TRIPLE HELIX

# What Implementation for Continuous Capability Sustainment?

## *Study of the Royal Canadian Air Force*

by William Richardson

March 2025

# POLICY PERSPECTIVE

## WHAT IMPLEMENTATION FOR CONTINUOUS CAPABILITY SUSTAINMENT?

### STUDY OF THE ROYAL CANADIAN AIR FORCE

by William Richardson

March 2025

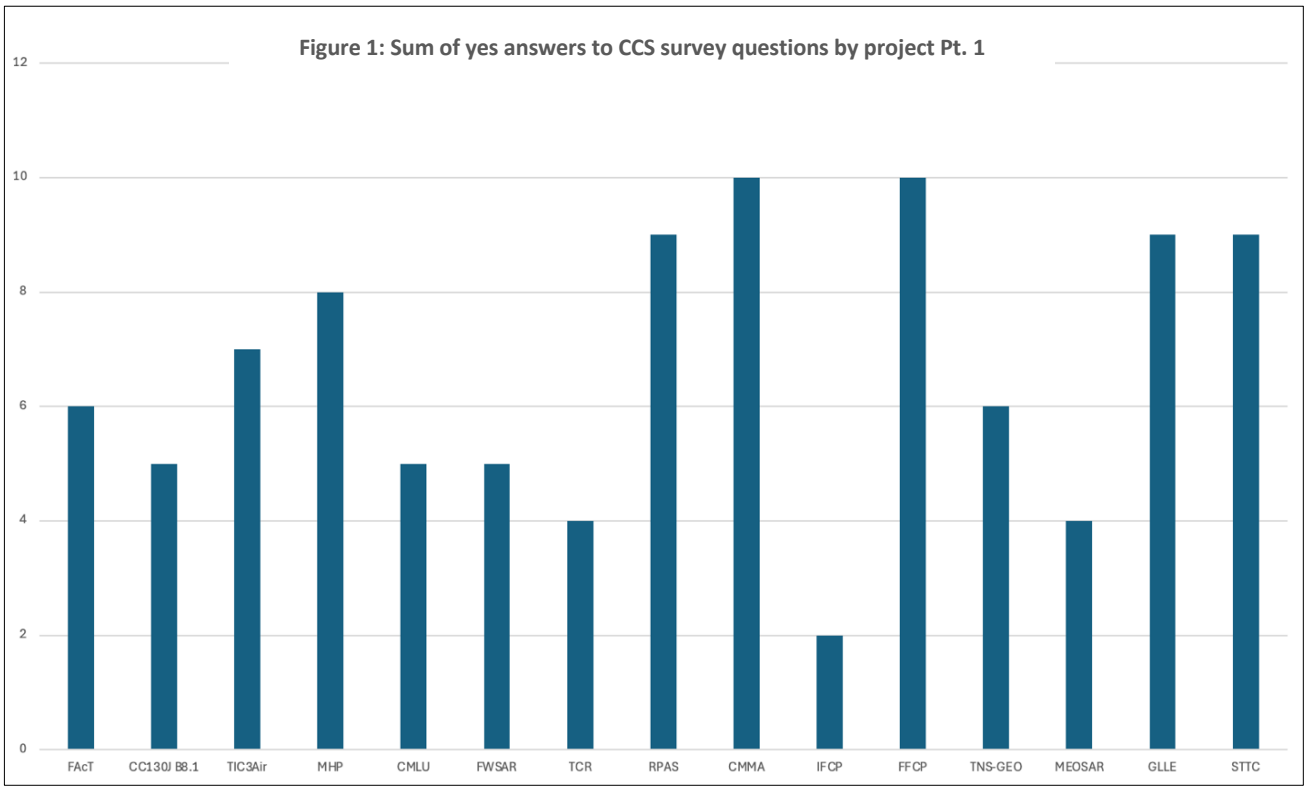



Prepared for Triple Helix
Suite 200, 8 York Street, Ottawa, ON K1N 5S6 Canada
www.cgai.ca/triple_helix

©2025 Triple Helix
ISBN: 978-1-77397-333-3

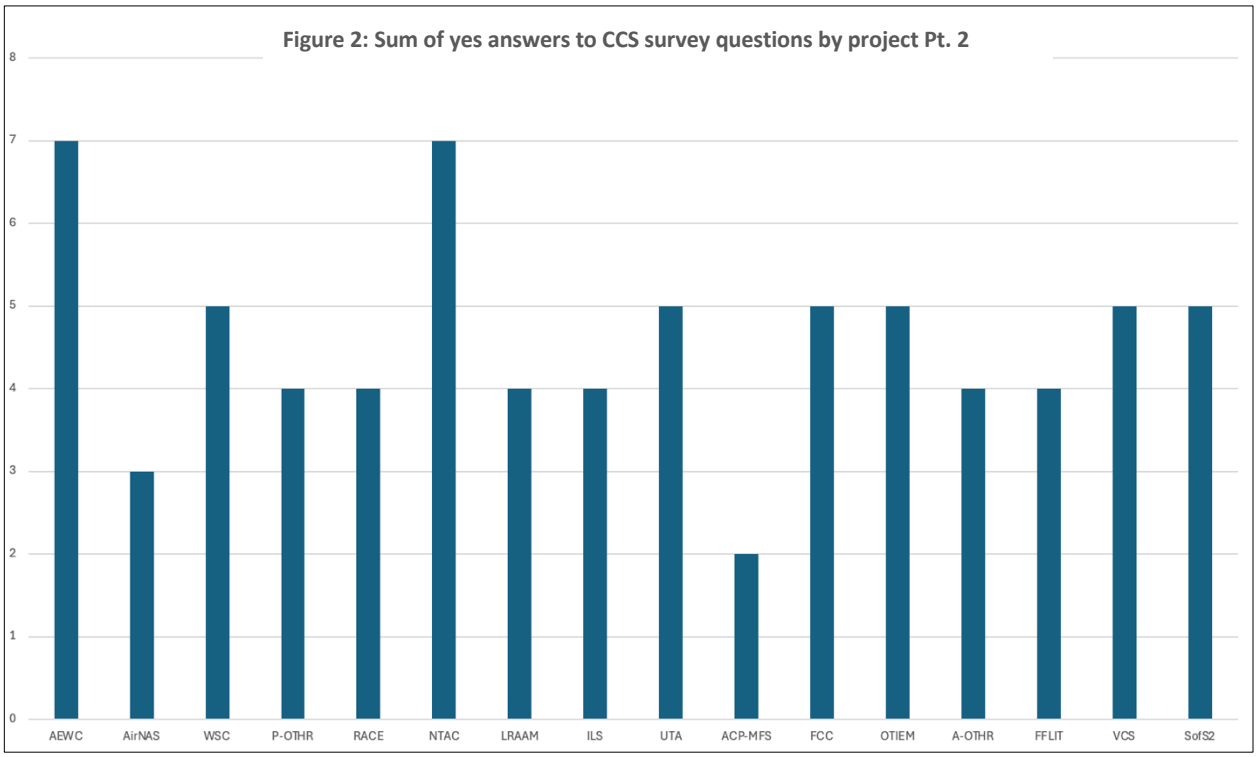
*This piece is part of a study examining how a continuous capability sustainment (CCS) approach will affect Canadian Armed Forces (CAF) projects. This paper outlines the application of CCS for Royal Canadian Air Force (RCAF) surveyed projects.*

This paper covers 31 current RCAF projects, many of which are at different project phases (see Annex). Survey results are first presented and analyzed together, then by project, and finally by category. This trifurcated approach is intended to show which projects may be most suitable for CCS both in general and in specific categories, and to provide greater granularity on the appearances of individual CCS indicators in the survey results.

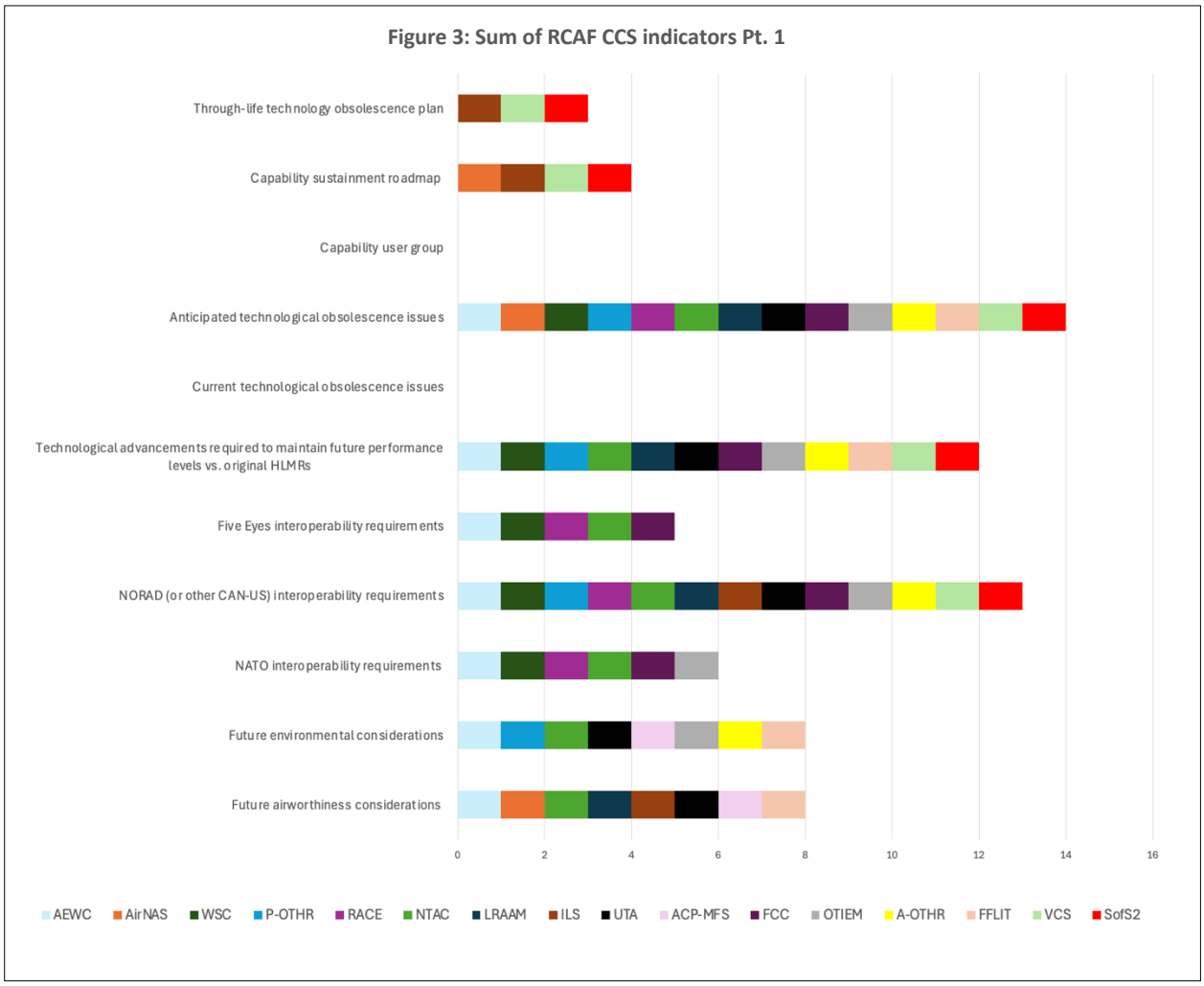



Figures 1 and 2 present the CCS indicators by RCAF project. Our assumption is that projects with higher CCS indicator scores may be more suitable at this time for through-life CCS. It is important to note, however, that projects in a more advanced project phase (like the Future Fighter Capability Project, which is in implementation) may score higher in Figures 1 and 2 because more analysis and future planning has taken place. The Canadian Multi-Mission Aircraft (CMMA) and Future Fighter Capability Project (FFCP) both represent acquisitions of complex, data-enabled platforms that will employ advanced multi-domain sensors, powerful mission systems, and secure beyond line-of-sight datalinks in operational use. Both capabilities will be closely integrated with

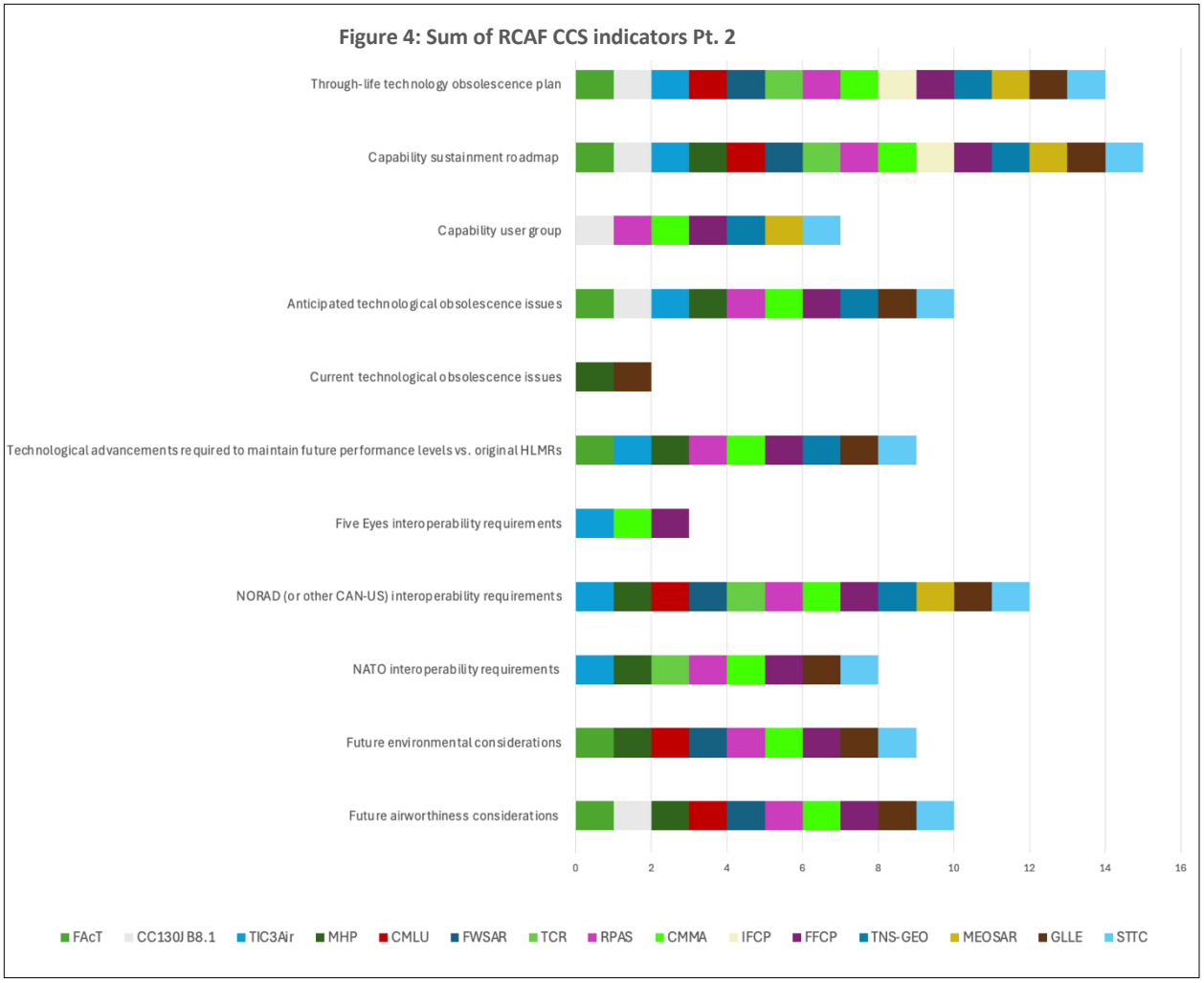
joint partners and allies. Given the current rate of technological change and the three most prevalent CCS indicators in Figures 3 and 4 (below), these two future RCAF capabilities may be the most suited to through-life CCS; indeed, F-35s in service today already receive frequent software updates and capability upgrades.



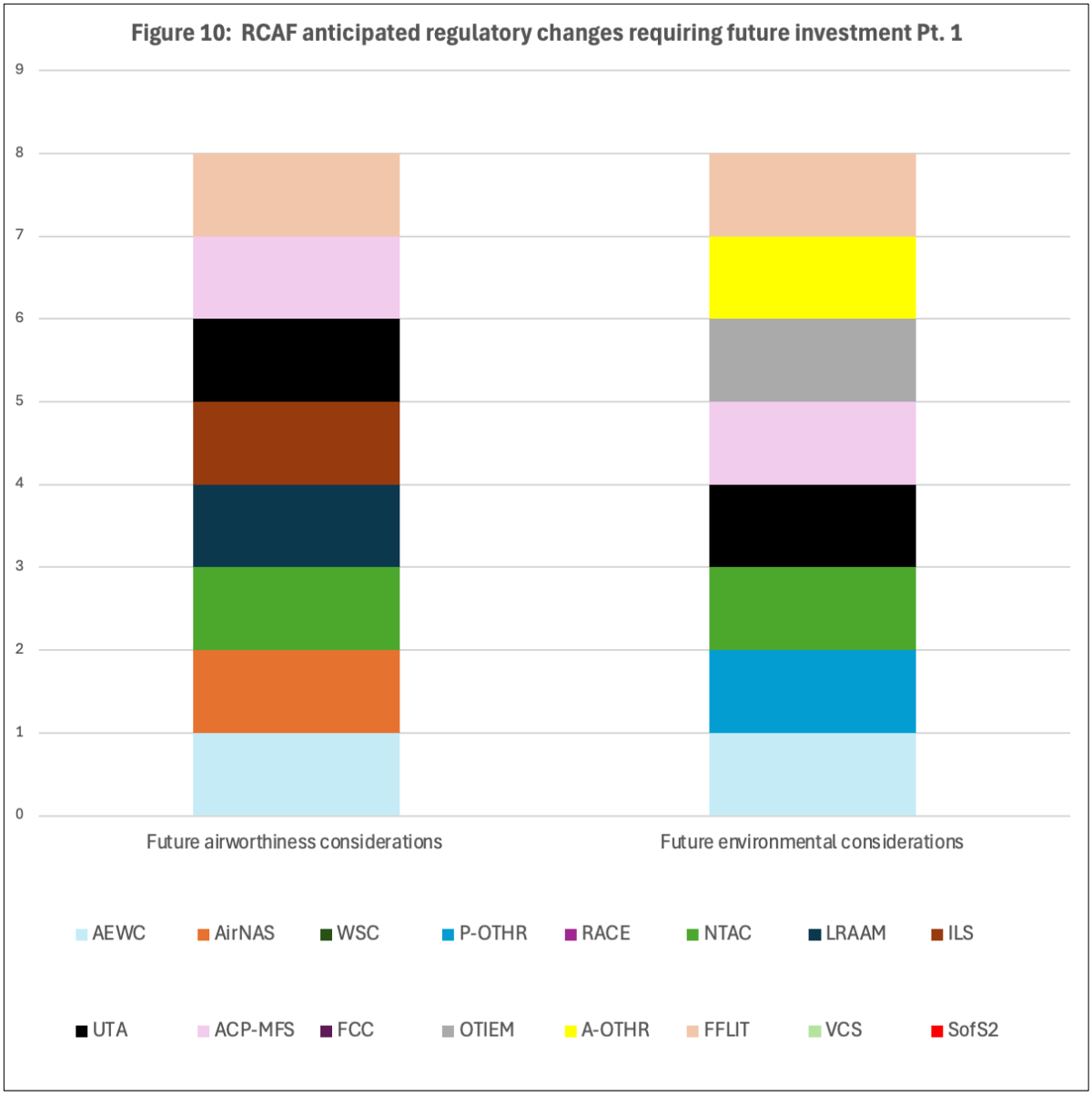

The Remotely Piloted Aircraft System (RPAS), Griffon Limited Life Extension (GLLE), and Strategic Tanker Transport Capability (STTC) also exhibit numerous CCS indicators. The Airborne Early Warning and Control (AEWC) and Next Tactical Aviation Capability (NTAC) are both relatively new procurement projects, with neither yet listed in the unclassified Defence Capabilities Blueprint. However, both still exhibit numerous CCS indicators, suggesting that allowances should be made for future CCS in these projects. In general, the distribution of CCS indicators across Figures 1 and 2 suggests that RCAF aircraft are well suited to through-life CCS. The survey results reveal military aircraft procurement projects possessing CCS indicators across the three indicator categories of regulatory changes, interoperability requirements, and future planning.



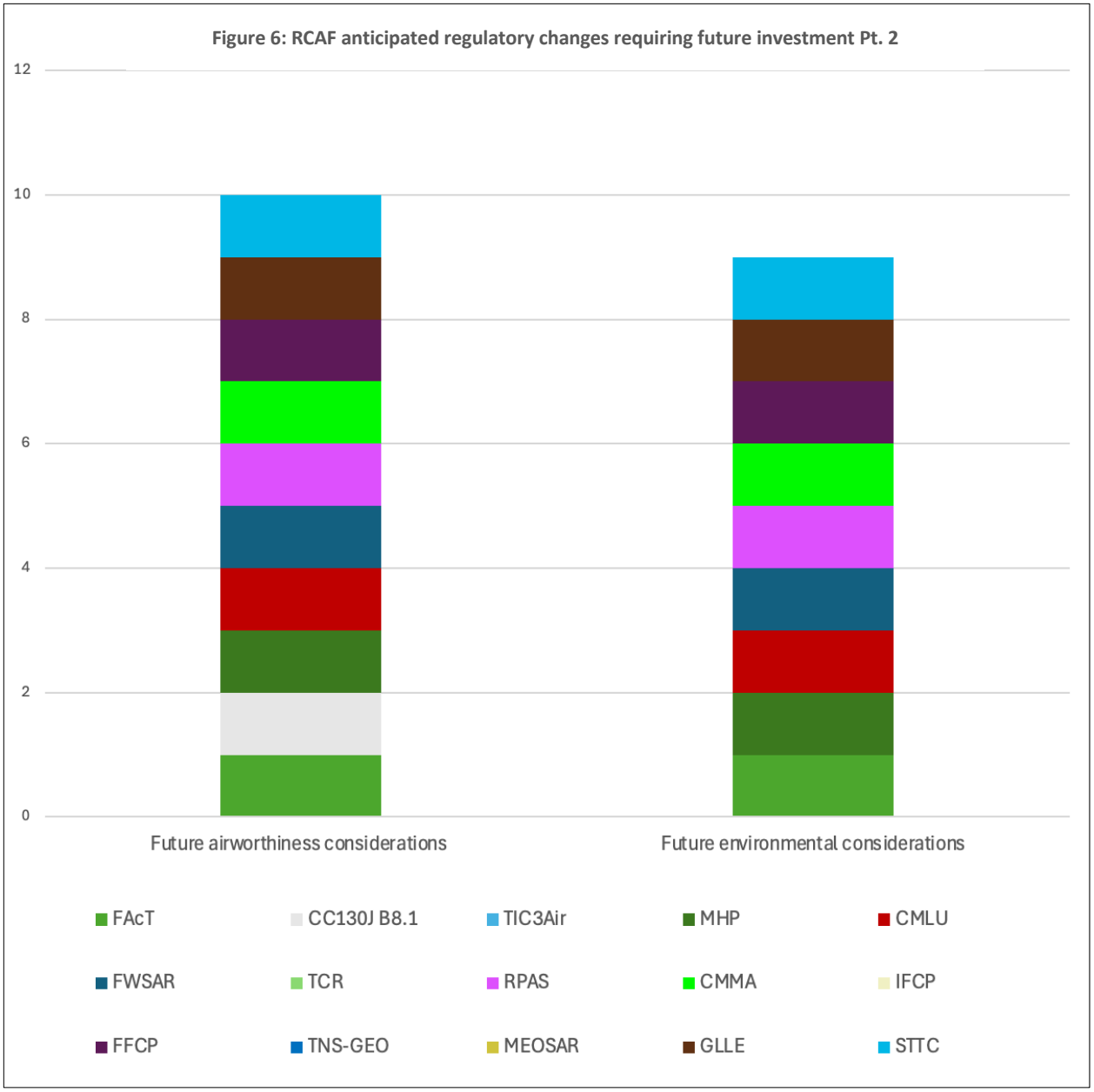

Figures 3 and 4 present all RCAF "yes" responses. They also highlight the CCS indicators which show up across the most projects. Anticipated NORAD interoperability requirements are expected to require future investment in approximately 81 percent of surveyed projects, future technological obsolescence issues are anticipated in 77 percent of surveyed projects, and technological advancements required to maintain future performance levels versus original high level mandatory requirements (HLMRs) are expected in nearly 68 percent of surveyed projects. Meanwhile, 55 percent of surveyed projects have through-life technology obsolescence plans, and 61 percent of surveyed projects have capability sustainment roadmaps.



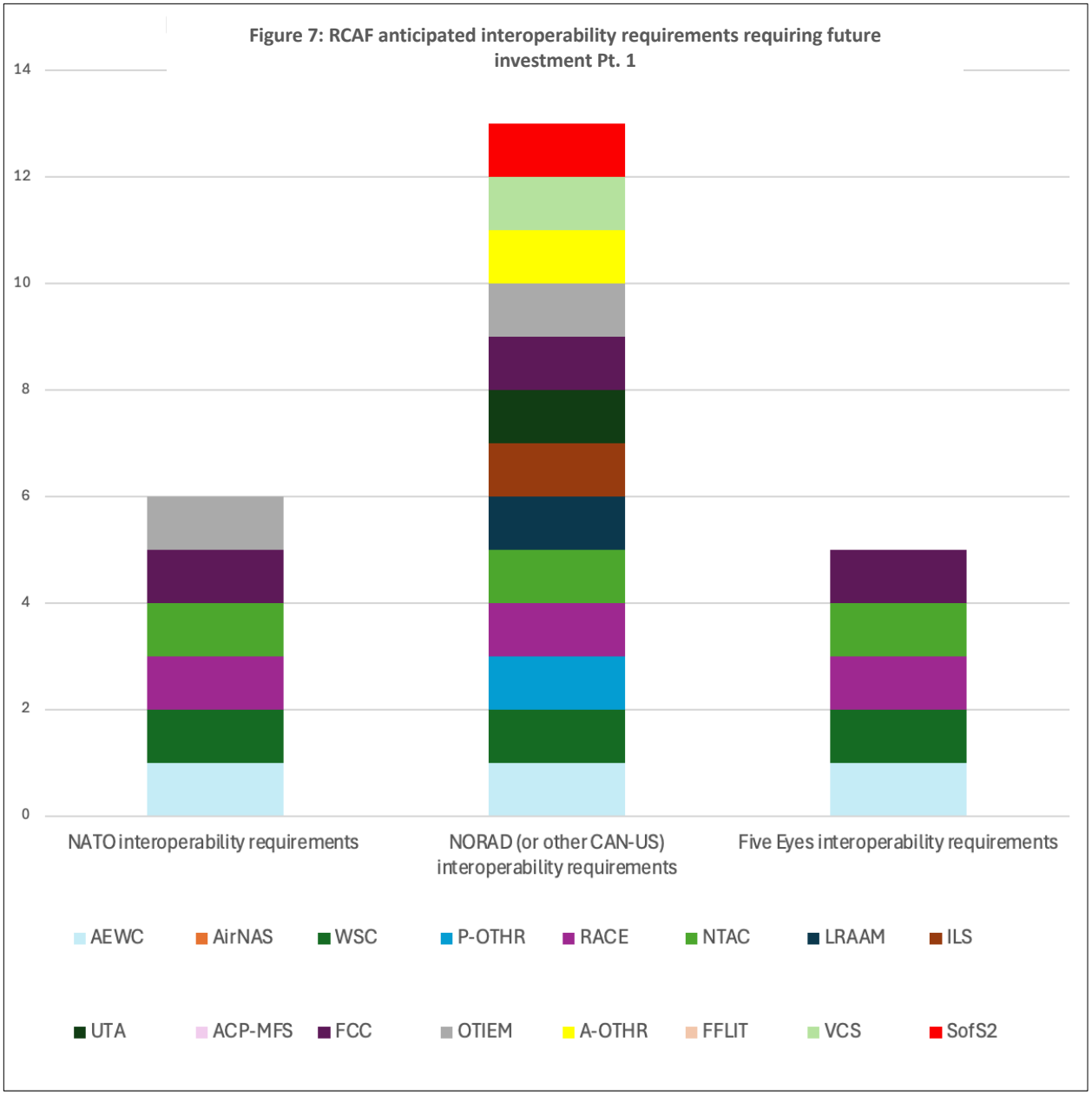

While newer projects are less likely than more developed ones to possess these plans, the prevalence of anticipated technological obsolescence, required technological advancements, and evolving interoperability requirements in the responses suggests that detailed through-life technology obsolescence plans and capability sustainment roadmaps will be absolutely critical to the RCAF's future capabilities. In general terms, and similar to the other CAF services, CCS may be most effective in helping to ensure that future RCAF capabilities avoid technological obsolescence issues and continue to meet evolving interoperability requirements. CCS should therefore be incorporated into the aforementioned plans.



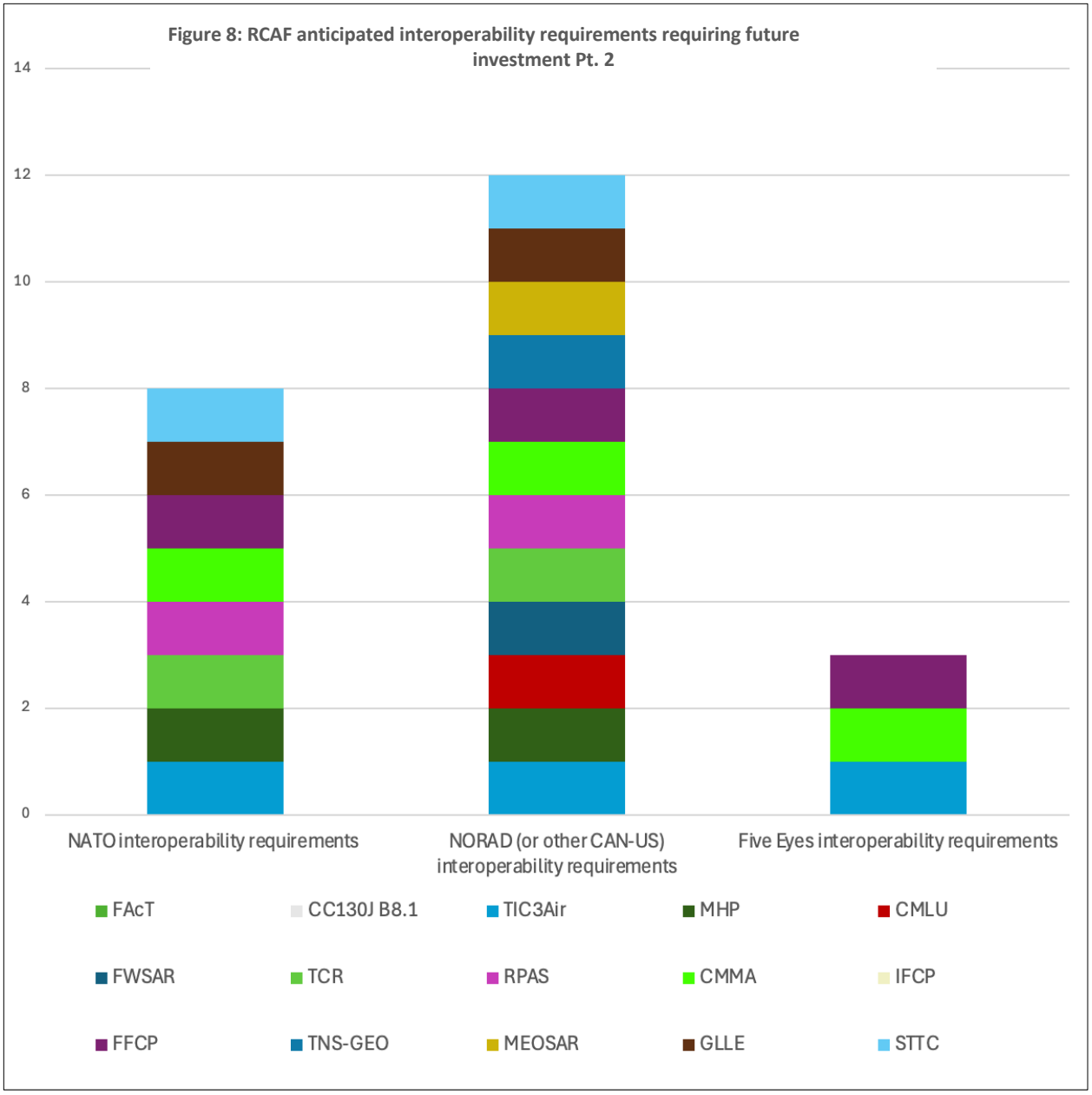

Figures 5 and 6 highlight the regulatory changes category. 58 percent of surveyed projects have future airworthiness considerations; 55 percent of surveyed projects have future environmental considerations. Evolving platform airworthiness requirements and navigational requirements are identified as the airworthiness considerations likely to require future investment. Similar to the Royal Canadian Navy, the Government of Canada (GoC) Greening Strategy and CAF fleet decarbonization are both expected to require future investments across RCAF fleets.



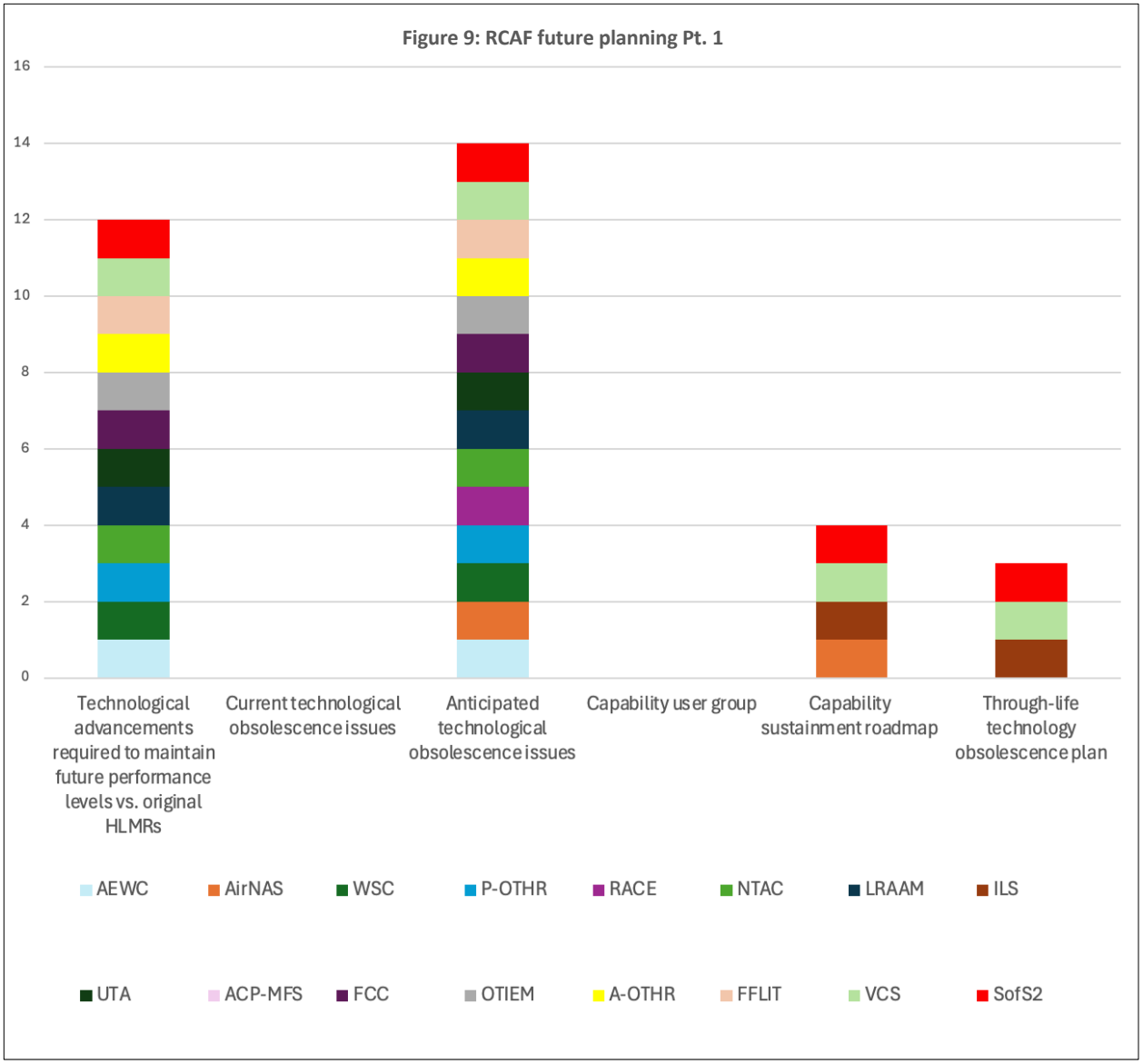

Future RCAF installations situated in Canada's North, including the Polar Over-The-Horizon Radar (P-OTHR) and the Artic Over-The-Horizon Radar (A-OTHR), are expected to require additional future investment based on evolving environmental regulations for their particular locations. The Operational Training Infrastructure Enterprise Modernization (OTIEM) is expected to be subject to significant environmental considerations in the future.



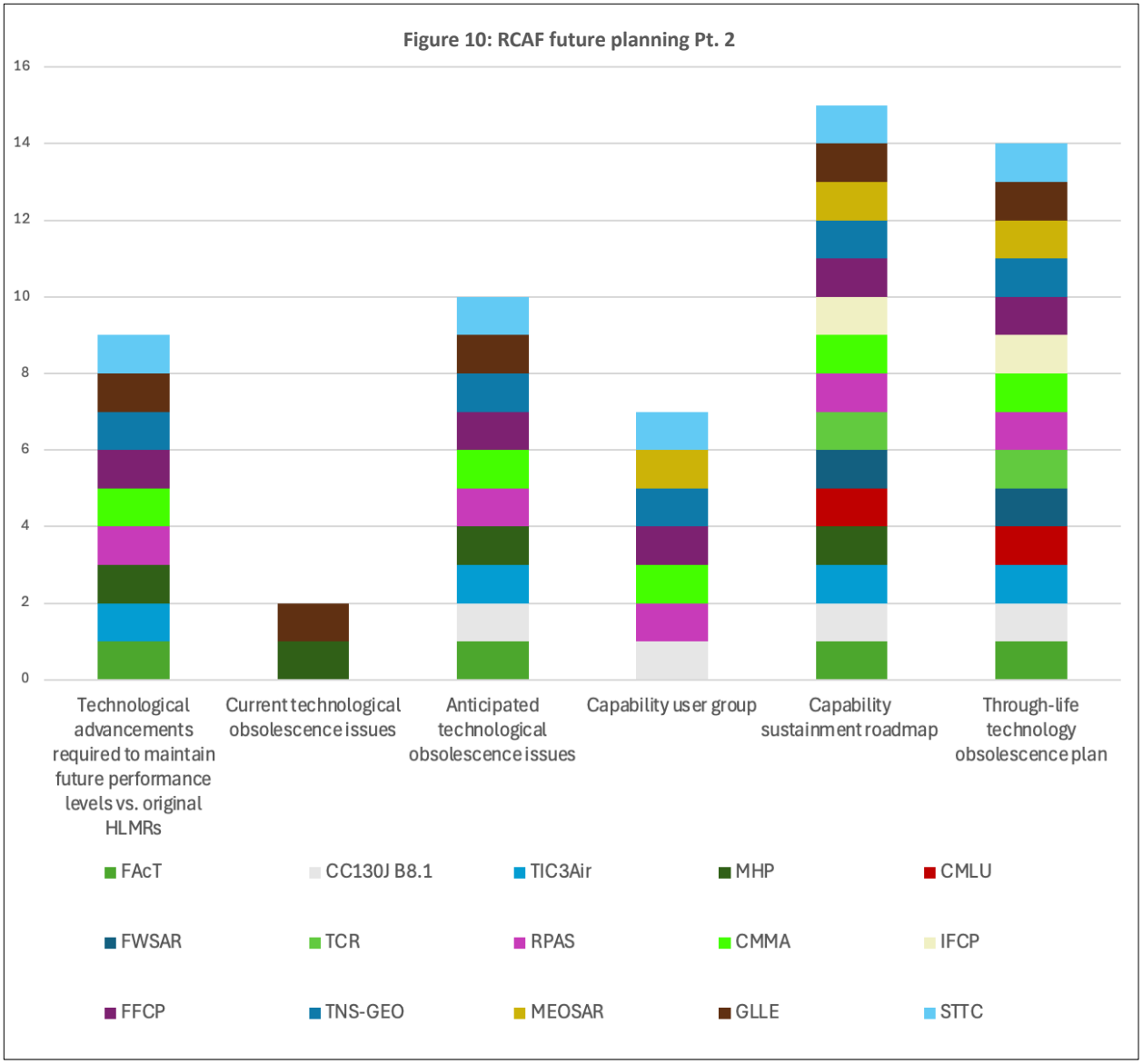

Figures 7 and 8 highlight the interoperability requirements category of CCS indicators. Less than half (45 percent) of surveyed RCAF projects anticipate evolving NATO interoperability requirements requiring future investment; this proportion is lower for the RCAF than it is for the Army and Navy. A significant majority (81 percent) of projects anticipate evolving NORAD or other Canada-United States (U.S.) interoperability requirements requiring future investment. This reflects the RCAF's status as the CAF's main force contributor to NORAD.




The RCAF also leads Canada's participation in NORAD Modernization activities, further explaining the prevalence of the NORAD interoperability CCS indicator across RCAF projects. In this context, CCS (or agile sustainment) could be discussed and evaluated with the U.S. for potential use in sustaining future NORAD capabilities. Five Eyes interoperability requirements are less prevalent across the surveyed projects (26 percent). Major aircraft procurements, command and control (C2), and communications projects tend to exhibit this CCS indicator.




Figures 9 and 10 capture the future planning category of CCS indicators. In keeping with the analysis of Figures 3 and 4 above, the prevalence of required technological advancements and anticipated technological obsolescence issues in the survey data suggests that CCS may be well suited to future technology insertion activities. Both indicators capture the swift pace of contemporary technological evolution. The predicted timeframes for the technological obsolescence issues captured in figures 9 and 10 range from 5 to 20 years, with a mean value of 10.7 years. This places the RCAF above the Army (6.0 years) and Navy (9.3 years).




Once again, the high numbers of capability sustainment roadmaps and through-life technology obsolescence plans communicated in the survey results may present opportunities for the future implementation of CCS by the RCAF.

*Conclusions:*

1. Anticipated NORAD interoperability requirements (81 percent), future technological obsolescence issues (77 percent), and technological advancements required to maintain future performance levels versus original HLMRs (68 percent) were the most prominent CCS indicators among the RCAF projects captured in the dataset. Based on this observation, future RCAF CCS planning and piloting efforts could be most effective and efficient if focused on these areas.

2. Given the potential efficiencies to be leveraged and the number of CCS indicators visible across its current aircraft procurement projects, the RCAF should consider implementing through-life CCS across its aircraft fleets.

3. In this era of rapid technological innovation, capability sustainment roadmaps and through-life technology obsolescence plans are critical to future force readiness and operational relevance. Consideration should be given to incorporating CCS into these plans from inception so that in-service CAF capabilities can be rapidly refreshed (whenever feasible) rather than replaced under more protracted and costly capital projects.

4. Canada should continue to work closely with the U.S. on the development of future NORAD interoperability requirements to ensure that future RCAF capabilities can be developed for maximum through-life interoperability and sustainment efficiency. The same consideration applies to engaging allies and partners on future environmental standards and regulations.

5. In some cases, respondents indicated that specific projects were not sufficiently mature to assess the presence of a CCS indicator, but those respondents posited that additional indicators could become visible as projects evolve.

# About the Author

***William "Will" Richardson*** *is a PhD candidate in Political Science at Carleton University. He specializes in International Relations and Public Policy. His Doctoral thesis will examine the intersection of Five Eyes military cooperation, emerging technologies and defence procurement. Will completed his MA at the Norman Paterson School of International Affairs at Carleton University in 2020. His MA thesis examined Canada's Future Fighter Capability Project and the role of interoperability in Canadian defence policy. Will also works as a Consultant at Space Strategies Consulting Limited, where he prepares research papers, concept papers and oral briefings on advanced aerospace concepts, military doctrine, emerging technologies and the commercial space sector for clients in the public and private sectors. Will has also worked as a political and security desk officer on several geographic desks at Global Affairs Canada, during which time he produced strategic advice, research reports, and briefing documents for use by the Prime Minister, Cabinet Ministers, and senior departmental officials. Will is passionate about history and aviation; and is also a keen cyclist and hiker.*

# Canadian Global Affairs Institute

The Canadian Global Affairs Institute focuses on the entire range of Canada's international relations in all its forms including trade investment and international capacity building. Successor to the Canadian Defence and Foreign Affairs Institute (CDFAI, which was established in 2001), the Institute works to inform Canadians about the importance of having a respected and influential voice in those parts of the globe where Canada has significant interests due to trade and investment, origins of Canada's population, geographic security (and especially security of North America in conjunction with the United States), social development, or the peace and freedom of allied nations. The Institute aims to demonstrate to Canadians the importance of comprehensive foreign, defence and trade policies which both express our values and represent our interests.

The Institute was created to bridge the gap between what Canadians need to know about Canadian international activities and what they do know. Historically Canadians have tended to look abroad out of a search for markets because Canada depends heavily on foreign trade. In the modern post-Cold War world, however, global security and stability have become the bedrocks of global commerce and the free movement of people, goods and ideas across international boundaries. Canada has striven to open the world since the 1930s and was a driving factor behind the adoption of the main structures which underpin globalization such as the International Monetary Fund, the World Bank, the World Trade Organization and emerging free trade networks connecting dozens of international economies. The Canadian Global Affairs Institute recognizes Canada's contribution to a globalized world and aims to inform Canadians about Canada's role in that process and the connection between globalization and security.

In all its activities the Institute is a charitable, non-partisan, non-advocacy organization that provides a platform for a variety of viewpoints. It is supported financially by the contributions of individuals, foundations, and corporations. Conclusions or opinions expressed in Institute publications and programs are those of the author(s) and do not necessarily reflect the views of Institute staff, fellows, directors, advisors or any individuals or organizations that provide financial support to, or collaborate with, the Institute.