*-class which was a challenging endeavor. The Type 26 is a new platform, however, by the time Canada builds the first Canadian Type 26, the British (ships 1 through 3) and Australia (ship 4) will be operating this class which reduces the risk to Canada. ISI is well positioned to start work on the CSC. ISI will

³³ Lloyd and Perry, "The Canadian Surface Combatant: Capability and Context."

³⁴ "CMS 330," Lockheed Martin, November 26, 2020, <https://www.lockheedmartin.com/en-ca/cms330.html>.

have completed 6 large Arctic Offshore Patrol Ships (AOPS) that displace 6,440 tonnes. This will provide the ISI shipyard valuable experience with a less complex ship before starting on the Type 26.³⁵ A photo of the ship is shown in Figure 2.



Figure 2: The latest rendering of the Type 26 Canadian Surface Combatant

Source: Lockheed Martin Canada, Canadian Surface Combatant

Type 31 - Not the Right Ship for Canada

The Type 31 Inspiration-class is a UK shipbuilding project created to increase national shipbuilding and offset the cost of the Type 26. The Type 31 is based off the Danish Navy's *Iver Huitfeldt*-class frigate and is being designed by Babcock. The Type 31 is significantly smaller than the Type 26 with a length of 138.7 meters and a displacement of 5,700 tonnes.³⁶ The genesis of the Type 31 was its lower cost and smaller size compared to the Type 26 with a price tag of £250M.³⁷ It is accepted that the

³⁵ Canada. Department of National Defence, "Arctic and Offshore Patrol Ship," Royal Canadian Navy, accessed April 24, 2022, <http://www.navy-marine.forces.gc.ca/en/fleet-units/aops-home.page>.

³⁶ "Type-31 Frigate Key to U.K. Royal Navy's Growth," United States Naval Institute News, September 30, 2021, <https://news.usni.org/2021/09/30/type-31-frigate-key-to-u-k-royal-navys-growth>.

³⁷ "More Details of the Royal Navy's Type 31 Frigate Emerge," Navy Lookout, September 15, 2019, <https://www.navylookout.com/more-details-of-the-royal-navys-type-31-frigate-emerge/>.

Type 31 is not the same level of ship as the Type 26 or the FREMM. The UK plans to operate the Type 31 as a traditional general-purpose frigate vice a high-end warfighter.³⁸ The major drawback of the Type 31 is the use of the combined diesel and diesel (CODAD) propulsion system. This is an old design that uses diesel engines to power the shaft of the ship while other diesel engines drive electrical generators to provide power.³⁹ Both the Type 26 and FREMM use integrated electrical and propulsion systems that generate electricity and drive the main shafts of the ship (CODLAG for the FREMM and CODLOG for the Type 26). The other major drawback of the Type 31 is that it is lightly armed when compared to the FREMM and Type 26 and has little room for increasing the lethality of the ship.



Figure 3: A rendering of the Type 31

Source: UK Defence Journal, The Type 31e Frigate – A Guide to the Royal Navy’s Future Warship

³⁸ United Kingdom. House of Commons, “Restoring the Fleet: Naval Procurement and the National Shipbuilding Strategy - Defence Committee,” accessed April 25, 2022, <https://publications.parliament.uk/pa/cm201617/cmselect/cmdfence/221/22102.htm>.

³⁹ Ryan White, “Propulsion Systems Used in Modern Naval Vessels - Naval Post- Naval News and Information,” March 8, 2021, <https://navalpost.com/propulsion-systems-navies-gas-diesel-electric/>.

The idea behind the UK having two different frigates is to have a mixed fleet of high and low capability ships.⁴⁰ The high-end roles of high-intensity operations in the main warfare areas such as AAW, ASuW, and ASW would be the missions assigned to the Type 26 and Type 45 destroyers. Lower intensity missions such as MIO, escort operations, and partner capacity building will be left to the lower-end ships such as the aging Type 23 and Type 31 frigates. By having a high low fleet mix the RN can avoid having to purchase the more expensive Type 26 for missions that can be conducted by a smaller less capable warship like the Type 31. A high low mix is effective for large navies that have the industrial base and political will to continually buy and upgrade warships.

Why a High Low Mixed Fleet Does Not Work for Canada

In the PBO report on the cost of the Type 26, one of the scenarios (scenario 2 in the report) was to purchase three Type 26s to replace the retired *Iroquois*-class destroyers and 12 Type 31 or 12 FREMMs to replace the *Halifax*-class.⁴¹ While the high low mix works for larger navies it will not be effective in Canada. The following section will explain Canada's geography and shipbuilding industrial base cannot support a mixed fleet of high and low warship designs.

The main reason Canada cannot purchase a smaller number of high-end ships like the Type 26 and then another fleet of lower end ships is due to geography. The RCN is

⁴⁰ "The Type 31e Frigate – A Guide to the Royal Navy's Future Warship," UK Defence Journal, accessed April 26, 2022, <https://ukdefencejournal.org.uk/the-type-31e-frigate-a-guide-to-the-royal-navys-future-warship/>.

⁴¹ Canada. Office of the Parliamentary Budget Officer, "The Cost of Canada's Surface Combatants."

split between two coasts and assets cannot be easily or quickly shared between them.⁴² If the RCN receives 3 high-end air defence Type 26s they will be split between the Atlantic and the Pacific. With regular maintenance one of the fleets would be without an area-air defence platform for a significant period on a regular basis. SSE is clear that Canada must maintain a deployable TG on each coast. Without an area-air defence platform the TG would be vulnerable and not effective in high-end warfighting. Having 15 ships capable of fulfilling all missions assigned to the RCN allows for a distributed Fleet across both coasts and provides the ability to maintain two TGs, one on each coast.

The second major concern with building a second class of ship is industrial capacity in Canada. Since the last boom cycle ended in the mid 1990s the shipbuilding industry in Canada has atrophied. As part of NSS the GoC partnered with two shipyards, ISI and Seaspan. If Canada were to produce a second class of ship and build it at another shipyard significant resources would need to be invested. Some argue that Davie in Quebec would be able to build another warship and produce it on time and on budget. Although Davie produced the MV Asterix for the RCN the building and integration of complex combat systems are much more intense when compared to a civilian tanker. Although Davie is a credible shipbuilder there is a capacity problem in Canadian shipyards. ISI is building AOPS and CSC, Seaspan is building CCG ships and the JSS, and Davie is likely to be building medium ice breakers for the CCG.⁴³ Adding another warship like the Type 31 would simply not be possible in the near term. In addition to the

⁴² Timothy Choi, "What Can We Expect from the New Canadian Surface Combatant?," CDA Institute, accessed April 25, 2022, <https://cdainstitute.ca/timothy-choi-what-can-we-expect-from-the-new-csc-combat-ships/>.

⁴³ "More Cost Overruns, Delays Coming for New Navy, Coast Guard Fleets," Atlantic, April 7, 2022, <https://atlantic.ctvnews.ca/more-cost-overruns-delays-coming-for-new-navy-coast-guard-fleets-1.5852316>.

industry capacity limits, the RCN would have a challenging time managing two major surface combatant shipbuilding projects simultaneously as it is also generating experience in managing shipbuilding in Canada.

Finally, although the cost of the Type 31 appears to be lower in price there is potential for that number to increase significantly. The design work surrounding the modification of the Type 31 to Canadian requirements is not trivial. Adding a larger gun and more missiles through the Mk 41 Vertical Launching System (VLS) would require major modifications to the design. Even if Canada were to forego the installation of more combat systems the design and build in Canada would face similar delays as the Type 26 and the budgetary savings reported by the PBO would be lost. Canada needs a single class of warship; it needs to provide the GoC a full range of options in a complex and dangerous maritime environment. The only ship that does this with room to grow into the future is the Type 26 Global Combat Ship.

FREMM is the Only Potential Competitor for the Type 26

The Fincantieri and Naval Group has built a capable and proven warship called the Frégate européenne multi-mission (FREMM). There are several countries operating the FREMM today and several others interested in producing the FREMM with the latest being the US. The US have selected the FREMM as the parent design for the FFG-62 *Constellation*-class frigate.⁴⁴ The United States Navy (USN) plans to build 10 at the Fincantieri shipyard in Wisconsin and another 10 at a different shipyard yet to be named for a total of 20 hulls. The FREMM has been in operation since 2012 by the French Navy

⁴⁴ David Larter, "5 Things You Should Know about the US Navy's New Frigate," Defense News, May 5, 2020, <https://www.defensenews.com/naval/2020/05/05/5-things-you-should-know-about-the-us-navys-new-frigate/>.

and several different variants are in the build phase including ASW and Air Defence variants. FREMM and the Type 26 are comparable in several different areas. Depending on what the customer values each ship could be determined to be the better purchase for a country. The Type 26 will be compared to the FREMM showing that although the FREMM is a capable ship the RCN would be better served by purchasing the Type 26.

The capabilities going into the US *Constellation*-class are like those of the Canadian variant of the Type 26. The FREMM will be a multi-mission frigate capable of AAW, ASuW, ASW and other general-purpose roles (MIO, HADR). A few differences are the smaller main gun on the *Constellation* (57mm vs. 127mm) and the SPY-6 radar vice the SPY-7 which will be installed on the Canada's Type 26.⁴⁵ As previously discussed both ships can have the same combat systems installed. Therefore, comparing the US to Canada specific sensors and weapons does not offer a definitive answer to which is better. Both ships are multi-role with an ASW bias as you would expect from a frigate however the Type 26 is a better ship for Canada.

The first major difference between the FREMM and the Type 26 is the FREMM has been in operation for a decade and has proven to be a capable ship. Whereas the Type 26 is still in the build phase with the first ship expected to be operational in 2027.⁴⁶ By selecting the Type 26, a ship that is not completed, Canada has accepted additional risk. The risk of the Type 26 design has been mitigated by BAE by using marine systems currently employed on other UK ships like the two aircraft carriers HMS Queen

⁴⁵ Roger Cyr, "Achieving a Cost-Effective Fleet in a Decade," *Canadian Naval Review* (blog), accessed April 25, 2022, <https://www.navalreview.ca/2022/01/achieving-a-cost-effective-fleet-in-a-decade/>.

⁴⁶ "More Details of the Royal Navy's Type 31 Frigate Emerge."

Elizabeth and HMS Prince of Wales.⁴⁷ Increased risk associated with a new ship does not outweigh the opportunities presented by a brand-new, cutting-edge design. The Type 26 has an updated propulsion system, it will be much quieter in the water when conducting ASW operations, and it will have the ability to increase the electrical load required of future combat systems. The Type 26 will use new Rolls Royce marine systems while the FREMM uses older LM2500 gas turbines.⁴⁸

The next difference is the size of each ship. The FREMM is 10 meters shorter and 1000 tonnes lighter than the Type 26. The larger Type 26 will be well suited to absorb new upgrades as new capabilities are introduced to the naval domain. The extra space on the Type 26 will allow flexibility in conducting operations other than war. The multi-mission bay in the Type 26 allows for multiple different configurations depending on the mission. This could include a HADR deployment kit, multiple boats for MIO, or extra medical facilities. The mission bay space is not available in the FREMM design. The larger Type 26 also allows for the implementation of larger magazines for missiles if the RCN decides it wants to increase missile capacity.⁴⁹ The larger ship size and increased ability to produce electricity led to a ship that can be upgraded as technology changes. With the addition of high-powered systems like anti-missile lasers the requirement for more space for equipment and higher electrical load will limit the life expectancy of the FREMM when compared to the Type 26.

⁴⁷ "Type 26 Global Combat Ship Capabilities," Think Defence, July 14, 2021, <https://www.thinkdefence.co.uk/type-26-global-combat-ship-capabilities/>.

⁴⁸ Max Blenkin, "Here Comes The Hunter!," *Australian Defence Business Review*, August 30, 2018, <https://adbr.com.au/here-comes-the-hunter/>.

⁴⁹ Blenkin.



Figure 4: The latest rendering of the *Constellation*-class frigate.

Source: Ozberk, US Navy's Constellation-Class

The FREEM is a proven design that brings a significant amount of capability to a navy. The Type 26 is an innovative design that presents technical risk but also offers opportunities for increased capacity and will operate well into the future. When any navy selects a ship for production several factors are considered to determine what is right for the individual navy. The USN has prioritized a proven design that will de-risk the build phase.⁵⁰ This makes sense for a large navy that will build a different ship in 20 years but is not realistic for a small navy like the RCN. Canada plans to build the CSC for the next 20 years and operate it into the 2060s and beyond. For this reason the GoC and RCN analyzed future proofing and state of the art systems more heavily than the US. This increases risk in the build phase but will allow Canada to operate the Type 26 well

⁵⁰ Tayfun Ozberk, "U.S. Navy's Constellation-Class: New Frigate to Start Construction This Year," *Naval News* (blog), January 15, 2022, <https://www.navalnews.com/naval-news/2022/01/u-s-navys-constellation-class-new-frigate-to-start-construction-this-year/>.

beyond the life of the *Constellation*-class or any other warship built on the FREMM parent design.

CONCLUSION

Canada has embarked on the most complex project in the history of the country to recapitalize the main battle fleet of the RCN while revitalizing the shipbuilding industry. In an unpredictable and dangerous world Canada will need a capable Navy to deter aggression and be able to fight and win against a near peer. Canada can only do this through the purchase of a highly capable destroyer and frigate replacement. The Type 26 is the best ship for Canada. Time and money invested will provide Canada with a ship that is operational for the next several decades with the capacity for future development. Arguments can be made that Canada should procure a different ship like the Type 31 and the FREMM. These arguments are often based on price and are misguided when considering how Canada will operate the new ships. A mix of high low ships will not be effective for Canada due to its vast geography, industrial base, and political factors.

The shipbuilding industry in Canada has not produced a major warship in decades and this represents the real risk to the project. This is not unique to the Type 26 and would be the case for any other major surface combatant build in Canada. Moving forward project management from the RCN and the BAE Lockheed Martin Canada consortium will be critical. Even with a mature design Canada as a renewed shipbuilder will encounter delays and budget overruns. The RCN will need to identify risk early and seek international assistance from the parent companies of BAE and Lockheed Martin Canada when required. The *Halifax*-class has been the workhorse for the RCN over the past 3 decades and performed admirably. The Type 26 will have big shoes to fill and that

is why it is critical Canada build the most advanced and capable warship. Settling for less than the Type 26 will require large investments for upgrades later in the life of the ships if it is even possible. The Type 26 gives the RCN the best possible ship at the best value for Canadian taxpayers.

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