Airbus Defence and Space/DND

Artist's conception of an Airbus CC-295 on a SAR mission. The 'ghost' aircraft above it depicts an RCAF Avro *Lancaster* Mark X configured as it would have been for SAR duties in the 1950s.

The Nascent Renaissance of Search and Rescue

by Martin Shadwick

The Trudeau government's December 2016 and May 2018 decisions to, respectively, replace the long-serving CC-115 *Buffalo* and legacy CC-130 *Hercules* with 16 Airbus CC-295s and "to replace or upgrade current and projected obsolete systems on the CH-149 *Cormorant* fleet [and] to augment the current CH-149 fleet size" portend a long-awaited rejuvenation and renewal for a vital component of the broader Canadian search and rescue system. The decisions to acquire the well-equipped CC-295 and to initiate a mid-life upgrade and fleet augmentation for the *Cormorant*—one of the comparatively few new-build aircraft specifically acquired for SAR in Canada—also represent something of a revolution for a search and rescue arm that has, since its formal inception in the late-1940s, largely depended upon a variegated mix of modified, often minimally modified, conversions of aircraft types already on the Canadian inventory. In the early postwar years, this included such repurposed types as the Avro *Lancaster*, Douglas *Dakota* and Consolidated *Canso*, as well as the Noorduyn *Norseman*, Lockheed *Ventura* and Canadair *North Star.* New production SAR aircraft were largely confined to such types as the Piasecki (Vertol) H-21 helicopter, the de Havilland Canada *Otter* and the Grumman *Albatross* amphibian. In more recent decades, the conversion in lieu of procurement model—which would have been more palatable had it been unfailingly accompanied by timely and genuinely substantive SAR modifications—has similarly embraced multiple types, ranging from the de Havilland Canada CC-115 *Buffalo* and Lockheed CC-130 *Hercules* to the Boeing Vertol CH-113A *Voyageur*, Bell CH-135 *Twin Huey* and Bell CH-146 *Griffon*.

Even when new-production aircraft were ordered or procured for Canadian search and rescue units there have been quantitative and/or qualitative issues. The RCAF's original early-1960s order for the Boeing Vertol CH-113 *Labrador*—destined to become one of the true backbones of SAR in Canada—ludicrously provided for only six aircraft. The de Havilland Canada CC-138 *Twin Otters*, as delivered in the early 1970s, were strikingly ill-equipped for search and rescue. By the same token, Brian Mulroney's abortive CH-149 *Chimo* SAR variant of the Anglo-Italian EH101 (now AW101) helicopter was better equipped for search and rescue than Jean Chrétien's EH101-derived CH-149 *Cormorant*.

DND photo RT112

Ground view of an RCAF Avro *Lancaster* configured for Search and Rescue.

Guardian Angel, by Charles Vinh. A successful rescue by a CH-113 *Labrador* and its crew.

Not surprisingly, further advanced in timescale than the more complex and multifaceted *Cormorant* mid-life upgrade and fleet augmentation initiative, the fixed-wing element of SAR renewal embraces 16 Airbus CC-295s (i.e., three aircraft each for CFBs Greenwood, Trenton and Winnipeg, five for CFB Comox—which will ultimately house both an operational squadron and a new operational training squadron for the CC-295 and CH-149—and two maintenance 'floaters'), infrastructure and set-up activities, such as training and engineering services, the construction of a new simulator-equipped training centre at CFB Comox, and the requisite maintenance and support services. Base-level maintenance by RCAF personnel will be reduced from the current CC-115/CC-130 model, but, in an intriguing and potentially promising departure from the full Alternative Service Delivery approach adopted for some Canadian fleets, first-line maintenance of the winglet-equipped CC-295 will utilize predominantly RCAF personnel working alongside a small number of private sector (i.e., PAL Aerospace) aircraft maintenance engineers. The aircraft will incorporate substantial Canadian content, including the PW127G powerplant from Pratt & Whitney Canada and the ubiquitous MX-15 electro-optical and infrared (EO/IR) system from L3 WESCAM. The RCAF's CC-295s, the first of which is slated for delivery in late-2019, will also feature an ELTA ELM-2022A maritime radar.

The CC-295's sensor suite and mission management system represent a quantum leap over the austerely-equipped *Buffalo* and *Hercules*—and provide the new aircraft with some intriguing secondary and tertiary potential in ISR applications such as coastal surveillance—but, that said, the CC-295 does represent some loss of speed and endurance from the legacy SAR CC-130H *Hercules*. Canada's newer CC-130J *Hercules* will remain relevant as a secondary SAR asset (i.e., for the deployment of major air disaster [MAJAID] equipment and supplies), but a case could also be made for maximizing the broader—albeit secondary—SAR potential of the CC-130J by procuring a modest number of roll-on/roll-off sensor packages that need not interfere with its primary transport role. This admittedly raises financial, doctrinal, crewing and other issues, but is worthy of the most thorough analysis.

On the rotary-wing side of the ledger, Sikorsky initially expressed the hope that Ottawa would hold a competition to meet its emerging search and rescue requirements—for which Sikorsky would offer an appropriately configured variant of its S-92 helicopter, a type already adopted by the coast guards of Ireland, the United Kingdom and South Korea. In Sikorsky's view, an S-92-based solution would be "more affordable at acquisition and throughout the entirety of the lifecycle" and offer useful levels of commonality with the RCAF's existing, S-92-derived, CH-148 *Cyclone* maritime helicopter. Although an intriguing concept and one similar in certain respects to the Mulroney government's abortive plan to acquire variants of the EH101 for both maritime and SAR applications, the Trudeau government opted to pursue the Cormorant Mid-Life Upgrade (CMLU) Project through "a non-competitive process with the Original Equipment Manufacturer, Leonardo S.p.A. (formerly AgustaWestland)" and its associated Team Cormorant (CAE, Rockwell Collins Canada and GE Canada). In the view of Leonardo, Ottawa's CMLU decision "recognizes that the AW101 [ex-EH101] is the only helicopter to meet Canada's primary [rotary-wing] search and rescue requirements and that it has been an excellent search and rescue asset providing outstanding coverage and capability…for RCAF search and rescue squadrons."

US Air Force photo by Andrew C. Patterson/DVIDS/3735387

A Royal Canadian Air Force CC-130J *Hercules* carrying humanitarian supplies from the government of Canada arrives at Joint Base San Antonio-Lackland, Texas, to aid in Hurricane *Harvey* relief efforts, 3 September 2017.

On a more practical political note, the prospect of plunging into yet another full-scale helicopter procurement competition—not exactly an area of strength for *any* Canadian government—could not have filled the Trudeau government with unbridled joy.

The CMLU Letter of Notification released by Public Services and Procurement Canada in May 2018 sought "to inform industry of Canada's intent to replace or upgrade current and projected obsolete systems on the [CH-149] Cormorant fleet, to augment the current [CH-149] fleet size, and to procure a [Rotary-Wing] Search and Rescue Flight Simulator." In a subsequent statement, a DND spokesperson noted that "the Cormorant Mid-Life Upgrade project will extend rotary-wing SAR services to at least 2040 by upgrading the existing CH-149 Cormorants" and augmenting the current 14-strong *Cormorant* fleet with up to seven additional AW101 helicopters. Fleet expansion, as media reports noted, could entail any of several options, including the acquisition of new-build AW101s, the leasing of AW101s or the activation of seven of the nine American VH-71s that were acquired by Canada in 2011 as a source of spares for the existing *Cormorant*s. Perhaps most telling, and potentially unsettling for those who seek an integrated, comprehensive and truly full-scope rejuvenation of the *Cormorant* (as opposed to piecemeal upgrades) were the spokesperson's observation that "capability enhancements will include replacement and modernization of avionic, communication and sensor system components. Other upgrades including replacement of older systems and *new systems that improve operational effectiveness may be considered* [emphasis added] following further industry consultation."

A Leonardo press release of 29 May 2018 reported that the firm, together with Team Cormorant, looked forward "to continue working with the Government of Canada to conclude the Options Analysis and finalize the requirements for the CH-149 CMLU and fleet augmentation, simulation and training program. Based on the AW101-612 standard, Leonardo and Team Cormorant will provide a very low risk solution to upgrade, enhance and address obsolescence, as well [as] augment the fleet to return the *Cormorant* to all four RCAF Main Operating Bases." Leonardo took note of recent efforts to reduce the cost of operating the *Cormorant* fleet, adding that "the CH-149 CMLU and [fleet] augmentation will position the rotary-wing SAR fleet for further reductions in [the] cost of ownership over the extended life of the fleet to 2040 and beyond."

Some inkling of what a rejuvenated *Cormorant* might bring to Canadian search and rescue was explored in the October-November 2018 issue of *Skies* magazine. Invited to fly a new-production AW101-612 destined for Norway—and representing a "configuration that Leonardo has proposed to the RCAF"—former test pilot and *Labrador* pilot Robert Erdos concluded that the

DND photo GD2016-0075-31 by Master Corporal Johanie Maheu

A CH-149 *Cormorant* engaged in a mountain rescue exercise scenario.

Bob Sharples/Alamy Stock Photo/KDD93D

A Norwegian AW101, the most advanced SAR helicopter in the world today.

AW101-612's "leading-edge systems—particularly electro-optic sensor technologies—offer SAR capabilities that are as much a generational improvement over the current *Cormorant* as the *Cormorant* was over my beloved…*Labrador*." Upgrades on offer to Canada, noted Erdos, included "new, more powerful, full-authority digital electronic-controlled (FADEC) General Electric CT7-8E turboshaft engines; a more modern Rockwell Collins cockpit and avionics suite; [an] improved aircraft management system; and a newly-designed, four-axis dual-duplex digital automatic flight control system (AFCS)." The sensor package "promises the biggest capability upgrade, and includes an electro-optical surveillance system; a multi-mode active electronically-scanned array (AESA) radar; [a] cell phone detection and tracking system; and [a] marine automatic identification system (AIS) transponder receiver."

Although much delayed, the CC-295 and CMLU initiatives signal at least a start to a genuine renaissance in the primary search and rescue capabilities of the RCAF. The CC-295 should provide an operationally effective, and genuinely cost-effective primary SAR asset for multiple decades. That said, it would be lamentably short-sighted if appropriate steps are not taken to realize the full secondary search and rescue potential of the CC-130J fleet. The definitive future shape of the rotary-wing element of primary SAR is more difficult to discern at this juncture, but there is a certain intoxicating appeal about the prospect of 21 *Cormorants* (or quasi-*Cormorants)* functionally equivalent to the AW101-612—a SAR helicopter that even externally looks more business-like than our existing *Cormorants*. The conundrum, of course, is that eye-watering performance often comes at an eye-watering price. Whether the available funds will stretch sufficiently to provide a truly comprehensive and integrated upgrade for the *Cormoran*t, a meaningful increase in fleet size—which is crucial if the long-neglected Trenton search and rescue region is to regain a truly credible helicopter capability—and other elements of the CMLU package remains to be seen. The need for CMLU is readily apparent—indeed, Canada's broader SAR credibility is on the line—but there are sceptics who fear that it could amount to a series of piecemeal enhancements and thereby fail to generate vital SAR capabilities or to realize the full potential of the *Cormorant*.

We would do well to remember that shiny new or rejuvenated fleets of fixed-wing and rotary-wing search and rescue aircraft—although absolutely indispensible—will not alone provide the type of thoroughgoing search and rescue renaissance (and world-class search and rescue system)—that Canada and Canadians require. DND's partners in SAR, including the Canadian Coast Guard, the RCMP, provincial and territorial governments (most notably, but not exclusively, their law enforcement agencies), civilian volunteers, and the private sector participants in search and rescue, have SAR shopping lists, too.

We must in particular remember that broader issues of SAR policy and SAR governance remain to be tackled—and tackled on a holistic, priority basis. One could posit, for example, that Canada still lacks an up-to-date, integrated and comprehensive national search and rescue policy, that the original concept of

a "lead minister" for search and rescue has seemingly disappeared into the ether, and that the National Search and Rescue Secretariat (NSS)—now ensconced within the Department of Public Safely—has continued to contract in size and apparently now lacks a military representative or, indeed, an ex-military individual with direct operational experience of search and rescue. In a somewhat similar vein, as Jean G.R. Leroux recently posited in the pages of this journal (*Canadian Military Journal*, Vol 18, No 2): (a) the "current framework and resources allocated to the [NSS] prohibit an effective connection between the strategic level and the operational elements of the SAR system"; (b) the "SAR agencies are often operating parallel to each other with no genuine coordination linking them together"; (c) even though "the [National SAR Program's] vision calls for SAR *coordination* [emphasis in the original] integrated in a multijurisdictional approach, the operational level is a *cooperation* [emphasis in the original] that is constantly challenged by federal-provincial relationships"; and (d) the "lack of coordination produces erroneous expectations of the SAR system from the population." To address such shortfalls, Leroux recommended that Ottawa "empower the National SAR Secretariat (NSS) to its original purpose of being the central agency of SAR representatives" and "augment current joint Rescue Coordination [Centres] (JRCCs) with the RCMP, relevant lead police agencies and Ground SAR (SARVAC) to make them multi-dimensional [centres] of operational coordination for all types of SAR incidents in Canada—land, marine, and air."

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Airbus Defence and Space

The Airbus CC-295 aircraft, which has been selected by Canada.