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AN OVERVIEW OF POTENTIAL NON-TRADITIONAL REMOTELY PILOTED AIRCRAFT SYSTEM (RPAS) ROLES

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AIM

1. The aim of this service paper is to provide an overview of three potential non-traditional Remotely Piloted Aircraft System (RPAS) roles that could be utilized in future Royal Canadian Air Force (RCAF) and Canadian Armed Forces (CAF) missions. The focus will be on the use of a RPAS in the Information Operations (IO) role, Support to Other Government Departments (SOGD) role, and Peacekeeping role. Each role will be related to practical, real-world examples including a recommendation. Future areas of investigation should include a detailed study of the sensor packages available for the various Unmanned Air Vehicles (UAV) up for consideration in the RPAS acquisition project, and the timeline and resources required to reconfigure them from one sensor configuration to the other.

INTRODUCTION

2. The topic of this service paper was selected from the 2018 Commander of the RCAF's list of research topics and answers the question, "What options exist to use unmanned aircraft systems (UASs) to conduct RCAF defence and non-defence missions?" As detailed in the Government of Canada's recent defense policy, *Strong, Secure, Engaged* (SSE), a variety of new initiatives have been identified that will bring new capabilities to the CAF. New initiative number 91 states that Canada will "invest in a range of remotely piloted systems, including an

armed aerial system capable of conducting surveillance and precision strikes.”¹ Although many of our Allies have successfully employed UASs for surveillance and precision strike worldwide, there are other missions that these platforms could perform. A new RPAS will be a welcome addition to the CAF. Its capabilities will include extremely long on-station times, the elimination of risk to aircrew in manned platforms, and provide the Joint Task Force Commander (JTFC) with a variety of new sensors.

3. This paper will not include a comparison of various UAV platform capabilities, nor the overall operating costs, or the resources required to operate them. Furthermore, the challenges of operating remotely piloted systems in the high arctic or in adverse weather will not be up for discussion and are beyond the scope of this paper. There are many other roles that an RPAS could fulfill, however only the IO, SOGD, and Peacekeeping roles will be discussed below.

DISCUSSION

Information Operations

4. The IO domain is a non-kinetic means available to the JTFC to effect “the will, understanding, and capability of adversaries... in support of overall objectives by affecting their information and information-based processes and systems.”² An RPAS could be an extremely effective platform for this use, more specifically in the influence operations and Electronic

¹Department of National Defence, *Strong Secure Engaged* (Ottawa: DND Canada, 2017), 73.

²Department of National Defence, B-GA-403-000/FP-001, *Canadian Forces Aerospace Shape Doctrine*. (Trenton: DND Canada, 2014), 73.

Warfare (EW) sub-roles of the IO domain. As noted in the RCAF's Shape doctrine, "early, broad, and persistent shaping through info ops will provide significant long-term operational dividends."³

5. Influence operations are an important part of any modern-day conflict. As with any airborne vehicle, if it has the capacity to carry a payload and the ability to release it in-flight, then it can fulfill the influence operations role. On 26 October 2016, one of the General Atomics Aeronautical System's vice-presidents Donald Cattel, told the media that an "Avenger was used to conduct a leaflet drop in Syria."⁴ The Avenger is a turbo-fan powered derivative of the Predator series UAVs.⁵ This is a unique, risk-free method for the application of influence operations. Furthermore, there is always the persuasion aspect of just employing RPAS in a specific theatre so long as the adversary knows and may be able to hear or see the airborne platform. As detailed in British Air and Space Power Doctrine, "the psychological impact of air power, from the presence of a UAV to the noise generated by an approaching attack helicopter, has often proved to be extremely effective in exerting influence, especially when linked to information operations."⁶ In Afghanistan, jet aircraft would fly low and over suspected enemy positions in a show of force to deter them from continuing an engagement, and UAVs have even been used to deter rhinoceros poachers in Africa.⁷

³*Ibid.*, 74.

⁴Aviation Online, "General Atomics Predator C Avenger ER Makes First Flight," last accessed 30 January 2018, <https://www.ainonline.com/aviation-news/defense/2016-11-11/general-atomics-predator-c-avenger-er-makes-first-flight>.

⁵General Atomics Aeronautics, "Predator C Avenger RPA," last accessed 30 January 2018, <http://www.gasi.com/predator-c-avenger>.

⁶Royal Air Force, *British Air and Space Power Doctrine AP 3000 Fourth Edition*, (Air Media Centre: HQ Air Command, 2009), 55.

⁷Nikela, "How UAVs (Air Rangers) effectively deter rhino poachers," last accessed 30 January 2018, <http://www.nikela.org/how-uavs-air-rangers-effectively-deter-rhino-poachers/>.

6. Near-peer and peer equivalent adversaries will utilize EW to manipulate the Electro-Magnetic (EM) spectrum to their benefit in future conflicts. The United States Army, through a recent Request For Information (RFI), has asked industry to develop an EW system that could be integrated into their Grey Eagle (Predator derivative) platform. The EW system will have “to provide the ability to detect signals and to jam them if necessary.”⁸ This would bring an Electronic Support (ES) and Electronic Attack (EA)⁹ capability to the skies over the battlefield in the form of a UAV. The reasoning behind the RFI was to match the Russian’s superior ability to manipulate the EW spectrum and the request is being fast-tracked to be fielded by 2023. The US Army is hoping that this could happen even earlier.¹⁰ The Russian Federation has already developed minor EW capabilities for their own fleet of Orlan-10 UAVs. In the Donbass area of Eastern Ukraine, it has been reported that these Orlan-10 UAVs have jammed the local Global System for Mobile Communications (GSM) network and have made mass Short Message Service (SMS) text message transmissions.¹¹ Western nations, including Canada, need to match and counter these capabilities within the IO domain.

7. As noted by General retired Michael Hayden of the United States Air Force, “Moscow relies on—and has heavily invested in—EW as an asymmetrical response to NATO’s technological edge across the spectrum of conflict and as an integral part of its anti-access/area

⁸Defense News, “Army wants electronic-warfare capability for Gray Eagle drone,” last accessed 30 January 2018, <https://www.defensenews.com/land/2017/02/09/army-wants-electronic-warfare-capability-for-gray-eagle-drone/>.

⁹Department of National Defence, Shape Doctrine... 81.

¹⁰Defense News, “Army wants electronic-warfare capability for Gray Eagle drone,” last accessed 30 January 2018, <https://www.defensenews.com/land/2017/02/09/army-wants-electronic-warfare-capability-for-gray-eagle-drone/>.

¹¹International Centre for Defence and Security, *REPORT: Russia's Electronic Warfare Capabilities to 2025: Challenging NATO in the Electromagnetic Spectrum*, (Tallinn: Estonia, 2017) 24, B-1.

denial strategy.”¹² The RCAF and the Canadian Army (CA) need to develop a common ES and EA future operating concept to match these well-needed peer-on-peer capabilities. The CA is in the process of modernizing their EW capabilities,¹³ and the RCAF should consider aligning the needs of the CA with future EW procurement initiatives. Like the US Army, the CA should be afforded the ability to leverage ES and EA from an airborne vehicle. This could provide coverage at an elevation that will be a lot more effective than a ground-based antenna and also provide airborne on-station durations in the form of days not hours.

Support to Other Governmental Departments

8. A Whole of Government approach provides better security for Canadians in protecting national sovereignty. The RCAF could provide RPAS capabilities through a Provision of Services contract to other government departments to help them fulfill their own mandates. At times when the RPAS is not in use supporting domestic and international operations, or being used to support Force Generation (FG) missions, these assets may be employed to support the Royal Canadian Mounted Police (RCMP), Transport Canada (TC), and the Department of Fisheries and Oceans (DFO). Furthermore, the RPAS could also be employed in direct support to Humanitarian Assistance and Disaster Relief (HADR) missions, and during the summer when the firefighting season in Canada is at its worst. Sensor packages that are easily installable on the RPAS could also offer other departments the opportunity to conduct research in remote areas of the country.

¹²*Ibid.*, II.

¹³Department of National Defence, “The Canadian Forces Land Electronic Warfare Modernization Project,” last accessed 30 January 2018, <http://www.forces.gc.ca/en/business-defence-acquisition-guide-2016/land-systems-123.page>.

9. In 2010, during the Winter Olympic Games in Vancouver, the CAF supported the RCMP-led Integrated Security Unit under Operation Podium.¹⁴ The RCAF contributed dedicated CP140 Intelligence, Surveillance, and Reconnaissance (ISR) support that included live Electro-Optical and Infra-Red (EO/IR) video streaming back to the Combined Air Operations Centre (CAOC) located in Winnipeg. As well, the CP140 was used to provide ISR in support of the G8 summit in the summer of 2010 under Operation cadence. Both of these RCMP led initiatives could have been supported with UAVs providing traditional ISR with much longer on-station times than the CP140. Other government security agencies already operate UAVs like the United States Department of Homeland Security. They operate Predator B and Guardian UAVs to augment their surveillance of the land borders and maritime approaches.¹⁵

10. Transport Canada is seeking to augment their surveillance capabilities in the Arctic with a “medium-altitude, long-endurance drone able to fly between 10,000 and 30,000 feet for as long as two days straight.”¹⁶ This drone is “expected to fly upwards of 500 hours per year and will supplement manned aircraft that are already patrolling the Arctic. It will watch for oil pollution, ice formation, illegal fishing, and help with search and rescue.”¹⁷ They have had some difficulties in getting the requisite approvals to purchase and operate these long endurance UAVs due to international arms-control rules. This would be another example where the RCAF could provide support to them by offering a certain number of Yearly Flying Hours in support of their

¹⁴Department of National Defence, “Operations in Canada and North America,” last accessed 30 January 2018, <http://www.forces.gc.ca/en/operations-canada-north-america/index.page>.

¹⁵Department of Homeland Security, “Unmanned Aircraft System MQ-9 Predator B,” last accessed 30 January 2018, https://www.cbp.gov/sites/default/files/documents/FS_2015_UAS_FINAL_0.pdf.

¹⁶Canadian Broadcasting Corporation, “Transport Canada's Arctic drone project delayed 2 years by arms-control rules,” last accessed 31 January 2018, <http://www.cbc.ca/news/politics/arms-control-uav-drone-transport-canada-missile-technology-control-regime-arctic-1.4203070>.

¹⁷*Ibid.*

initiatives. CP140 aircraft already support Joint Task Force North (JTFN) missions by providing ISR coverage throughout the year.

11. Other non-kinetic uses of the RPAS could be in the HADR or firefighting support roles. Following the devastating earthquake in Haiti in 2010, the United States Air Force (USAF) sent Predator and Global Hawk UAVs to provide “time-critical imagery support and over watch for military and civilian relief workers in Haiti.”¹⁸ Not only did the UAVs play an important role in providing security, but it also showed the world that these complex weapon systems could do more than be part of targeting chain. The Altair UAV (predecessor to the Predator) operated by the National Aeronautics and Space Administration (NASA), has provided support to state emergency response units in helping determine the hottest parts of forest fires and their boundaries. In 2007, after a request to conduct some remote sensing on a forest fire, NASA flew a 16 hour mission that was able to deliver many critical visible and infra-red photographs to incident commanders on the ground. The incident commanders were then able to allocate their resources more efficiently in containing and fighting the fire.¹⁹ The sensors used to capture this required data were housed in a self-contained pod that was attached to the underside of the fuselage of the platform. This capability could be used in support of fighting fires in Canada every spring and summer to help with the efficient placement of firefighting personnel and resources. Although the RCAF would have no need to directly use such a sensor on an RPAS, the technology exists and provincial governments could purchase the sensors for use on the RPAS.

¹⁸Jaylan Haley, “Revelations in Haiti. The Side Effects of New Priorities for Remotely Piloted ISR Aircraft,” *Air & Space Power Journal*, Vol 25, Issue 1 (March 2011): 45.

¹⁹National Aeronautics and Space Administration, *Ikhana: Unmanned Aircraft System Western States Fire Missions*, (Washington D.C.: Library of Congress Cataloguing-in-Publication Data, 2009), 29.

12. Along the lines of assisting provincial authorities in fighting forest fires, the RPAS could also provide government agencies with the chance to conduct atmospheric research or geographical mapping in remote areas of the country that are not easily accessible by manned aircraft. Northrop Grumman and L-3 have already proposed equipping the “Polar Hawk”²⁰ with “a wide range of instrumentation for conducting science and environmental missions”.²¹ Perhaps these atmospheric sensors could collect data on a non-interference basis as the RPAS is flying around conducting its primary mission.

Peacekeeping

13. Canada has pledged about 600 personnel for future Peacekeeping missions including the use of high-end capabilities so as to improve the effectiveness of these United Nations (UN) missions.²² An RPAS capability would greatly enhance Canada’s international contribution to peace and stability by providing real-time ISR and passive IO in support of UN missions. Furthermore, as the UN has recently had success in employing armed attack helicopters, it is only a matter of time before UAVs are allowed to employ precision-guided munitions. An RPAS contribution to a UN mission would allow Canada to become a contributing country without the risk of exposing personnel whether that be on the land, in the air, or on the sea.

²⁰Northrop Grumman proposal for a Canadianized version of the Global Hawk.

²¹Canadian Manufacturing, “Northrop Grumman, L-3 pitch Polar Hawk UAV for arctic use,” last accessed 31 January 2018, <https://www.canadianmanufacturing.com/manufacturing/northrop-grumman-l-3-pitch-polar-hawk-uav-for-arctic-use-65313/>.

²²Prime Minister of Canada, “Canadian contributions to United Nations peace support operations,” last accessed 31 January 2018, <https://pm.gc.ca/eng/news/2017/11/15/canadian-contributions-united-nations-peace-support-operations>.

14. Herve Ladsous, the under-secretary-general for Peacekeeping operations oversaw the implementation of the first UN UAVs in the eastern part of the Democratic Republic of the Congo (DRC). In a recent interview, he described that the “UAVs do a better job of protecting civilians because they provide real-time pictures of situations as they develop on the ground. You can act more quickly and more decisively.”²³ Four countries have already deployed UAVs in support of UN Peacekeeping missions. In 2013, the UN leased five Falco UAVs from the Italian manufacturer Leonardo. This medium-altitude and medium endurance UAV was used to provide a tactical overview of the operational scenario in real time and was the first time the UN used a civilian contractor to provide UAV ISR services.²⁴ Sweden has operated the tactical level Shadow 200 UAV since 2015, but as one Swedish army Colonel mentioned, he would have liked to have operated a platform with more payload and a SIGINT capability.²⁵ The UN subsequently signed a second civilianized contract with QinetiQ from the United Kingdom to operate three Israeli Hermes 900 UAVs in Mali.²⁶ The Medium Altitude, Long Endurance (MALE) UAVs were needed to operate in the remoter areas of Mali. Germany has also leased the Israeli made Heron for use in its UN mission in Mali and has been utilizing this platform for just over a year now.²⁷

²³United Nations, “Unmanned aerial vehicles are effective in protecting civilians—Hervé Ladsous,” last accessed 31 January 2018, <http://www.un.org/africarenewal/web-features/unmanned-aerial-vehicles-are-effective-protecting-civilians%E2%80%94Herv%C3%A9-ladsous>.

²⁴Leonardo Company, “Selex ES Falco Begins Supporting United Nations Peacekeeping Operations,” last accessed 31 January 2018, <http://www.leonardocompany.com/en/-/falco-un-peacekeeping>.

²⁵Flight Global, “Swedish army evaluates Mali UAV deployment,” Last accessed 31 January 2018, <https://www.flightglobal.com/news/articles/swedish-army-evaluates-mali-uav-deployment-418264/>.

²⁶Defence Web, “UN flying Hermes 900 UAVs in Mali,” last accessed 31 January 2018, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=44843:un-flying-hermes-900-uavs-in-mali&catid=35:Aerospace&Itemid=107.

²⁷Defence Web, “Germany to continue Heron flights in Mali,” last accessed 31 January 2018, http://www.defenceweb.co.za/index.php?option=com_content&view=article&id=50301:germany-to-continue-heron-flights-in-mali&catid=35:Aerospace&Itemid=107.

15. As seen recently in Africa, the UN and its Peacekeepers have had a taste of UAV ISR in support of its missions and Canada could contribute a high-end RPAS capability once acquired. One big advantage that a UAV brings in its utilization in these remote areas of the world, is that they do not need expensive Search and Rescue coverage.²⁸ In turn, this brings more flexibility to commanders as to when and where they want to employ the ISR assets. Canada and the CAF should consider the use of UAVs in support of Peacekeeping as a means to participate meaningfully in these UN missions but with limited risk to personnel.

CONCLUSION

16. This paper has presented three non-traditional roles that the future RPAS could fulfill. These include the IO role, the SOGD role, and the Peacekeeping role. Efficiencies gained in using the RPAS in support of these roles, will free up resources on manned platforms allowing them to focus on core capabilities, achieving a more effective force. Furthermore, with the acquisition of MALE platforms, they will offer extremely long on-station times to commanders, they could operate at very high altitudes vastly extending the EW horizon of a supported force, and they will eliminate the risk presented to aircrew that operate manned platforms. Procurement initiatives in acquiring RPAS for the CAF should consider the possibility of using these platforms as mentioned above, not just to fulfill the surveillance, targeting, and precision strike role.

²⁸Walter A. Dorn, *Air Power in UN Operations*, (Burlington : Ashgate Publishing Company, 2014), 150.

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