Corporal Parker Salustro, Canadian Armed Forces

A CH-149 Cormorant helicopter and its crew from 442 Search and Rescue Squadron provide support for Operation LENTUS, evacuating people out of Merritt, British Columbia (BC), after heavy rain triggered mudslides along a BC highway on 15 November 2021

Search and Rescue Blues

by Martin Shadwick

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In December of 2016 and May of 2018, respectively, the Trudeau government announced its decisions to replace the long-serving and austerely-equipped CC-115 Buffalo and legacy CC-130H Hercules search and rescue aircraft with 16 sensor and data management system-rich Airbus (originally CASA) CC-295s and to upgrade and life-extend the Leonardo (previously AgustaWestland) CH-149 Cormorant and augment the existing CH-149 fleet with additional helicopters. Although the Winter 2018 edition of this column (*Canadian Military Journal,* Vol. 19, No. 1) expressed concern over a variety of issues—including but not confined to the repeated delays in both the Fixed-Wing Search and Rescue (FWSAR) and Cormorant Mid-Life Upgrade (CMLU) projects, the lower speed and endurance of the CC-295 compared to the legacy SAR CC-130H and whether "the available funds will stretch sufficiently to provide a truly comprehensive and integrated upgrade for the Cormorant" and a "meaningful increase in fleet size"—it expressed the hope that the decisions would herald "a long-awaited rejuvenation and renewal for a vital component" of the Canadian search and rescue system. In retrospect, a more nuanced assessment would have been prudent given the very worrisome and intensely frustrating array of challenges—admittedly different types of challenges—that now beset the CC-295 and the Cormorant upgrade initiatives.

In a scathing analysis in *The Hill Times* of 30 May 2022, for example, Richard Shimooka, a Senior Fellow at the Macdonald-Laurier Institute, criticized successive governments, the loosening of operational requirements to create competition—thereby "allowing the C-295 to compete and, thus, blunting the...advantages" of the air force's long-assumed preference, Alenia's C-27J Spartan—and the perceived technical and operational deficiencies of the CC-295. Since winning the competition, he argued, "the C-295 has struggled to meet its promised performance. Modifications increased the aircraft's weight and it is now underpowered for its missions." Along "with a number of other major deficiencies, such as...operation in icing, paradrop limitations and problematic centre of gravity" this "severely impacts the aircraft's ability to operate effectively, and even safely." He also argued that the cabin layout "posed difficulties for SAR technicians to move around." Shimooka concluded that "the recent announcement to push back

the [aircraft's] Initial Operational Capability...is a clear punt by [the Trudeau] government to offload these problems until a later date. While some of the deficiencies are fixable (e.g., avionics), the problems around weight, power and icing capabilities are very likely not, as they are fundamental to the aircraft's design. There is a significant chance that Canada will need to scrap the entire $2.9 billion purchase, and seek a different outcome." Similar concerns were voiced during his 7 June 2022 testimony before the House of Commons Standing Committee on Indigenous and Northern Affairs.

The reservations enumerated by Richard Shimooka and others have inevitably raised the ire of CC-295 advocates who see them as unfair or exaggerated and the critics disinclined to acknowledge either the merits of the Canadian SAR-specific modifications to the baseline C-295 or the shortcomings of would-be alternatives (e.g., the lack of a missionized C-27J). They point, in particular, to a very sophisticated mission avionics suite that offers a quantum leap over the legacy CC-130H Hercules and Buffalo, extremely high levels of availability and serviceability, an outstandingly reliable powerplant and the ready availability of spares (in part a reflection of a substantial customer base and a lengthy and on-going production run). They note that some perceived problems have already been addressed (a point also made in a variety of venues by government officials), reject suggestions that the aircraft is underpowered (it is, admittedly, slower than the CC-130H Hercules but faster than the now-retired Buffalo) and posit that the so-called centre of gravity "issue" has been misunderstood and misinterpreted (a point also made by a senior government official in 22 March 2022 testimony before the House of Commons Standing Committee on Government Operations and Estimates). The CC-295's defenders are no happier about the slippage in Initial Operational Capability (IOC) and Full Operational Capability (FOC) than its detractors, but stress that the pandemic was a very significant factor. It is possible, too, that some of the slippage can be attributed to the shortages of military aircrew and technicians—a systemic problem not confined to the SAR world—and that a perceived lack of DND/CF focus on the project also had negative consequences.

The debate between the CC-295's detractors and defenders has become distressingly polarized but it nevertheless broaches a host of important questions and dilemmas. If the fully modified Kingfisher is ultimately deemed satisfactory for the Canadian SAR operating environment, albeit with serious slippage in the IOC and FOC, it will vindicate the aircraft's governmental (see, for example, the laudatory comments in Hansard [5 April 2022] by Kevin Lamoureux, the ex-air force Parliamentary Secretary to the Leader of the Government in the House of Commons about the "amazing" and "incredible" Kingfisher) and non-governmental supporters and confound its critics. If, on the other hand, some notable perceived weaknesses defy correction, then the implications—be they operational, political, military, bureaucratic, legal, financial or industrial in nature—could prove profound. Canada would require both modified interim arrangements for primary fixed-wing SAR and a search for a replacement type (or types, if a hybrid fixed-wing SAR fleet was deemed the superior option). Ottawa also would need to determine the fate of the already-delivered Kingfishers. If retained on the Canadian inventory, it might find a viable niche as a ramp-equipped, multi-purpose transport with a useful—albeit not Aurora-like—Intelligence, Surveillance and Reconnaissance (ISR) capability. Others might seek to recast the Kingfisher as the more modest end of a two-type fixed-wing search and rescue aircraft fleet with the other aircraft carrying the bulk of the primary SAR load. The political fallout from a jettisoned or recast fleet would be significant and undoubtedly extend well beyond the Kingfisher. The Opposition and political pundits would be quick to remind Canadians that an earlier Liberal government, that of Jean Chretien, also experienced challenges and embarrassments with SAR (i.e., cancelling the plans of the Brian Mulroney and Kim Campbell governments for a fleet of AgustaWestland EH101s, absorbing a cancellation penalty and then ultimately purchasing a somewhat more austere SAR member of the same EH101/AW101 family). To compound the conundrum with a third scenario, what would happen if the fully modified Kingfisher was deemed workable but not optimal?

The technical, operational, certification and qualification issues which confront the Kingfisher differ in a variety of important respects from those which confront the Cormorant. The core CMLU issues are rooted in issues of cost and affordability but if the resolution of those issues requires a more austere upgrade and reducing or eliminating the proposed augmentation of the

Aviator Justine Dusablon, Valcartier Imaging Services

Members of the 3rd Battalion, Royal 22e Régiment release cargo from a CC-130J Hercules aircraft during Exercise PÉGASE NORDIQUE in the training area of CFB Valcartier in Québec, Québec, February 14, 2018

Cpl Louis Gagné, Canadian Armed Forces

The CC-295, the newest fixed-wing search and rescue aircraft in the Royal Canadian Air Force arrives at 3 Wing Bagotville on September 16, 2020

Cormorant fleet, there will be adverse consequences not only for the operational effectiveness of the Cormorant but, more broadly, for the overall credibility of the Canadian search and rescue system. Complete failure to reach a deal with Leonardo would have an even wider array of implications. In 22 March 2022 testimony before the House of Commons Standing Committee on Government Operations and Estimates, Simon Page—the Assistant Deputy Minister, Defence and Marine Procurement, Department of Public Works and Government Services—acknowledged that the discussions between Ottawa and Leonardo "have not been easy."

The latest chapter in the FWSAR saga was sparked on 4 May 2022 when the federal government announced that "as the [CC-295] project has progressed, we've gained a better understanding of the complex work needed to meet all the requirements necessary for the CC-295 to conduct its search and rescue missions. This includes significant design and development, integration of new capabilities, testing, qualification and certification, as well as work required to deliver the necessary technical publications, courseware and support systems." Consequently, and given "the added impacts of COVID-19", the Initial Operational Capability target date for the aircraft would be shifted from Summer 2022 to Fiscal Year 2025-2026 and its Full Operational Capability from Summer 2024 to Fiscal Year 2029-2030. This represented a very substantial further delay from the schedule envisaged when the CC-295 was selected in 2016 (i.e., mid-2020 for the IOC and 2022 for the FOC). Astonishingly, the latest FOC, if realized, would be more than a quarter of a century removed from Prime Minister Paul Martin's 14 April 2004 speech at CFB Gagetown announcing that the Fixed-Wing Search and Rescue project would be fast-tracked.

A DND backgrounder of 4 May 2022 attributed the "extended timelines" to a combination of certification and qualification, technical and training maturity issues. In order "to meet the Canadian requirements for search and rescue and as part of their initial proposal, for example, Airbus included over 30 design changes to the base [C-295] model for the CC-295 Kingfisher." These changes to meet Canadian mandatory or rated requirements, reported Chris Thatcher of *Skies* magazine (19 May 2022) ranged from a "cockpit roof hatch to allow the crew quick egress" in the event of a water ditching to a heads-up display in the cockpit to "enclosing the main landing gear tires that protrude from the underbelly of a C-295 during flight" in a bid to enhance range and endurance. Such changes, noted the backgrounder, "have resulted in a requirement for additional certifications", adding that "the volume and sequencing of work by Airbus and by the CAF requires more time and cannot be expedited." In addition, "Airbus chose to develop and integrate new capabilities. In the process of the development, unforeseen technical challenges have been identified that are taking Airbus and its sub-contractors time to resolve." The testing of the avionics associated with the glass cockpit proposed by Airbus, for example, "uncovered problems with the Crew Annunciation System, which monitors aircraft systems and provides alerts," noted Thatcher. Such deficiencies, reported Ottawa, "must be corrected through software and/or hardware development and updates which takes time and follows a rigorous testing and certification process." Finally, "for any new capability, aircraft operating instructions and related training materials must be developed that are reflective of the final configuration. Delays with the qualification of capabilities and the resolution of technical issues are, therefore, in turn, impacting the development of the operating instructions and courseware." Although not explicitly referenced in the 4 May 2022 statement or backgrounder—but confirmed in a variety of venues by DND officials—other issues have included defining "a safe envelope" for search and rescue technicians exiting via the rear ramp—since resolved but, notes Thatcher, "the test teams are still finalizing procedures to retrieve a jumper whose parachute gets snagged behind the airplane" and managing the Kingfisher's centre of gravity.

As an interim measure to compensate the Victoria search and rescue region for the retirement of the CC-115 Buffalo and the delay in the IOC of the Kingfisher, a detachment of two CC-130H Hercules from 435 Transport and Rescue Squadron has been redeployed from CFB Winnipeg to CFB Comox—thereby producing a decidedly far-flung squadron with SAR responsibilities at two bases and a reduced capability to meet its air-to-air refueling and air transport mandates. In a statement to *Skies*, the RCAF reported that it is "also exploring the option of using part of the

CC-130J fleet to augment the CC-130H in the SAR role." The implications for the RCAF of the significantly delayed service entry of the Kingfisher, however, go well beyond the shuffling and potential reassigning of aircraft. They will "disrupt" the training schedules and posting cycles of "SAR pilots and maintenance technicians preparing to transition to the new aircraft from the legacy CC-115 Buffalo and CC-130H Hercules" notes Thatcher, potentially foster morale and personnel retention challenges, and generate a massive test and evaluation workload.

The 4 May 2022 statement and backgrounder have helped to rekindle debates that in some cases extend back to the earliest days of the Fixed-Wing Search and Rescue aircraft project. These include but are not confined to the procurement process and subsequent changes to that process, the perceived air force bias toward the Alenia C-27J, the ramifications of the determined quest by some actors for Canadian industrial benefits (e.g., the Pratt and Whitney Canada powerplants of the C-295), the relative merits for search and rescue in the Canadian operating environment of the C-295, the C-27J and other contenders, potentially revised basing options and approaches for Canada's fixed-wing search and rescue aircraft (particularly in the north and near north) and whether due consideration was given to "the cost and potential benefits of providing *part* (emphasis added) of the fixed-wing search and rescue solution through contracted support for elements such as aircraft, aircrew, and maintenance" (a 2010 National Research Council study commissioned by the Department of Public Works and Government Services urged Ottawa to conduct an "in-depth analysis" of this option). Indeed, the myriad range of issues raised by the particularly blunt NRC study could potentially prove instructive today as one seeks to fully understand the circumstances and decisions that led to such serious and implication-laden delays in the IOC and FOC of the CC-295. Fundamentally, in the case of the CC-295, was there a failure—by multiple parties and actors—to appreciate fully the extent, the scope and the complexity of the design changes necessary to meet Canadian search and rescue requirements and of the amount of time and energy that would be required—again, by multiple actors—to fully address those issues? Ottawa's statement of 4 May 2022 argues that "while the delay is unfortunate, these types of issues are not unusual given the complexity of the capability being developed." Although such downplaying of problems is not unexpected in a statement of that type, and is to some degree accurate, it is uncomfortably close to claiming that these are mere teething problems.

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The rotary-wing component has encountered its own trials and tribulations since the Trudeau government announced its decision to pursue a Cormorant Mid-Life Upgrade (CMLU) project via a "non-competitive process" with the Original Equipment Manufacturer, Leonardo, in 2018. Based on the impressive Royal Norwegian Air Force AW101-612 variant of the AW101, the CMLU sought to "replace or upgrade current and projected obsolete systems on the Cormorant fleet", to enhance the Cormorant fleet with new SAR capabilities, to augment the current fleet size of 14 aircraft—in part to permit the reintroduction of the Cormorant to CFB Trenton (which very briefly operated the type early in its career)—and to procure a Rotary-Wing Search and Rescue Simulator. In a follow-on statement, a DND spokesperson noted that the CMLU "will extend rotary-wing SAR services to at least 2040" by upgrading the existing helicopters and by augmenting the current fleet with *up to seven* (emphasis added) additional helicopters. A Leonardo press release of 29 May 2018 posited, ironically as events transpired, that the undertaking would "provide a very low risk solution" to Canada's future requirements for rotary-wing search and rescue.

Minister of National Defence Harjit S. Sajjan confirmed in August 2019 that the Cormorant fleet would be upgraded "to extend its life to at least 2042" but noted, in an apparent downward shift, that the existing fleet would be bolstered by "at least two additional helicopters." A 2019 DND document mapped out a very aggressive timeline for the CMLU, including the first delivery of an upgraded Cormorant by 2022 and initial operational capability in 2024. Key elements of the CMLU included upgraded flight management, communications, navigation and safety capabilities, the introduction of modern SAR mission sensors, upgraded engines, maintainability and reliability enhancements, an extended service life, improved in-cabin wireless communications and the return of the Cormorant to CFB Trenton.

Unfortunately—or perhaps inevitably given the pitfalls and vagaries of defence procurement in Canada—negotiations for the Cormorant Mid-Life Upgrade project were paused in July of 2021 following Ottawa's determination that Leonardo "could not do the work at a cost that would respect the project's overall budget." DND noted that the Cormorant had been in service for almost two decades and that consequently some "of the onboard systems are...becoming obsolete and increasingly difficult to support including engines. Additionally, the helicopter does not have the required avionics to meet new regulatory standards." The Department was therefore "working to see what can be done to extend the life" of its Cormorant fleet. One "option is a life-extension of the existing [fourteen] helicopters to meet regulatory requirements and replace obsolete parts. This would extend the life of the aircraft and leverage its existing capabilities." To that end, "intermediate steps are currently being taken within the in-service support program to ensure the helicopter is viable until an upgrade program can be put in place." The DND statement added that replacing the CH-146 Griffon in the SAR role at CFB Trenton "is still a consideration." Assistant Deputy Minister (Materiel) Troy Crosby noted, additionally, that DND and the RCAF "will now examine what other options could be available for the [Cormorant] helicopters. First and foremost, we

will ensure the helicopters remain capable and available. But the mid-life upgrade project had sought to do more than that and we'll have to look at what we can achieve through various options."

In a Twitter statement of 13 June 2022, Leonardo reiterated that it "remains fully engaged with the Canadian Government in relation to the upgrade" of its CH-149 Cormorant search and rescue fleet. The "Cormorant Mid-Life Upgrade (CMLU) Project will address obsolescence issues, ensure compliance with emerging airspace requirements, extend the life expectancy of the fleet to 2042+ and *provide the option* [emphasis added] to augment the fleet, enabling the return of Cormorant helicopters" to the main operating base at CFB Trenton. Somewhat curiously given the lack of explicit references to enhancements and modifications unrelated to obsolescence issues and emerging airspace requirements, the statement posited that "the CMLU Project will transition Canada's [AW101/CH-149 Cormorant] SAR helicopter fleet to the latest standard currently being delivered for SAR in Norway and arguably the best search and rescue helicopter in the world."

Precisely where the post-pause CMLU discussions between Ottawa and Leonardo will lead remained unclear at the time of writing. Sufficient additional funding to pursue CMLU as originally envisaged appears unlikely even if Ottawa is now at least modestly more amenable to increased defence spending. At the very least, though, Canada must pursue—and pursue expeditiously given the buffeting of the original CMLU timelines—the life-extension of the existing Cormorant fleet and address a pressing range of obsolescence, serviceability and regulatory issues. In the absence of additional funding for CMLU, a comprehensive and fully integrated AW101-612-inspired mission avionics suite would be a non-starter but some useful enhancements, albeit non-integrated or only semi-integrated and less advanced, should be pursued. Thoughtful observers, though, would be left to ponder how Norway, but not Canada, can afford "arguably the best search and rescue helicopter in the world."

A credible augmentation of the Cormorant fleet—partly to replace the ill-suited CH-146 Griffons at CFB Trenton, partly to cover for Cormorants undergoing CMLU upgrades and partly to provide a modest number of maintenance "floaters" and a hedge against future attrition—remains extremely important but also extremely problematic. Indeed, the accident involving Cormorant 149903 at CFB Gander on 10 March 2022—thereby sustaining "very serious" Category B damage—has at the very least temporarily reduced the active Cormorant fleet to only thirteen aircraft and further underscored a fleet size dilemma extending back to the days of the CH-113/CH-113A Labrador. A "determination has not yet been made as to whether it is feasible to return [Cormorant 149903] to active service. This assessment is ongoing." Another Cormorant, of course, was lost in a fatal crash on 13 July 2006. Instead of "at least two additional aircraft", the fleet needs to be reinforced by at least three—and preferably four or even five—additional Cormorants. A more modest number would suffice if Ottawa opted to forego replacing the Griffons at CFB Trenton with the Cormorant, but the Griffon, even if upgraded under the broader Griffon Limited Life Extension (GLLE) project and additionally provided with some SAR-specific enhancements, is no Cormorant. A potential alternative, if one is prepared to embrace niche privatization, would be to privatize the SAR operation in Gander—with an appropriate helicopter type to be determined—and shift its Cormorants to CFB Trenton as Griffon replacements. If so, it could prove useful to examine the hybrid civilian and military crewing model originally envisaged when the Royal Air Force exited the primary SAR role.

While the various relevant parties attend to the woes of the Kingfisher and the CMLU, we would do well to remember, as this column has stressed on multiple occasions (see, for example, *Canadian Military Journal*, Winter 2018, Vol. 19, No. 1), that "broader issues of SAR policy and SAR governance remain to be tackled—and tackled on a holistic, priority basis." One could posit that we still lack "an up-to-date, integrated and comprehensive national search and rescue policy", that SAR in Canada suffers from a lack of accountability, that there remains a lack of coordination between the strategic level and the operational components of the national SAR system, that meaningful levels of service remain ill-defined or non-existent, that the concept of "lead minister" for search and rescue has effectively disappeared and that the de facto loss of the National Search and Rescue Secretariat has had deleterious consequences. Any independent review and analysis of the problems encountered by the Kingfisher and CMLU projects should not fail to take such broader weaknesses and defects into account.

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Problems with the Kingfisher and the Cormorant also have the potential—the conceivably very messy and controversial potential—to energize anew the decades-old debate over stripping primary fixed-wing and rotary-wing SAR from DND and the Canadian Forces and transferring it to the private sector by emboldening those who seek, wisely or unwisely, full privatization. It is also conceivable but distressing that some heretofore staunch supporters of the military's retention of primary SAR have now become so frustrated with SAR equipment deficiencies, the delays in fielding the FWSAR aircraft and upgraded (and augmented) Cormorants, the polarized debates and questionable decision-making—not to mention frustration with broader issues of Canadian national SAR policy and governance—that they may now be more willing to ponder, if not yet full privatization, at least the increased niche privatization of SAR in Canada. Whether this would do search and rescue, the military or the country—we far too readily forget that such issues demand a broad and genuinely holistic national perspective—any favours remains very far from clear. To what extent a privatized approach to search and rescue could have avoided or reduced the problems associated with the Kingfisher and the Cormorant upgrade is debatable, but even a *perception* that it could have might prove challenging to dislodge.

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