



6 QUESTIONS TO CONSIDER WHEN PLANNING FOR CANADA'S NEXT SUBMARINE

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With the decommissioning of the *Victoria*-class submarines scheduled to start in 2031 and conclude by 2042, Canada should consider how to best replace this versatile capability. Doing so requires a complex balancing act of forecasting Canada's national security needs through ~2090 (assuming the replacement's operating lifetime is 50 years) and optimizing technical capabilities, cost, and schedule.

As the Canadian Patrol Submarine Project team works through the "Identification" and "Options Analysis" phases of the military equipment acquisition process, they should consider 6 questions to guide their recommendations:

1. What undersea warfare capabilities does Canada require through the end of the century?
2. Does Canada need submarines to fill those capabilities?
3. Which submarine designs are appropriate for Canada's needs?
4. What are the fiscal constraints for a submarine replacement?
5. Which of the potential acquisition timelines meet Canada's needs?
6. What is the best trade-off of technical, cost, and schedule constraints?

Answering these questions could not only help Canada get the right capabilities, it can also help the Navy prepare compelling communications with central government and the Canadian public.

1. What undersea warfare capabilities does Canada require through the end of the century?

Each military platform delivers a specific set of capabilities; by considering the capabilities that Canada currently has - and whether those capabilities will be needed in the future - Canada can start the discussion of what their future undersea warfare capabilities should be. Topics to consider as part of this question include:

- Capabilities provided by the *Victoria* class, noting those capabilities that Canada's other platforms (e.g., ships, sensors, aircraft, satellites) cannot provide
- Missions that Canada has wanted to perform but has not been able to
- Missions that Canada has performed with the *Victoria* class that it would like to be able to perform in the future, noting those missions that only the *Victoria* class could perform
- Missions that Canada has performed with the *Victoria* class that it no longer has a requirement to perform, noting those missions that only the *Victoria* class could perform

2. Does Canada need submarines to fill those capabilities?

Once the required capabilities are known, the next step is to identify how to meet those capabilities - and whether Canada needs submarines to do so. With Canada's long-term, stable alliances and the

rise of autonomous technologies, Canada may have options to meet its capabilities beyond a 1-for-1 replacement of the *Victoria* class. Topics to consider as part of this question include:

- Current Allied platforms and systems that meet Canada's needs
- Current Canadian platforms and systems that meet Allied needs
- Which of Canada's required capabilities can only be met by human-operated submarines
- Which of Canada's required capabilities can be met by sensors, remote-piloted vehicles, and autonomous vehicles

3. Which submarine designs are appropriate for Canada's needs?

Having defined the specific mission(s) that a human-operated, Canadian submarine must be able to accomplish, this question identifies whether such a submarine exists, could be adapted from an existing design, or would need to be a new design. Considering this question could result in re-examining some of the required capabilities, especially if Canada's required capabilities are unique amongst submarine navies. Topics to consider as part of this question include:

- The high-level specifications required to meet the specific missions that a human-operated, Canadian submarine must be able to accomplish (e.g., Blue Ocean capabilities, range, speed, depth, under ice operations, stealth requirements, shock requirements)
- The extent to which Canada's specifications match those of existing submarines and designs
- The extent to which existing designs could be adapted to meet Canada's specifications

4. What are the fiscal constraints for a submarine replacement?

New submarines can be expensive (for example, Australia was planning to pay \$90B for 12 Attack class diesel submarines), so it is important to understand Canada's available budget for submarines and whether used submarines are available from allied nations. Canada's use of accrual accounting for defence spending, where costs are accounted for during the operating life of the equipment, is advantageous for shipbuilding, given the long lifetime of the ships and the longer development timeframe. For example, acquisition of each Attack class submarine would cost ~\$150M per year (assuming a 50-year life), a fraction of Canada's ~\$20B annual defence budget, and start once each submarine has been commissioned.

The cash requirements to acquire new submarines are significant and are incurred upfront, so Canada will need to understand both the available upfront cash and the long-term accrual spending available. Since a *Victoria*-class replacement does not yet have defence policy coverage, this hopefully provides the Canadian Patrol Submarine Project team room to propose a budget, rather than "shoehorn" submarines into the existing budget.

Topics to consider as part of this question include:

- Upcoming defence capital expenditures (e.g., CSC, fighter aircraft, NORAD modernization)
- Sustainable levels of defence spending through 2090
- Availability of cash requirements through 2050

- Potential costs of the designs appropriate for Canada's needs (acquisition, operating, and sustainment), including both new construction and buying used submarines
- How defense spending and cash requirements could be influenced by different levels of domestic content (given the economic benefits in terms of expenditures, jobs, and tax revenue that the submarine replacement effort could bring to Canada), ranging from completely outsourced to fully Built in Canada
- Implications on submarine capabilities and designs, including the impact of design for affordability and design/build processes to reduce design, construction, and life cycle costs

5. Which of the potential acquisition timelines meet Canada's needs?

Defence projects take on average 15 years to go from inception to delivery, and that is a challenge given that the first *Victoria* class submarine will retire in 2032 – 10 years away. Canada needs to identify which acquisition timelines are possible, and then prioritize based on how well those timelines fit Canada's needs (e.g., in-service date, mission suitability of the designs that could be built in that timeline, cost profile, domestic economic benefit). Not all designs can be built in all timelines, so deciding on a timeline could also implicitly be deciding on a design.

Topics to consider as part of this question include:

- Time needed to finish the design
- Time needed to build the first submarine (whether first-of-class or an existing design), and how that might be different depending on different levels of domestic content (ranging from completely outsourced to fully Built in Canada)
- How the timeline changes based on the capabilities Canada requires the submarine to have
- Implications on submariners and whether each timeline maintains operational capabilities

6. How can Canada best trade off technical, cost, and schedule constraints?

It is possible that there is not a new construction solution that meets Canada's timeline, operational requirements, and available funding, and used submarines may not be available. This final question is where Canada should decide what is most important: schedule, capability, or cost. Mindful that these submarines will likely need to last 50 years (consistent with the lifetime of the *Victoria* class), Canada could be using these boats well into the 2090s – towards the 2070s, the budgetary and schedule constraints of the 2020s and 2030s may seem far less important than the capability gap with Canada's geopolitical rivals. Similarly, the economic benefits from building on the industrial infrastructure and supply base that NSS has begun to establish in Canada could far outweigh the cost and schedule tradeoffs, especially when this new class of submarines needs to be replaced.

Conclusion

Thoughtfully considering these 6 questions will help Canada get the capability that it needs to defend its sovereignty for the remainder of the century, and can serve as a framework for robust discussion of how to best replace the *Victoria* class.

Photo credit: The Canadian Press

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Mr. Jones is the Managing Director of MW JONES & COMPANY. He has over 24 years of consulting experience specializing in strategy, growth initiatives and business transformation. He has worked with global Aerospace and Defense companies, as well as U.S. and international governments, to improve performance for air, sea, and space-based systems. Mr. Jones designs and leads multi-year projects for cost repositioning, market growth and post-merger integration strategies. As a leading expert in cost repositioning and value migration strategies, Mr. Jones works with CEOs and executive teams faced with volume disruptions or competitive pricing. Mr. Jones created the highly recognized “Design for Affordability” framework to dramatically improve affordability and bound total ownership costs for highly engineered products.



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Prior to his last position, Hughes served as vice president for In-Service Aircraft Carriers and was responsible for planning and executing aircraft carrier refueling and overhaul programs at Newport News as well as carrier fleet support work around the globe. He began his career at Newport News Shipbuilding as a Combat Systems engineer in Aircraft Carrier and Nuclear Cruiser Engineering.



Mr. Miller is a Senior Associate at MW JONES & COMPANY. He has over 15 years of experience in aerospace and defense, including over 5 years as a management consultant. His project experiences span many industries, with a focus on highly engineered products in space, defense, and industrials. He started McKinsey & Company's Capture Excellence service line and has supported leading aerospace and defense firms across the business development lifecycle, from project formulation through execution. He has led government sales strategy, operations improvement, due diligence, and business cost restructuring projects. Prior to consulting, he led business development strategy for a veteran-owned engineering services firm.

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