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A COMBAT SEARCH AND RESCUE CAPABILITY FOR CANADA

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Maj Jonathan Knaul

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A COMBAT SEARCH AND RESCUE CAPABILITY FOR CANADA

For Brigadier-General Scott Clancy, Director General Readiness & Plans, Air Staff,
Royal Canadian Air Force

AIM

1. “The isolation, capture and/or exploitation of [North Atlantic Treaty Organization] NATO personnel during operations could have a significant negative impact on the operational security, morale of assigned forces and public support.”¹

2. The purpose herein is to demonstrate that Canada requires a Combat Search and Rescue (CSAR) capability to effect potential Personnel Recovery (PR) of Canadian aircrew in the hostile locations it is likely to encounter on deployed operations. Such a capability may also allow Canada the option to offer CSAR as its contribution toward United Nations (UN) or allied/coalition missions.

INTRODUCTION

3. The Government of Canada (GoC) has expressed an interest over the past 18-months to commit Canadian troops to UN peace operations in a region such as Saharan or Sub-Saharan

¹ Joint Air Competency Centre, *Personal Recovery: That Others May Live to Return with Honour*: quoted in Department of National Defence, B-GA-442-001, *Tactical Aviation Tactics, Techniques and Procedures* (Kingston: DND Canada, 7 October 2016), 9-2.

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Africa. Such a location may have little to no coalition air support, unlike the robust coalition air support Canada benefitted from in Afghanistan between 2008 and 2011. While Canada gained a tremendous amount of combat experience flying helicopters in the desert and high-rugged terrain of Afghanistan from 2008 to 2011, that is the extent of Canada's rotary-wing conventional combat experience. Indeed, Canada fielded helicopters in the Balkans throughout the 1990s and early 2000s, but this was a comparatively low threat within a coalition setting and not considered a combat environment. Furthermore, the bulk of Canadian tactical aviators that flew helicopters in Afghanistan no longer form part of Canada's current flying cadre.

4. In countries such as Mali, which is one declared potential destination for CF troops, the security threat and threat to aviation are significant.² However, the PR capability is virtually non-existent and not necessarily provided by partner peacekeeping nations. In short, the air threat is high, but the chance of PR is low.

5. A background and some history related to CSAR is presented herein. Substantiation is provided below to suggest that Canada stand-up an RCAF CSAR squadron comprised of a minimum of four Rescue Vehicles (RV) and eight-armed escort helicopters. Three Courses-of-Action (COA) are presented below with the preferred COA being a CH-149 Cyclone (RV)/CH-

² Sean Smith, "Security threats unable to take shine off Mali gold," *Verisk Maplecroft in Mining.com*, 21 April 2016, accessed online 29 January 2018, <http://www.mining.com/web/security-threats-unable-to-take-shine-off-mali-gold/>; "The Northern Mali Conflict," *Wikipedia*, accessed online 29 January 2018, https://en.wikipedia.org/wiki/Northern_Mali_conflict.

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146 Griffon (armed escort) mix.

DISCUSSION

Substantiation of need for Canadian CSAR

6. PR is “the sum of military, diplomatic, and civil efforts to prepare for and execute the recovery and reintegration of isolated personnel (IP).” CSAR is but one aspect of PR.³ Since World War I, the examples of IPs resulting from fixed wing shoot down events are many.⁴ Far fewer are examples of isolated rotary wing aircrew and passengers, mainly because some argue that mutual support helicopters were able to self-rescue.⁵ The latter statement is false.

7. As demonstrated in the case of the unfortunate shoot-down of Canadian Chinook 147202 on 5 August 2010, rotary wing aircrew and passengers can become rapidly isolated on the ground. Call sign Blowtorch 61 was on a re-supply mission with a total of twenty persons aboard with two armed Griffons flying escort. In broad daylight over Panjwayi District, within just two miles of their intended landing spot at Forward Operating Base (FOB) Ma’sum Ghar, Blowtorch 61 was struck by insurgent fire from a combination of small and large caliber weapons. With the

³ Christopher A. Mouton, Jia Xu, Endy M. Daehner, Hirokazu Miyake, Clarence R. Anderegg, Julia Pollak, David T. Orletsky, and Jerry M. Sollinger, “Rescuing Downed Aircrew – The Value of Time,” (research report, RAND Corporation, Santa Monica, California, 2015, Library of Congress Control Number: 2015955037, ISBN: 978-0-8330-9096-6), 1.

⁴ George Galdorisi and Thomas Phillips, *Leave No Man Behind: The Saga of Combat Search and Rescue* (Minneapolis: Zenith Press, 2008), ix.

⁵ Christopher A. Mouton, . . . , 7.

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Chinook on fire and critically disabled, the aircraft commander safely landed the helicopter and all aboard egressed safely. All members then rapidly established themselves in defensive ground positions. Insurgents immediately began engaging the Canadians with small arms and closed on their position. The two Griffons were unable to land due to the insurgent threat, nor did they have the capacity or aircraft performance to lift more than two additional passengers per aircraft. By luck, a combat patrol of Canadian Light Armoured Vehicles (LAV) was nearby, responded within ten minutes and successfully ground extracted all twenty persons to nearby FOB Ma'sum Ghar. Thankfully, there were no fatalities or major injuries.⁶

8. Two crucial PR-related lessons learned are highlighted from the Blowtorch 61 loss. Once on the ground and under insurgent attack:

- a. the aircrew rapidly discovered that they did not possess the necessary soldiering skills to defend themselves in a fire-fight sufficiently.⁷ While CF aircrew training in Survival, Escape, Resistance and Evasion (SERE) is considered to be of a very high standard, aircrew should also be instructed in how to fight and defend themselves against the enemy on the ground; and

⁶ Craig Mantle, "The Loss of a Canadian Chinook in Afghanistan: The Pilot's Recollection of 5 August 2010," *Canadian Military History* 24, issue 2, article 12 (2015): 270-290, accessed online 29 January 2018, <http://scholars.wlu.ca/cgi/viewcontent.cgi?article=1787&context=cmh>.

⁷ *Ibid.*, 280-285.

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- b. the aircraft commander discovered that he was unable to communicate with anyone using his survival radio, likely because of the surrounding rugged terrain.⁸ Canadian aircrew are issued the PRC-112G survival radio. While capable of many functions including satellite-linked non-line-of-site communication, Canada limited its purchase to only the Very High Frequency (VHF) line-of-sight (LOS) transmission option. Canada neither purchased the tactical operations centre receiver station nor the airborne find & locate apparatus that goes with the PRC-112G. The Canadian PRC-112G is severely limited – non-LOS communication being the most significant issue. For the cost of a few hundred thousand dollars, the PRC-112G can be upgraded.

9. In other examples of aircrew losses, a Canadian de Havilland Buffalo aircraft was shot down by a Syrian surface-to-air missile (SAM) over the Sinai Desert in 1974. The Buffalo was flying as part of the UN Emergency Force II peacekeeping mission between Israel and Egypt. All nine aircrew and passengers were lost.⁹ Three years before the shoot-down of Blowtorch 61, a Canadian military photographer was lost in an insurgent surface-to-air attack on a United States (US) Chinook in May 2007 in Helmand Province.¹⁰ Moreover, throughout the Allied campaigns in Afghanistan and Iraq in this century alone, the loss of helicopters to enemy fire is numerous as

⁸ *Ibid.*, 282.

⁹ *Ibid.*, 270.

¹⁰ In Memory of Flipper 75, accessed online 29 January 2018, http://www.chinook-helicopter.com/history/aircraft/D_Models/86-01644/86-01644.html.

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is the loss of life aboard and the isolation/capture of the aircrew who survived in many cases.¹¹ Most notably, the tragic fatalities, isolation, and capture of aircrew in the well-publicized US *Blackhawk Down* incident in Somalia in October 1993 is but one clear example of the inability of mutual support helicopters to self-rescue stranded comrades. It was also the cause of the United States' strategic mission failure in Somalia, as is too often the case these days when aircrew are killed or captured.¹²

10. In 2015, RAND Corporation of Santa Monica, California, was contracted by the US Air Force (USAF) to conduct research to quantify “the rescuability-window” of downed aircrew in combat conditions. RAND found that fifty-five percent of downed aircrew are captured or killed immediately. Of the remaining forty-five percent, the success of rescue drops off drastically after the first two hours on the ground.¹³

11. Canada’s most recent Defence Policy, *Strong, Secure, Engaged* establishes that Canada will:

Lead and/or contribute forces to NATO and coalition efforts to deter and defeat

¹¹ George Galdorisi and Thomas Phillips, *Leave No Man Behind . . .*, 517-522.

¹² *Ibid.*, 504.

¹³ Christopher A. Mouton, Jia Xu, Endy M. Daehner, Hirokazu Miyake, Clarence R. Anderegg, Julia Pollak, David T. Orletsky, and Jerry M. Sollinger, “Rescuing Downed Aircrew – The Value of Time,” (research report, RAND Corporation, Santa Monica, California, 2015, Library of Congress Control Number: 2015955037, ISBN: 978-0-8330-9096-6), xii, 49-50.

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adversaries, including terrorists, to support global stability. [and] Lead and/or contribute to international peace operations and stabilization missions with the United Nations, NATO, and other multilateral partners.¹⁴

12. The GoC announced in November 2017 that it is willing to offer up to 200 troops for future UN peacekeeping operations, including transport and armed helicopters.¹⁵

13. In summary, Canadian Tactical Aviation is low on combat experience and likely to face a dangerous foe in a peacekeeping theatre that may be thin or nil on PR support. The price of killed or captured aircrew can be strategic mission failure. Canadian aircrew could also benefit from SERE training that includes defensive fighting as well as improved survival radios.

A General Model of Canadian CSAR

14. The Canadian CSAR model should be, “capable of planning and executing Joint Personnel Recovery (JPR) operations by locating, authenticating and recovering isolated personnel (IP) from a situation where hostile interference may be expected.”¹⁶ Not all details are provided herein, only the principle capabilities, as follows:

¹⁴ Canada’s Defence Policy, *Strong, Secure, Engaged*, copyright Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence, 2017, 82. Catalog number D2-386/2017E. ISBN 978-0-660-08443-5.

¹⁵ Murray Brewster, “Canada offering 200 ground troops for future UN peacekeeping operations,” *CBC News*, 15 November 2017. Accessed online 29 January 2018, <http://www.cbc.ca/news/politics/peacekeeping-plan-trudeau-vancouver-1.4403192>.

¹⁶ Joint Manoeuvre – Air (E.1.1), *Combat Search and Rescue – Personnel Recovery Code*, within an email from Lieutenant-Colonel Robert Tyler, RCAF Air Staff, to Major Jonathan Knaul, 25 January 2018.

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- a. The minimum force package should be one Rescue Vehicle (RV) helicopter with two-armed escort lighter helicopters, and scalable up as required. The minimum squadron establishment to support this should be four RVs and eight- armed escort helicopters and must be capable of always operating within a joint environment.
- b. The RV should be capable of lifting twelve fully equipped soldiers or 3,000 pounds of equipment/supplies, loaded internally or slung externally, and meeting a combat radius of 150 kilometres at eighty-five percent maximum mission gross weight, with at least one-hour on-station. The minimum speed of travel is 100 knots. Upon arriving at the recovery site, the helicopter must be capable of lifting a minimum 3,000-pound load.¹⁷
- c. The RV should be capable of conducting other roles of Casualty Evacuation (CASEVAC), Medical Evacuation (MEDEVAC) and Air Assault to ships.
- d. The armed escort should have a minimum dual mounted rapid-fire suppression system and a robust Electro-Optical/Infrared (EOIR) sensor, and be capable of a

¹⁷ *Ibid.*

minimum combat radius of 150 kilometres, with at least one hour on-station, at eighty-five percent maximum mission gross weight, and minimum speed of travel of 100 knots.

- e. All helicopters should be capable of shipborne operations, day/night flying, and able to operate up to 10,000 altitude at 85 degrees Fahrenheit.

- f. Should a purchase of a new helicopter platform go forward, it is recommended that the GoC secures within the contract a robust and reliable in-service parts provision sub-contract. Parts provision has tended to be a tremendous obstacle in the way of operational serviceability of many current Royal Canadian Air Force (RCAF) fleets. Also, a logistics tracking system other than Defence Resource Management Information System (DRMIS) should be sought, and one that can rapidly and efficiently be transitioned to paper documentation at the tactical level.

- g. The overall capability should be stood up within the RCAF, as a separate squadron, intimately tied to Canadian Special Operations Force Command (CANSOFCOM). A new infrastructure/facility would be required to house this new capability. Consideration should be made to nesting the CF SERE school within such a squadron.

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Recommended Courses-of-Action (COA)

15. The COAs presented below focus on the aircraft only, as the aircraft are the most significant determining factor regarding politics and cost. Attack helicopters are not considered as they are not politically acceptable in Canada. Assumed also is a ten-year period from Statement of Operating Intent (SOI) to Full Operational Capability (FOC):

16. COA 1 – Legacy Chinook/Legacy Griffon. This COA proposes a CSAR squadron comprising four CH-147F Chinooks as RVs, and eight CH-146 Griffon helicopters as armed escort. These helicopters would be chopped from the existing fleets and shifted to the CSAR squadron.

a. The CH-147F would require upgrading with the following modifications:

- (1) All-Weather RADAR;
- (2) Right Cargo Door Hoist;
- (3) Satellite Communications radio (SATCOM);
- (4) Blue Force Tracker;

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- (5) Tactical Data Link 16, and ability to down/up-link imagery on the existing EO/IR system;
 - (6) Extended Range Fueling System (ERFS);
 - (7) Rapid Fire Suppression System, such as the M-134 Dillon, mounted left, right and rear;
 - (8) MEDEVAC capable internal configuration; and
 - (9) Legacy aircraft self-defense suite should be used. However, the Directed Infrared Countermeasures (DIRCM) system hardware should be reviewed for performance.
- b. The CH-146 Griffon should be fielded with:
- (1) ability to mount the M-134 Dillon on either side and the GAU-21 .50 calibre weapon on either side;
 - (2) a robust EO/IR sensor;

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- (3) Tactical Data Link 16; and
 - (4) A moving map display and ability to transfer imagery between CH-147F and CH-146.
- c. The main advantages are the many efficiencies realized in use of existing fleets with existing maintenance and parts support, current standards and policies, and personnel already trained in some related/vital areas.
- d. The prime disadvantage is loss of resources to fleets that are already stretched beyond capacity to meet their current mandates. A similar drawback is the Griffon's limited performance.
- e. A parallel option exists to instead order four newly built, additional, CH-147F Chinooks from The Boeing Company and eight newly built CH-146 helicopters from Bell Helicopter, Montreal. Should new CH-146 helicopters be purchased, the inherent performance limitation must be addressed.
17. COA 2 – CH-149 Cyclone/Legacy Griffon. Canada has purchased twenty-eight CH-149 Cyclone helicopters to replace the aging Sea King fleet. Six helicopters have been delivered to

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date, with full delivery expected by 2021.¹⁸ Given the current transition of the Royal Canadian Navy (RCN) from its legacy frigates to the Canadian Surface Combatant (CSC) class of ships, it is likely that there will be a sufficient surplus of Cyclones that at least four aircraft could be rolled into a CSAR squadron as RVs. The CH-149 current aft section tactical suite would need removal and the backend reconfigured for the CSAR RV role. Eight CH-146 Griffons, operating in the armed escort role, would require the same modifications as noted in COA 1, or the purchase of eight newly built CH-146s from Bell Helicopter, Montreal.

- a. The main advantage lies in the use of a very robust helicopter as an RV while not disturbing resources in the Chinook fleet; and
- b. The main disadvantage is the impact on the legacy CH-146 Griffon fleet, which could only be offset through the purchase new CH-146 helicopters.

18. COA 3 – New purchase of the HH-60W Combat Rescue Helicopter (CRH). Few western countries have a CSAR capability. Those who do include France,¹⁹ Italy,²⁰ South Korea,²¹ Chile,²²

¹⁸ Lindsay Peacock and Eleanor Keymer, *Jane's World Air Forces*, issue 46 (Surrey: Jane's by IHS Markit, 2017): 107, ISBN 2514-0329, 2017.

¹⁹ *Ibid.*, 211.

²⁰ *Ibid.*, 309.

²¹ *Ibid.*, 351.

²² Jose Higuera, "Chile's S-70i helicopters to be used for CSAR, special ops," *Jane's Defense Weekly*, 22 September 2016, accessed online 28 January 2018, <http://janes.ihs.com/DefenceWeekly/DisplayFile/jdw63228?edition=2016>.

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Singapore,²³ and the United States,²⁴ employing variants of either the Airbus Puma, Sikorsky Blackhawk or Bell 412 helicopters. The Sikorsky HH-60W CRH is soon to be the replacement helicopter for the USAF HH-60G Pavehawk. This aircraft can serve in both the RV and armed escort role. This COA would thus be for a total of twelve helicopters minimum.

- a. The main advantages are the purchase of a single fleet and that Canada would be flying the same CSAR aircraft as the US which carries with it several compatibility/combined benefits; and
- b. The main disadvantage is the cost in purchase of a new fleet combined with the political substantiation required.

19. All three COAs have the advantage that a Canadian CSAR capability could be offered as the Canadian contribution to a UN peacekeeping operation or allied/coalition campaign. All three COAs suffer the limitation of the RCAF's current personnel shortfalls affecting both pilot cadres and maintenance staff. Retention and/or recruitment would require improvement to offset.

²³ Kelvin Wong, and Gila Bend, "Singapore demos advanced medical technologies for CSAR missions," *Jane's Defense Weekly*, 28 Dec 2015, accessed online 28 January 2018, <https://janes.ihs.com/InternationalDefenceReview/DisplayFile/idr18207?edition=2016>.

²⁴ *Ibid.*, 665.

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20. Lastly, the sooner the rescue, the higher the chances of IP survival.²⁵ A fourth COA should be considered in investigating the feasibility in purchase of a CSAR tiltrotor fleet. The main advantage being the speed of tiltrotor which can be as high as triple the cruising speed of most helicopters. Options exist with the Bell-Boeing OV-22 Osprey and Agusta Westland AW-609.²⁶

CONCLUSION

21. Some theatres to which Canada may deploy troops and helicopters harbor an extremely high surface-to-air threat, mostly from small arms. Many of the UN/coalition operations or campaigns in such theatres are sparse on PR capability. Recognizing that speed of recovery is essential, it is argued that Canada develop its own CSAR capability nested within a separate RCAF squadron. Such a capability could also make-up Canada's contribution to a UN, coalition or allied operation.

RECOMMENDATIONS

22. The recommended preferred COA is COA 2 which includes use of surplus Cyclone helicopters (four) as the RV combined with a new purchase of eight upgraded CH-146 Griffon armed escorts. Notwithstanding, all three COAs should be subjected to a more detailed technical

²⁵ Christopher A. Mouton, . . . , 2.

²⁶ Paul Jackson FRAeS, *Jane's All the World's Aircraft Development & Production* (Surrey: Jane's by IHS Markit, 2017-2018): 470-472. ISB 978-0-7106-3250-0.

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and cost analysis. The fourth COA of a tiltrotor platform should also be investigated.

23. Any new purchases should include a robust, flexible and adaptive in-service parts contract, and use a logistics tracking system not based on DRMIS, and imbibe an agile paper transition capability.

24. The SERE school should be embedded within the new CSAR squadron.

25. The SERE training aircrew syllabus should be upgraded to include defensive ground fighting.

26. The legacy aircrew survival radio must be improved to include non-LOS communication, the purchase of airborne locating equipment, and the purchase of the commensurate tactical operations centre base station.

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