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CANADIAN SUBMARINE REPLACEMENT AND THE INDO-PACIFIC

AIM

1. Canada is currently in the early stages of a project aimed at replacing its current *Victoria* Class submarine fleet. To ensure that the new submarines meet the country's specific requirements, a statement of requirements will be developed. The Government of Canada has recently emphasized the importance of the Indo-Pacific region from both an economic and military perspective, as reflected in the Canadian Indo-Pacific Strategy.¹ In order to align this significant defense procurement with the Indo-Pacific Strategy, Canada must include criteria in the statement of requirements that consider the impact of the purchase on the broader goals of the government's Indo-Pacific Strategy. Canada also needs to manage expectations around the procurement process to ensure that the Canadian Armed Forces receive a submarine that meets their needs and provides value for the taxpayer's money.

INTRODUCTION

2. Canada's submarine capability is nearing the end of its expected 50-year lifespan from construction, which is projected to be by 2040 at the latest.² While Canada is investigating the replacement of these submarines, there is no policy in place to move forward with a procurement. Through policy documentation, it is clear that the submarine is a critical capability within the Canadian Armed Forces and it is a priority to replace the current submarine class before it reaches the end of its lifespan.³ Due to extended procurement timelines and limited shipyard capacity within Canada, it is preferable to replace the *Victoria* Class with a pre-designed platform rather than a Canadian-made one.⁴ There are currently four contenders – Spain, Germany, South Korea, and Japan – that produce conventional submarines and could potentially supply Canada with submarines. In addition, France and Sweden manufacture submarines and have potential designs that have not yet been built.⁵

3. The *Victoria* Class submarines were originally built by the British in the 1980s and were commissioned as the *Upholder* class between 1990 and 1994.⁶ In the late 1990s, Canada was in urgent need of submarines to replace the *Oberon* Class, due primarily to a failed procurement in the late 80s subsequent defence cutbacks that resulted from the end of the Cold War in the early 90s under Prime Minister Jean Chrétien. At the time of purchase, the submarines were seen as a cost saving measure for Canada and a procurement was quickly conducted. The *Upholder* Class was originally designed to conduct short-range patrols departing from the UK and conducting patrols of the Greenland, Iceland, and UK Gap to look for Russian Submarines.⁷ Canadian requirements have resulted in these submarines being forward deployed to as far as the eastern Mediterranean on the east coast and as far as Japan on the west coast, well outside of design

¹ Canada's Indo-Pacific strategy: A more prosperous, sustainable and secure future, Government of Canada, 2022,

² Canada, Strong Secure Engaged (Canada: Department of National Defence, 2017b). 65. And Canada, Leadmark 2050 - Canada in a New Maritime World (Canada: Department of National Defence, 2016b). 42.

³ *Ibid*

⁴ Kim Nossal, Charlie Richard, *Foxtrot: Fixing Defence Procurement in Canada*, Toronto: A.J. Patrick Boyer Book, 2016;2017.

⁵ Janes Fighting Ships 21/22, "List of submarine classes in service".

⁶ LCdr Ashley Hunt, "The Future of Submarines in Canada", Canadian Forces College, 2020:2021.

⁷ LCdr Hunt

intent which clearly indicates the ambitions of the RCN to have a forward deployed submarine presence, in addition to conducting domestic patrols with continental defence in mind.⁸ From a defence policy standpoint, submarines remain a hallmark of domestic maritime defence, with Leadmark 2050, the RCN's strategic guideline, and Strong, Secure, Engaged, Canada's current defence policy discussing the importance of the submarine capability and maintaining that capability in the future.⁹

DISCUSSION

4. In November 2022, the Canadian Government unveiled its Indo-Pacific Strategy with the aim of redirecting attention towards the Indo-Pacific Region. This region is currently experiencing economic growth but also instability, largely due to China's disregard for the international rules-based order that facilitated their prosperity. The strategy has five interrelated objectives: promoting peace, resilience, and security; expanding trade, investment, and supply chain resilience; investing in and connecting people; building a sustainable and eco-friendly future; and positioning Canada as an active and engaged partner in the Indo-Pacific. The plan emphasizes the need for increased collaboration with Japan and the Republic of Korea. By establishing stronger partnerships with countries that share Canadian values, the strategy aims to reduce the influence of problematic actors in the region, specifically China and North Korea.¹⁰

5. Leadmark 2050, the Royal Canadian Navy's current vision for the composition of the future fleet describes submarines as "weapons of strategic deterrence" which are able to "alter an adversary's decision-making across an entire maritime theatre of operations".¹¹ This is due to both the stealth and lethality of the platform. They are aptly suited to collect intelligence, conduct area deterrence, and operate in areas where surface platforms would be under considerable risk, both due to other surface platforms and due to anti-access area denial weapons. The *Victoria* Class platform is a capable option, however, the limited quantity and hasty procurement process, which prioritized affordability over optimal suitability for Canada, has resulted in restrictions on the submarine force's capabilities due to the lack of available platforms.¹² If due to reliability issues and limited numbers, Canada is unable to deploy a submarine, the strategic deterrence effect is nullified. Leadmark 2050 calls for a blue water navy that is among other things forward-postured, globally deployable and survivable.¹³ With the emphasis on the Indo-Pacific region outlined through the Indo-Pacific Strategy, this naturally leads to a discussion on how the procurement of a future submarine for the RCN can enable the commitments of this strategy in order to further Canadian interests abroad, support allies in the pursuit of increased security in the region while continuing to protect Canadians at home.

⁸ Brett Ruskin, "Canada deploys submarine to Japan for the first time in a half century", CBC News, 19 October 2017, <https://www.cbc.ca/news/canada/british-columbia/canada-deploys-submarine-to-japan-for-the-first-time-in-a-half-century-1.4362754>.

⁹ SSE, Leadmark 2050

¹⁰ Canada's Indo-Pacific strategy

¹¹ Leadmark 2050

¹² Canadian House of Commons, "Procurement of Canada's Victoria Class Submarines: Report of the Standing Committee on National Defence and Veterans Affairs", April 2005.

¹³ Leadmark 2050

6. It is important to understand the potential classes of submarines available for Canada to purchase in the Indo-Pacific region that will strengthen ties with allies. The discussion will be limited to conventional submarines (the only ally in the region considering nuclear-powered submarines is Australia and that procurement will take decades before they become operational). The first to discuss is the two Japanese Classes of submarines in the region, the Sōryū-class submarine and the Taigei-Class submarine. The Taigei class is Japan's newest submarine, and there will be five manufactured in total, three of which have already been launched with the fourth and fifth of the class scheduled to be launched in 2023 and 2024. There have been 12 Sōryū-class submarines already manufactured. The differences between the classes include reduced noise signature and increase power generation efficiency with the Taigei Class. Each of the classes is approximately 3000 tons in weight, compared to 2400 tons for the Victoria Class, with weight being used as an approximate measure for global endurance. With a 3000-ton submarine, global deployments will be achievable. Both classes were manufactured in Japan. The last two of the Sōryū- Class and all of the Taigei-Class are equipped with Lithium Ion batteries, which allow for greater power density than lead acid batteries used in all other conventional submarines. In the process of equipping its classes with lithium-ion batteries, Japan made the decision to forego the air-independent propulsion system due to the increased underwater endurance offered by the former. However, a deeper investigation at the classified level is required to assess the feasibility of conducting under-ice operations with this variant. Initial indications suggest that such operations may be viable. Given the importance of under-ice operations to Canada's efforts to safeguard its Arctic sovereignty, a pressing issue in the public discourse, this development holds significance.¹⁴¹⁵¹⁶

7. The next class of submarines to consider is the South Korean KSS-III Class. South Korea has planned to construct nine submarines in this class, with one completed and four currently under construction. These submarines have a slightly higher tonnage compared to the Japanese classes, weighing approximately 3,300 tons, and are equipped for blue water operations. The KSS-III Class is also an advanced submarine that includes a vertical launch system capable of firing submarine-launched ballistic missiles, a feature that is unprecedented for a conventional submarine. There have been discussions about incorporating lithium-ion batteries into future versions of the class to enhance power-to-weight density, similar to the Japanese classes. In conclusion, both the Japanese and South Korean conventional submarines are potential candidates to replace the Victoria Class. Even foregoing any consideration to the Indo-Pacific Strategy, they should be given careful consideration along with other available military off-the-shelf designs. However, it is my opinion that the Canadian government should prioritize the Indo-Pacific strategy when evaluating future submarine procurement options. This must be conveyed clearly to both procurement authorities and the public to garner support for the idea. As China is currently facing widespread criticism, this presents a favorable moment for Canada to reaffirm its commitment to the Indo-Pacific region.¹⁷

¹⁴ Taigei-Class Attack Submarines, Japan, Naval Technology, 8 July 2022, <https://www.naval-technology.com/projects/taigei-class-attack-submarines-japan/>.

¹⁵ SS Soryu-Class Submarines, Japan, Naval Technology, 26 February 2021, <https://www.naval-technology.com/projects/ssoryuclasssubmarin/>.

¹⁶ Victoria-Class Attack Submarines, Canada, Sea Forces, <https://www.seaforces.org/marint/Canadian-Navy/Submarine/Victoria-class.htm>.

¹⁷ KSS-III (Jangbogo-III) Class Attack Submarines, South Korea, Naval Technology, 21 January 2022, <https://www.naval-technology.com/projects/kss-iii-jangbogo-iii-class/>

8. Another area of concern currently within Canadian defence circles is Canada's exclusion from the AUKUS submarine technology exchange agreement between the US, the UK, and Australia.¹⁸ This exchange will provide Australia with nuclear submarine propulsion technology and the ability to enter into an agreement with either the US or the UK to purchase one of their nuclear submarine classes.¹⁹ The generation of this agreement may have had negative ramifications for relations between Australia and France but will enable a long-term strategic partnership between Australia, the UK, and the US. Initially, Australia had indicated they would be purchasing conventional submarines from France, but decided to reverse that decision when the US and the UK offered to share nuclear submarine propulsion technology with Australia.²⁰ The ramifications regarding the decrease in French and Australian bilateral relations should not be ignored by Canada. On cancellation of the French-Australian agreement, France withdrew its' ambassadors from Australia and issued a statement that there will be delays in coming to an agreement on an Australian-EU Free trade agreement.²¹²² Canada has the chance to establish an AUKUS-like arrangement with South Korea or Japan by procuring submarines from either country. This partnership will extend well beyond the naval realm and has the potential to foster trade between the two countries and facilitate negotiations in any future free trade agreements with either country.²³ This needs to be emphasized to the Canadian public as a value-for-money proposition. Canada also needs to ensure the in-service maintenance of the submarines remains in Canada and that is communicated to the general public so they see Canadian content within the procurement. However, Canada must learn from Australia's experience with France to ensure that any partnership is entered into with caution and maintained to reap the rewards of the agreement. A contained liaison at both the military and democratic level is critical to ensuring the partnership is able to prosper. The day-to-day technical details of managing the programme will foster a long-standing relationship.

9. The importance of enhanced cooperation resulting from submarine procurement with a partner country must be emphasized. While it may not always lead to a significantly closer relationship, procurement requires necessary communication and collaboration. This type of procurement can also foster synergies in operational and technical domains by sharing engineering and tactical best practices, as well as through joint procurement of spare parts. It allows for friendly foreign actors who are knowledgeable about the platform's maintenance practices, potentially even enabling maintenance activities to be conducted in-country without

¹⁸ Leyland Cecco, "Trudeau lambasted over exclusion from US-led military alliance as election nears", The Guardian, 17 September 2021, <https://www.theguardian.com/world/2021/sep/17/justin-trudeau-criticism-aukus-canada-federal-election>.

¹⁹ Prime Minister of Australia, "Australia to pursue Nuclear-powered Submarines through new Trilateral Enhanced Security Partnership", 16 September 2021.

²⁰ Bevan Shields, "France recalls its ambassadors to Australia and United States amid submarine fury", The Sydney Morning Herald, 18 September 2021.

²¹ *Ibid*

²² Geoffrey Miller, New Zealand could be the big winner of Aukus fallout, RNZ, 20 September 2021.

²³ Bryan Rooney, Grant Johnson, Tobais Sytsma, Miranda Priebe, "Does the U.S. Economy Benefit from U.S. Alliances and Forward Military Presence?" Santa Monica, CA: RAND Corporation, 2022. https://www.rand.org/pubs/research_reports/RRA739-5.html

the need for a Canadian maintenance unit to be deployed. In the event of a naval conflict in the Indo-Pacific region, the most probable location for such conflicts, Canada can forward deploy a submarine with the assurance of a naval base well-versed in the platform in the area.²⁴ This is especially beneficial for conducting repairs in a deployed scenario during wartime. Canada has previously relied solely on public service maintenance staff from Canada to be flown in for maintenance, making this expanded repair option crucial for resilience. The partnership is also not a zero-sum game, as the chosen partner country can also augment its workforce with experienced Canadian technicians to increase maintenance capacity if necessary. This improves the resiliency of the class maintenance capabilities and is something that should be explored in the event a decision is made to procure a submarine from another country, even if it is not from the Indo pacific.

CONCLUSION

10. To conclude, when selecting a replacement for the Victoria Class Submarine, the Indo-Pacific Strategy must be considered. Even if we disregard the Indo-Pacific strategy, the submarines produced by partners in the region are highly capable diesel-electric submarines and should be considered as a replacement for the Victoria Class. A joint submarine program has the potential to offer additional benefits beyond a capable submarine partnership, extending into the diplomatic and trade domains. Canada will receive value for money beyond the military realm, potentially entering the economic realm. Shared platforms increase maintenance resiliency, thereby improving platform survivability. A partnership that recognizes the importance of Western countries having a presence in the Indo-Pacific region is a beneficial long-term strategy that Canada should pursue, and it is sound military advice to recommend this to the Canadian government.

RECOMMENDATIONS

11. The following recommendations should be implemented to align the Indo-Pacific strategy with the future Canadian submarine procurement in order to increase bilateral relations with an Indo-Pacific partner:

- a. Recommend that the Indo-Pacific Strategy be used as a criteria for consideration when assessing replacement options for the *Victoria* Class Submarines;
- b. Recommend is that Canada initiate a dialogue with both Japan and South Korea regarding the possibility of procuring submarines from either country before the *Victoria* Class submarines reach the end of their operational lifespan.
- c. Recommend that diplomatic and military ties be strengthened between Canada and the country chosen to build the *Victoria* Class replacement to maximize the benefits of the partnership.

²⁴ Mark F., Cancian Matthew Cancian, and Eric Heginbotham, "First Battle of Next War – Wargaming Chinese Invasion of Taiwan", Center for Strategic & International Studies, 9 January 2023.

BIBLIOGRAPHY

Canada. Canada's Indo-Pacific strategy: A more prosperous, sustainable and secure future, 2022.

———. Leadmark 2050 - Canada in a New Maritime World. Canada: Department of National Defence, 2016.

———. Strong Secure Engaged. Canada: Department of National Defence, 2017.

Canadian House of Commons. "Procurement of Canada's Victoria Class Submarines: Report of the Standing Committee on National Defence and Veterans Affairs". April 2005.

Cancian Mark F., Matthew Cancian, and Eric Heginbotham. "First Battle of Next War – Wargaming Chinese Invasion of Taiwan". Center for Strategic & International Studies, 9 January 2023.

Cecco, Leyland. "Trudeau lambasted over exclusion from US-led military alliance as election nears". The Guardian. 17 September 2021.
<https://www.theguardian.com/world/2021/sep/17/justin-trudeau-criticism-aucus-canada-federal-election>.

Janes Fighting Ships 21/22, "List of submarine classes in service".

Naval Technology. "Taigei-Class Attack Submarines, Japan". 8 July 2022.
<https://www.naval-technology.com/projects/taigei-class-attack-submarines-japan/>.

Naval Technology. "SS Soryu-Class Submarines, Japan". 26 February 2021.
<https://www.naval-technology.com/projects/ssoryuclasssubmarin/>.

Nossal, Kim Richard. Charlie Foxtrot: Fixing Defence Procurement in Canada. Toronto: A.J. Patrick Boyer Book, 2016;2017.

Prime Minister of Australia. "Australia to pursue Nuclear-powered Submarines through new Trilateral Enhanced Security Partnership". 16 September 2021.

Rooney, Bryan, Grant Johnson, Tobias Sytsma, and Miranda Priebe, Does the U.S. Economy Benefit from U.S. Alliances and Forward Military Presence? Santa Monica, CA: RAND Corporation, 2022. https://www.rand.org/pubs/research_reports/RRA739-5.html. Also available in print form.

Ruskin, Brett. "Canada deploys submarine to Japan for the first time in a half century". CBC News. 19 October 2017. <https://www.cbc.ca/news/canada/british-columbia/canada-deploys-submarine-to-japan-for-the-first-time-in-a-half-century-1.4362754>.

Sea Forces. "Victoria-Class Submarines". <https://www.seaforces.org/marint/Canadian-Navy/Submarine/Victoria-class.htm>

Shields, Bevan. "France recalls its ambassadors to Australia and United States amid submarine fury", The Sydney Morning Herald, 18 September 2021.