



A CH-146 Griffon helicopter over Opa Locka, Florida, during Exercise Southern Breeze, 9 February 2017.

## Future Airpower: Trends and Implications for Canadian Special Operations Forces Command (CANSOFCOM)

by David Johnston

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### Introduction

Advanced Special Operations Forces (SOF) capability requires dedicated Air and Aviation resources, yet the Royal Canadian Air Force (RCAF) has not responded to the deepening operational relevance of Canadian SOF. In its capstone document, *Air Force Vectors*, the RCAF clusters SOF with Space and Cyber activities,<sup>1</sup> both significantly more niche and less mature than Canadian Special Operations Forces Command (CANSOFCOM). Similarly, recent Airpower articles from the *Canadian Military Journal* and the *Canadian Global Affairs Institute* mention CANSOFCOM in passing only.<sup>2</sup> With more than ten years of domestic and expeditionary SOF operations in support of Canada's national interest, CANSOFCOM has emerged as a highly reliable organization. More importantly, future indications show no end to the requirement for SOF. The Chief of Force Development characterizes the Future Security Environment as one where "...state and non-state actors alike will seek to combine conventional, irregular and high-end asymmetric methods concurrently, often simultaneously in the land, sea, air, and space environments and the cyber domain to gain advantage in future conflict."<sup>3</sup>

With irregular and asymmetric threats, the irregular and asymmetric solutions provided by SOF are essential. As U.S. Admiral Eric Olsen stated, "...most conflicts involving NATO in the future will require broadly capable and skilled SOF."<sup>4</sup>

Uniquely poised to respond to irregular and asymmetric threats, CANSOFCOM requires an increase in joint interoperability and capability development with the RCAF. This article analyzes broad trends in Air and Aviation as they relate to SOF Airpower. It clarifies the need for SOF Airpower, explores six technological trends: unmanned systems, autonomy, next-generation rotary wing, future precision strike, alternate-service delivery, and fuel requirements, and ultimately, presents implications for CANSOFCOM in order to advocate for future SOF Airpower.

### Why SOF Airpower?

*Ad hoc* relationships between SOF and conventional Air and Aviation lack the foundational qualities necessary for fulfilling SOF mission sets. The Holloway Report, commissioned in 1980 after the failure of U.S. Operation *Eagle Claw*, concluded that "...the *ad-hoc* nature of the organization and planning is related to most of the major issues,"<sup>5</sup> and recommended that a permanent organization be created to plan, train, and conduct counter-terrorism missions. This was the genesis for USSOCOM, and in particular, the 160<sup>th</sup> Special Operations Aviation Regiment.<sup>6</sup> NATO SOF determined a similar force posture after realizing that, without dedicated

Air and Aviation assets, their forces were unable to execute missions for which they were otherwise capable and ready.<sup>7</sup>

The NATO study provides several key reasons why any alternative is sub-optimal: Technical skills are different; common cultural understanding, values and norms are absent; and finally, planning and rehearsal parameters vary significantly.<sup>8</sup>

The rationale for dedicated SOF Air and Aviation does not presuppose an elaborate Air Wing. Light, agile, and interoperable airpower is more appropriate. CANSOFCOM has retained Operational Command of a squadron of CH-146 *Griffon* helicopters since 2006 (even earlier, in other configurations), employing this highly effective unit in support of domestic and expeditionary operations across the spectrum of CANSOFCOM missions and units.<sup>9</sup> Nevertheless, light utility helicopters have never been sufficient for the broad spectrum of SOF missions. CANSOFCOM needs additional capabilities from across the RCAF or beyond. As a CANSOFCOM member, the author can recount numerous examples of degraded mission results due to non-existent fixed-wing surveillance assets, lack of airborne precision fire support, poor integration with conventional aviation assets, or a combination of the above. To assure operational success into the future, CANSOFCOM must develop a mature Airpower capability.

## Future Trends

### Manned vs. Unmanned

The air domain now and into the future will mix manned and unmanned platforms, a trend which CANSOFCOM must embrace. The inclusion of unmanned assets, already currently common practice among well-developed militaries, is certain. Many missions flown in support of SOF, along with occasional conventional force missions, include long-endurance unmanned drones. The unmanned suite of aerial vehicles ranges from hand-held micro ‘off-the-shelf’ varieties used by front-line tactical elements, to medium and high altitude long-endurance strategic unmanned assets. Canada is in the process of procuring medium altitude long endurance systems. The CAF’s forays into unmanned systems came from humble beginnings in Afghanistan, relying upon short-term leased versions. The long awaited permanent solution has a goal of procuring “...interoperable, network-enabled Unmanned Aircraft Systems to provide Intelligence, Surveillance, Reconnaissance, Target Acquisition and all-weather precision strike capabilities in support of CAF operations worldwide.”<sup>10</sup>

Long-delayed but highly anticipated, unmanned systems will operationally enhance CANSOFCOM.

### Autonomy

With certain use of unmanned systems, CANSOFCOM and the RCAF must determine how humans will remain relevant in the air domain, a trend known as *Humans in the Loop*. A report from the U.S. Air Force Air University concluded that there are no technological barriers to replacing manned fixed-wing assets with unmanned variants, thereby increasing the endurance of platforms and preserving the lives of air crews in high-threat environments.<sup>11</sup>

Possibly, the preponderance of future air assets supporting the ‘find-fix-finish’ portions of the targeting cycle may be unmanned. Current unmanned assets fly with either a human pilot operating remotely, or with autonomous computer algorithms replacing human control. When conducting surveillance missions, surveilling a nation’s border or a coastline, for example, the latter might be preferred. Swarms

of unmanned assets may provide persistent coverage and support over wide swaths of land or sea. However, for mission sets that depend on real-time intelligence, split-second adjustments, or those where lives hang in the balance, logic dictates that humans remain in the loop. The Air University report indicates that, even though technology is so well advanced that humans are the limiting factor, in most cases, humans prove more discerning than a machine. For example, an autonomous asset cannot differentiate a wounded soldier from a healthy one, or a chaplain from a fighter.<sup>12</sup> Most commanders with authority over lethal engagements will likely never cede control of lethal force to a machine. While one may defer the notion of phasing out manned flight completely, unmanned assets are certain to become more and more prevalent in future war. Humans will remain in the loop across the spectrum of SOF mission sets, but will recede further and further.

“The rationale for dedicated SOF Air and Aviation does not presuppose an elaborate Air Wing.”



Lockheed Martin S-97 Raider.

### Future Aviation

The next generation of aviation platforms must be considered for the CH-146 *Griffon* replacement, as technology advancements position aviation as the platform of choice for SOF missions. Future aviation platforms are trending in two different directions, both with longer combat ranges, faster speeds, and in higher and hotter conditions than today. First is the super-helicopter, exemplified by the Sikorsky S-97 *Raider*. With two coaxial counter-rotating main blades coupled with a rear thrust propeller, the S-97 and other variants achieve significantly increased speed without any drastic reduction in range, capacity, or auxiliary capabilities.<sup>13</sup>

Second is the tilt-rotor platform, most notably, the V-280 *Valor*. This category blends the vertical takeoff of a helicopter with the speed and range of a fixed-wing aircraft. The future of tilt-rotor technology looks bright, with the Bell V-280 *Valor* providing a fast, precise vertical takeoff mobility platform.<sup>14</sup> The future of aviation technology may conceivably nullify the payload and range advantage that tactical fixed wing platforms currently enjoy over helicopters. As such, a future SOF planner is likely to choose a precision asset instead of one requiring fixed infrastructure for take-off and landing. CANSOFCOM and the RCAF must collaborate on procurement of future helicopters with these considerations in mind.

### Future Precision Strike

SOF operations will need precision fire support far into the future, a role that the RCAF must prioritize. Of the multiple offensive roles and missions of air forces, air-to-ground and close air support are the two most applicable to ground forces, and to SOF in particular. As an indication of this significance, the U.S. Air Force's venerable A-10 *Warthog* has been taken out of impending retirement. According to open source reporting, "...much of

the leadership within the Air Force is keen to retire the A-10 so that the resources used to maintain the fleet can be pumped into the fifth-generation F-35 program."<sup>15</sup> However, the high demand for the A-10 as the premier close air support platform (other than the AC-130 *Spectre* gunship), makes it a constant 'go-to' asset in support of ground forces.<sup>16</sup> The trend of supporting the air-land battle is one that will continue into the future, as attempts in recent history to achieve decisive victory without committing ground forces have failed. In the rare and unlikely event that a future conflict does not involve SOF in some capacity, it is certain to involve proxy forces, civilians in need of defending, or both.

A second trend in precision strike is the case of the F-35 and the A-29, as an illustration of the debate between expensive, complex strategic platforms and ones that are simple, abundant, and tactically focused. The future of strategic attack lies in the F-35 fifth generation stealth fighter, with the aircraft blending a futuristic high-technology airframe with a human pilot. With production delays, cost overruns and some sponsors withdrawing from the program, the F-35 has experienced some developmental problems.<sup>17</sup> Nevertheless, the program continues, with a current cost per aircraft of approximately \$100 million. Juxtaposed with the F-35 is the Embraer A-29 *Super Tucano* light attack aircraft. The A-29, in comparison, costs a mere \$10 million and can be employed in multiple roles, including precision strike and surveillance and reconnaissance.<sup>18</sup> However, its utility should not be overstated: The A-29 is not a stealth fighter or a fifth generation aircraft, and is inappropriate for 'near-peer' conflicts. However, it is certainly a viable option to permit ground forces, either our own or those of a partner nation, to run their own organic fixed wing fire support missions. For example, the Afghan Air Force is training on A-29s in close air support missions with success.<sup>19</sup>



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Concept design of a Bell V-280 *Valor*.



DVIDS photo 2311483 by Technical Sergeant Nathan Lipscomb

A USAF Republic A-10 *Thunderbolt II*.



Agência Força Aérea © Sergeant Johnson at <https://www.flickr.com/photos/ministreioda defesa/8780131013>.

A pair of Embraer A-29 *Super Tucano* light attack aircraft.



A USAF Bell TH-1H Huey II.

The US Navy flirted with the concept of employing A-29s but cancelled the program, due to a number of factors beyond need and viability, principally Washington politics.<sup>20</sup> The A-29 certainly cannot replace the platform requirement necessary to compete for air superiority or defend Canada’s north as part of our NORAD commitments. Nevertheless, the value of ‘down-teching’ applies to fixed wing strike platforms supporting SOF, and, arguably, in an equal sense across the spectrum of military technology.

#### Alternative Service Delivery

Contracted civilian aircraft via Alternate Service Delivery (ASD) would ease pressure on scarce RCAF resources while providing much-needed operational flexibility to CANSOFCOM well into the future. Alternate Service Delivery (ASD) means providing “... services or products, which have been provided traditionally by the Public Service, through or in partnership with organizations outside the Public Service... while making the best use of scarce resources.”<sup>21</sup> When applied to future SOF Airpower, ASD would see CANSOFCOM entering into public-private partnerships to leverage civilian airframes. There are many successful military examples of ASD. The RCAF Contracted Airborne Training Services (CATS) program uses civilian pilots and airframes to provide live-flying instruction as part of fighter pilot training.<sup>22</sup> ASD can easily extend beyond the training realm. PAL Aerospace, headquartered in Canada, purports to have provided over 250,000 hours of airborne ISR in support of military and law enforcement missions.<sup>23</sup> U.S. AFRICOM has

**“The US Navy flirted with the concept of employing A-29s but cancelled the program, due to a number of factors beyond need and viability, principally Washington politics.”**

also successfully used contracted Air and Aviation in operational theatres over the long term with success, and recently awarded new medium-term contracts to two separate air mobility providers.<sup>24</sup> In times of relative fiscal constraint, the *lease vs. buy* option provided by ASD makes sense for the RCAF and CANSOFCOM. ASD also opens up flexibility for CANSOFCOM that the RCAF cannot provide. In 2014, the *Globe and Mail* reported that down-grades to the CC-144 *Challenger* fleet would mean the “...air force may have to use larger, more costly aircraft for important military missions, including medical evacuation.”<sup>25</sup> Outsourcing access to platforms, perhaps even with outsourced crews, helps to solve future resource scarcity.

The ASD concept may also be applied to re-role current RCAF platforms in order to provide SOF-specific mission capabilities. This is a novel solution with significant potential for CANSOFCOM. The U.S. Marine Corps achieved something similar with their UH-1 *Huey* platforms, in which they upgraded a portion of their fleet into more powerful light-attack helicopters while maintaining 85 percent commonality of parts.<sup>26</sup> This same style of program could be applied to the *Griffon* Limited-Life Extension program for CANSOFCOM airframes.<sup>27</sup> This upgrade would preserve a common airframe, while meeting future SOF requirements for mobility and fire support. Further, more short-term variations of this concept include light-weight, rapidly reconfigurable weapon and sensor mounts for the *Griffon* helicopter.<sup>28</sup> With a system such as this, CANSOFCOM *Griffons* could quickly

re-role from mobility platforms to fire support. This *roll-on, roll-off* concept may be applied across the spectrum of RCAF platforms, allowing greater flexibility and operational relevance for CANSOFCOM through alternate means of delivery.

### Fuel Sources

The cost and environmental impact of carbon fuel sources will push militaries to develop alternative fuel sources, a consideration that the RCAF and CANSOFCOM must embrace. The U.S. Navy began this process with *The Great Green Fleet*, a program designed to help their ships and aircraft "...go farther, stay longer and deliver more firepower" through, among other things, advanced biofuel.<sup>29</sup> Although future RCAF airframes will one day be powered by perpetual fuel sources, such as nuclear and solar power, the foreseeable future will maintain the requirement for aircraft and helicopters to refuel regularly. Refueling has two viable tactical options: either from the air or on the ground. Air-to-air refueling has long been a standard practice for fixed wing platforms. It is beginning to transition into the conventional aviation realm, although the RCAF's newest helicopter is not equipped with this capability.<sup>30</sup> Ground refueling via a forward arming and refueling point remains the most likely tactical option for aviation, and it may be the preferred option for both Air and Aviation mission profiles not suitable for vulnerable tanker aircraft. In recognition of the continued need to refuel, CANSOFCOM has developed the Airfield Surface Assessment and Reconnaissance capability to facilitate tactical airfield operations on unprepared, unconventional, and semi-prepared airfields.<sup>31</sup> This capability allows CANSOFCOM to facilitate *wet-wing* refueling from CC-130s to helicopters, along with various other concepts to extend the range of tactical mobility platforms.<sup>32</sup> Notwithstanding

likely fuel sources yet to be operationalized, the need to refuel will exist well into the future, and capabilities such as this increase the reach that the RCAF and CANSOFCOM can achieve together.

### Implications for CANSOFCOM

This article has analyzed a number of future trends applicable for Canadian Air and Aviation. The increase in unmanned assets, artificial intelligence, future fixed and rotary wing platforms, alternate service delivery, as well as changes to future fuel sources will affect the CAF well into the future.

A few conclusions specific to CANSOFCOM appear clear. First, the SOF 'truth' that *humans are more important than hardware* remains highly relevant.<sup>33</sup> All the technological advances aside, the decision-action cycle requires human authority. This is certainly the case in the near term, while there is very low – or no – trust associated between autonomous and manned aircraft. More broadly speaking, however, human decision-makers must remain involved in order to provide accountability to the public they serve. Concurrently, the SOF 'truth' that *most special operations require non-SOF assistance* is equally relevant. CANSOFCOM is unlikely to grow Air and Aviation assets across the entire spectrum of tasks and capabilities. With a medium-size military, and a budget below NATO guidelines,<sup>34</sup> CANSOFCOM cannot expect to replicate American SOF assets. As such, Canada must continue and augment the dedication of RCAF elements in support of SOF missions. These relationships must not fall prey to the 'ad hocism' of other nations' past mistakes but rather be lasting and meaningful in order to foster common culture and shared understanding.



Airbus C295W.



An AC-130U *Spectre* gunship in action.

Bearing these SOF truths in mind, consideration of pragmatic and incremental growth in SOF Air and Aviation should occur. Unquestionably, precision aviation will continue to be a core SOF task. A replacement for the CH-146 *Griffon* should be retroactively added to the Defence Policy Review, with SOF-specific considerations onboard.<sup>35</sup> In the interim, CANSOFCOM and the RCAF must collaborate to meet current needs as part of the *Griffon* Limited Life Extension. Interoperability with the RCAF medium-lift aviation capability should be pursued. This relationship must support CANSOFCOM adequately to allow for episodic and sustained joint training, while determining the best practices for integration of light-and-medium platforms under a Special Operations Aviation Detachment. For mobility needs beyond what aviation can provide, interoperability with the C-130 community must continue and be expanded. ASD options for non-standard fixed wing mobility and fire support should be explored. As an example, procuring a *roll-on, roll-off* ISR and fire support configuration for the C-130 or the recently-procured C-295 may be viable. Regardless of the platform, CANSOFCOM must continue to support tactical refueling of RCAF assets to extend operational reach beyond current capabilities. Lastly, CANSOFCOM must own a portion of the ISR continuum. Affiliation may work for other RCAF assets but will not for high-payoff, low-density intelligence collectors. NATO SOF learned this lesson: “Reliance on non-dedicated air support ... is equally disadvantageous due to scarcity of resources, lack of a habitual training relationship, and unfamiliarity with the SOF mission.”<sup>36</sup>

## Conclusions

### Summary

- 1) Despite autonomy and AI, humans must remain in the decision-action cycle, albeit further back in the loop with the progress of time
- 2) RCAF elements must be dedicated to support SOF missions across the range of capabilities
- 3) SOF Airpower must grow pragmatically and incrementally:
  - a. *Griffon* life extension and replacement program with SOF equities
  - b. Force Employment Concept for a combined *Griffon-Chinook* SOAD
  - c. Consider ASD for non-standard fixed-wing mobility and fire support
  - d. Operationalize the CANSOFCOM ASAR Capability
- 4) Generate CANSOFCOM-owned ISR, manned and unmanned

**T**his article has sought to determine which future SOF Air and Aviation assets should support CANSOFCOM’s mandate. Although the themes analyzed here do not provide an unobstructed roadmap into the future, they serve as a starting point for further discussion. Areas for further study include the effects of mega-cities, the struggle to exploit vastly increasing amounts of ISR data, and the organizational design for an expanded RCAF component within CANSOFCOM. Notwithstanding the complexity of future trends, CANSOFCOM and the RCAF must be closely linked to remain relevant into the future.



## NOTES



A CH-146 Griffon helicopter in Wainwright, Alberta, during Exercise Maple Resolve 16, 29 May 2016.

DND photo IS04-2016-0008-019 by Master Corporal Jonathan Barrette

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