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ARCTIC POLICY IMPLICATIONS FOR ROYAL CANADIAN AIR FORCE UNMANNED AERIAL VEHICLES

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JCSP 44

Exercise Solo Flight

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UNMANNED AERIAL VEHICLES**

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INTRODUCTION

As the potential for increased Arctic accessibility continues to grow, so too does international interest in the region's resources and transportation routes. This growing interest is shaping related regional policy for each of the eight Arctic Council nations. Canada's latest defense policy, Strong, Secure, Engaged (SSE), accordingly recognizes the Arctic's growing importance stating that it will increase its presence in the region over the long term while working cooperatively with fellow Arctic partners.¹

As part of Canada's reinvestment in the Royal Canadian Air Force (RCAF), SSE includes "medium altitude remotely piloted systems" or unmanned aerial vehicles (UAVs).² While the Canadian Armed Forces (CAF) has years of expeditionary operational UAV experience, the government's Arctic policy focus has direct implications for the RCAF in the domestic realms of surveillance and security. Considering the vastness of the Arctic and the limited air force assets at its disposal, the RCAF must introduce UAVs as a complement to existing platforms if it intends to meet the Canadian Government's domestic vision of increased Arctic presence and surveillance. It is recommended that "adaptive innovation" be considered as a means to incorporate UAVs into existing RCAF Arctic capabilities.

CANADIAN GOVERNMENT ARCTIC POLICY

¹ Canada. Department of National Defence. *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: DND Canada, 2017), 14.

² *Ibid.*, 39.

In 2010, the Government of Canada released its statement on Arctic foreign policy outlining its top priority of exercising sovereignty over Canada's North and describing the tremendous potential the Arctic holds for Canada's future.³ To properly exercise its sovereignty the government highlighted a whole-of-government coordination of activities to be conducted by related federal departments, the CAF, the RCMP and the Coast Guard, as well as, cooperative approaches to be taken with foreign governments including the United States (U.S.) via the North American Aerospace Defense (NORAD) agreement.⁴ While the surveillance of Canada's Arctic region and support to the NORAD mission were implied tasks to be inherited, to varying degrees, by many of the aforementioned players in the 2010 statement, the RCAF was a primary partner in supporting these two areas, in particular.

It is not until 2017's SSE that the Government of Canada issued policy which not only reemphasized the importance of the Arctic to Canada but also emphasized a requirement for increased Arctic presence and surveillance via a number of initiatives, to include continued cooperation with partner nations and a reinvestment in numerous organizations such as the CAF. For the RCAF, the reinvestment included replacement acquisitions for fighter aircraft, space-based satellites, CP-140 surveillance and patrol aircraft, and fixed-wing SAR aircraft, as well as, the investment in medium altitude remotely piloted systems.⁵ According to the policy, the RCAF requires these platforms because, "...[g]iven the vastness of Canada's territory, it is vitally important for the [CAF] to be able to operate throughout Canada on very short notice – [and] the Air Force

³ Global Affairs Canada. *Statement on Canada's Arctic Foreign Policy* (Ottawa: Canada Communication Group, 2010), 3.

⁴ *Ibid.*, 7.

⁵ Canada. *Strong, Secure, Engaged...*, 39.

makes this possible.”⁶ However, when viewed against the backdrop of all CAF missions, both domestic and expeditionary, it is clear that RCAF leadership will need to exercise careful stewardship of its limited resources if it hopes to meet the government’s vision of an increased footprint in the Arctic.

Presently, government policy considers UAVs as a modern capability, similar to the domains of cyber and space, where investment is required to ensure CAF relevance in future operations.⁷ While grouping UAVs in likeness to the domains of cyber and space may aid in their easy conceptualization as a new capability, it muddies the waters when viewed at the organizational level because, unlike cyber and space, UAVs are not an abstract domain wherein various assets are employed. Rather, UAVs are themselves assets that are considered part of a system, with the Arctic being the regional focus for this paper. As such, the RCAF must decide if UAVs should be considered as an asset supporting other platforms in the Arctic, like the approach taken by the Royal Canadian Navy (RCN) and Canadian Army (CA), or as a specific platform unto themselves, like the CP-140 or CF-188.

ARCTIC POLICY IMPLICATIONS FOR RCAF UAVS

RCAF intelligence, surveillance and reconnaissance (ISR) doctrine defines UAVs as an environmental system comprised of a platform, associated sensors and equipment, networking and personnel required to operate them.⁸ The doctrine further groups UAVs under the environmental systems category, which includes the sub-categories of space-

⁶ *Ibid.*, 38.

⁷ Canada. Department of National Defence. *Department of National Defence and the Canadian Armed Forces 2018-19 Departmental Plan* (Ottawa: Canada Communications Group, 2018), 5.

⁸ Department of National Defence, B-GA-401-002/FP-001, *Royal Canadian Air Force Doctrine: Intelligence, Surveillance and Reconnaissance* (Ottawa: DND Canada, 2017), 17.

based systems, inhabited aircraft systems, ground-based systems, surface-based systems, and subsurface-based systems.⁹ Finally, the doctrine compares UAVs to robots, “...ideally suited for collection missions that are long and tedious (dull), hazardous (dangerous) or carried out in undesirable conditions (dirty).”¹⁰ This definition makes UAVs suitable candidates for Arctic operations notwithstanding the challenges presented by such an austere environment; however, the size of Canada’s Arctic region coupled with the government’s Arctic policy, and limited RCAF resources, demands that senior air force leadership carefully consider how a UAV system will be introduced into the Arctic AOR. Potential options include a stand-alone approach to replace existing assets, like the CP-140, or a complementary force multiplier approach, like subsurface acoustic sensors or ground radars.

Concerning surveillance and security in the Arctic, the RCAF’s primary platforms include limited numbers of CP-140s for ISR, CF-188s for security, as well as, space-based satellites and ground-based radars. Although government policy calls for increased Arctic presence and surveillance, current government procurement processes continue to be less than ideal for introducing a disruptive, stand-alone, platform on a scale rivaling an inhabited aircraft system. Canada’s well-documented UAV procurement processes, highlighted by the Remote Piloted Aircraft System (RPAS) project (formerly-known as the Joint Unmanned Surveillance and Target Acquisition System (JUSTAS) program), points to a large and complex purchase with a funding range between \$1 billion and

⁹ *Ibid.*

¹⁰ *Ibid.*

\$4.99 billion.¹¹ Caution must be exercised such that a procurement of this size remains complementary and does not eventually attempt to supplant future inhabited systems.

Considering the scale of the proposed purchase, some have argued that the RCAF should introduce UAVs as a stand-alone platform, to be used for a variety of purposes including the assumption of some roles traditionally accomplished by manned RCAF aircraft.¹² This argument is not valid when applied to Canada's CF-118s conducting Arctic security operations involving the interception of Russian military aircraft for two reasons: the integrity of the required UAV communications links cannot be guaranteed; and, the risk level and degradation of tactics assumed when attempting to intercept foreign military aircraft with UAVs would be unacceptable. In light of the requirement for certain mission sets in the Arctic to remain manned, as well as, the ongoing CP-140 and CF-118 replacement projects already underway, the RCAF will best achieve success in Canada's North if it introduces UAVs as a complement to other systems in the region.

In addition to security in the Arctic, surveillance challenges also linger and it has been noted that Canada does not have the ability to persistently surveil its Northern region despite existing satellite coverage, Coast Guard operations, limited RCN patrols, and allotted CP-140 flying hours.¹³ While certain aspects of the CP-140 Arctic surveillance mission could theoretically be accomplished by a suitable UAV platform, the vastness of Canada's Arctic mandates that any UAV addition be introduced to supplement other existing systems. While it may be tempting to argue replacing the CP-

¹¹ Canada. Department of National Defence. "Remotely Piloted Aircraft System (RPAS) Project," last accessed 25 May 2019, <http://dgpapp.forces.gc.ca/en/defence-capabilities-blueprint/project-details.asp?id=977>.

¹² Danny Garrett-Rempel. "Will JUSTAS Prevail? Procuring a UAS Capability for Canada" *RCAF Journal* 4, no. 1 (Winter, 2015), 23.

¹³ K.L. Ciesielski. "Canadian Arctic Sovereignty: A Glacial Response to Rapidly Changing Environment" (Command and Staff Program Exercise Solo Flight Paper, Canadian Forces College, 2015), 19.

140's Arctic mission outright with UAVs so that the former's high-demand multi-role capabilities could be used elsewhere, the government's policy focus on increasing Arctic presence and surveillance demands the RCAF keep the CP-140 in the North, while introducing UAVs to enhance existing systems coverage.

The government's SSE policy brings additional implications to the RCAF in an AOR that some describe as already having a "...severe capability gap..." concerning persistent surveillance.¹⁴ Beyond the added pressure to keep inhabited aircraft such as the CP-140 and CF-118 operating in the Arctic to fulfill its coverage obligations, the RCAF must look to UAVs as a primary means to increase existing Arctic presence and surveillance because projected inhabited aircraft replacement numbers are unlikely to meet the challenge alone.¹⁵ To successfully achieve the policy increases, it has been argued that the RCAF should model the Royal Australian Air Force (RAAF) approach to UAV integration with, "...a plan outlining the creation of a balanced force of manned-unmanned systems to serve ISR purposes..."¹⁶ One viable approach for the RCAF in accomplishing a balanced force in the Arctic is to introduce UAVs using adaptive innovation.

UAV INNOVATION

In 2015, Gary Schuab Jr. used, "...a three variable innovation adoption framework that integrates cost, impetus, and disruptive nature..." to explain UAV service differences across the RCAF, the RCN and the CA.¹⁷ While cost and impetus will

¹⁴ C.F. Palmer. "No Longer Hiding Behind Arctic Ice – An Unmanned Aircraft System for the Canadian Arctic" (Command and Staff Program Exercise Solo Flight Paper, Canadian Forces College, 2017), 2.

¹⁵ Canada. *Strong, Secure, Engaged...*, 38.

¹⁶ Conrad Edward Orr. "Can Unmanned Aircraft Systems Meet Canadian Air Power Needs?" *RCAF Journal* 5, no. 3 (Summer, 2016), 20.

¹⁷ Gary Schuab Jr. "JUSTAS for all? Innovation and UAVs in the Canadian forces," *Defense Studies* 15, no. 2 (05 Jun 2015), 124.

likely vary regardless of how the CAF ultimately chooses to introduce UAVs, the “disruptive nature” variable will be the focus of this paper as it pertains to the government’s Arctic policy implications for RCAF domestic UAVs. Schuab Jr. describes the disruptive nature of innovation as being either *adaptive* or *disruptive*; the former, “...increases the effectiveness or efficiency of performing traditional core tasks...” while the latter, “...challenges the organization’s core tasks.”¹⁸ Canada’s Arctic vision, as outlined in SSE, calls for an increase in presence and surveillance, which does not explicitly require an introduction of new core tasks.

This is not to diminish the substantial resources required for the RCAF to properly introduce UAVs in the Arctic; however, any implications for RCAF ISR doctrine in the Arctic should not require substantial changes to the fundamentals, principles or tenets of Air ISR. As Schuab Jr. describes, “...adaptive innovation requires less change than disruptive. A new technology that increases efficiency or effectiveness may require an expenditure of resources...but otherwise can be grafted onto old doctrines and modes of operation.”¹⁹ For the RCAF, adaptive innovation may best answer government Arctic policy by introducing a system to augment other existing systems, for the purpose of enhancing a core ISR tenet.

Adding credence to adaptive innovation for RCAF UAVs in the Arctic, is Schuab Jr.’s analyses of both the RCN’s and CA’s introduction of UAVs into their respective inventories. Beginning in 2011, the RCN used UAVs to successfully augment existing ship platforms in the performance of ISR, while the CA used UAVs during the

¹⁸ *Ibid.*, 127.

¹⁹ *Ibid.*

Afghanistan conflict to successfully augment various sized units in conducting ISR.²⁰ While both instances exemplified the merits of introducing UAVs as a complement to existing platforms, it must be noted that the RCN's and CA's use of mini-UAVs differs significantly both in cost and complexity to the RCAF's intention to use medium altitude long endurance (MALE) UAVs.²¹ Notwithstanding the added procurement and operational challenges of introducing a MALE UAV platform into the Arctic domain, government policy should remain the RCAF's guiding principle in using adaptive innovation to introduce UAVs as a complementary system.

CHALLENGES AND ROADBLOCKS

The CAF has a history of utilizing UAVs in expeditionary operations in the 21st century; however, RCAF domestic operations such as Arctic ISR remain largely in the conceptual planning stage.²² Key challenges include a shortage of communications and ground infrastructure, severe weather and icing.²³ Despite these challenges, the RCAF should continue to advocate for the procurement of a MALE UAV and consider developing a targeted introduction into the Arctic, taking many factors into consideration including weather and infrastructure limitations. This may involve initially operating in the lower Arctic region, and within the vicinity of existing physical and communications infrastructure. The accumulation of RCAF domestic UAV experience must start at the earliest available opportunity. To wait until the arrival of a perfect Arctic UAV platform, or abundant supporting infrastructure, would be to fail in meeting government policy.

²⁰ *Ibid.*, 134.

²¹ Canada. *Strong, Secure, Engaged...*, 39.

²² Gary Schuab Jr. and Kristian Soby Kristensen. "But who's flying the plan? Integrating UAVs into the Canadian and Danish armed forces," *International Journal* 70, no. 2 (2015), 265.

²³ Ernie Regehr. "Canada, the Arctic, and the expanding world of drones," last modified 27 October 2017, <http://thesimonsfoundation.ca/resources/canada-arctic-and-expanding-world-drones>, 5.

Three years before SSE, critics of Arctic ISR UAVs argued that, "...the still-considerable lifespan of Canada's primary surveillance assets, the unlikelihood of a substantial increase in maritime traffic in the Arctic during the next decade and the unsuitability of current...MALE UAVs to Arctic conditions..." demand that UAV procurement for Arctic surveillance be questioned, and a refocusing on expeditionary UAV operations should be the priority.²⁴ Following SSE, many of these same challenges persist; however, the RCAF must continue working towards introducing UAVs into the Arctic for a number of reasons.

SSE calls for an increase in presence and surveillance, which means reliance on already limited CP-140 flying hours is not the answer. Furthermore, the volume of Arctic maritime traffic may serve to influence ISR asset placement, but it should not be a measure of whether the CAF should pursue domestic UAV use in the region. Finally, while the noted limitations on MALE UAVs in Arctic operations continues to present a challenge, work must continue to adapt the platform for specific operations in suitable areas as a complement to existing systems such as the CP-140, satellites, ground and maritime units. Returning to the RAAF example, "...[a] planned combination of manned-unmanned systems to complement one another specifically for the roles of maritime and overland surveillance, has obvious benefits for Canada..." which would suit a targeted RCAF introduction of UAVs into the Arctic as a complement to existing systems.²⁵

Another challenge to RCAF Arctic UAV progress is the issue of whether one or two drone platforms is required. SSE stipulates that the government will invest in MALE

²⁴ Michael Byers and Kelsey Franks. "Unmanned and unnecessary: Canada's proposed procurement of UAVs," *Canadian Foreign Policy Journal* 20, no. 3 (13 December 2014), 285.

²⁵ Conrad Orr. "Can Unmanned Aircraft Systems..." 22.

UAVs as part of its RCAF reinvestment; however, the platform must be able to fulfill both domestic and expeditionary missions. In 2016, the Chief of the Defence Staff (CDS) told reporters, “[i]n my view, there’s no point in having a UAV that can see danger but can’t strike, if it needs to.”²⁶ While this fulfills the expeditionary aspect, experts state that “[t]here is currently no current or foreseeable role for armed drones” in the Arctic.²⁷ Furthermore, in 2013, “...five of eight companies that responded to a request for information in the fall of 2012 proposed a mixed fleet.”²⁸

In 2019, despite the different mission requirements and industry feedback, the CAF decided on a plan, “...to buy one type of medium-altitude, long-endurance UAV for the military,” with specific procurement details to follow in the near future.”²⁹ One must assume the MALE platform will have the configurable functionality to be equipped for domestic Arctic surveillance, but it is impossible to assess potential operational limitations or restrictions until details are released. At this juncture, it must also be assumed that the RCAF has avoided the mixed-fleet industry recommendations, which should reduce procurement costs and simplify operational complexities.

CONCLUSION

Canada’s latest defense policy acknowledges the increasing importance of the Arctic, and has mandated an increase in both regional presence and surveillance. This has direct implications for the RCAF’s procurement and subsequent domestic operation of

²⁶ Murray Brewster. “Little point to having a drone that sees danger but can’t strike: Vance,” last modified 7 March 2016, <https://www.citynews1130.com/2016/03/07/little-point-in-having-a-drone-that-sees-danger-but-cant-strike-it-vance/>.

²⁷ Ernie Regehr. “Canada, the Arctic...,” 5.

²⁸ Murray Brewster. “Military drone plan grounded amid continuing debate over fleet needs,” last modified 17 August 2014, <https://search.proquest.com/docview/1554461775?accountid=105241>.

²⁹ Lee Berthiaume. “RCAF aims for armed drones; Commander says fleet of UAVs to be in the air in next six years,” <https://search.proquest.com/docview/2177181636?accountid=10524>.

UAVs. Despite the acknowledged challenges, the RCAF must introduce UAVs as a complement to existing platforms if it intends to meet the Canadian government's domestic vision. The vastness of Canada's Arctic region, coupled with limited RCAF assets, demands a "system of systems" approach to increase regional presence and surveillance.³⁰ Attempts to supplant existing Arctic platforms with an untested MALE UAV is not yet feasible and would reduce the likelihood of meeting government policy, while introducing unacceptable levels of tactical risk in certain manned Arctic missions.

The RCAF's domestic UAV experience must start as soon as possible in the Arctic. While the challenges are real and must be acknowledged, UAV technology and capability will continue to evolve. As such, the RCAF should not delay in accumulating related experience. With replacement programs under development for both the CP-140 and the CF-118, the RCAF must use the Arctic region to incorporate UAVs to assist these new inhabited aircraft systems, not replace them.

It is recommended that the RCAF consider "adaptive innovation" as a means to introduce UAVs as a complement to existing and future RCAF systems. Similar to the RAAF, the concept of a manned-unmanned system of systems approach to the Arctic would improve the RCAF's chances for meeting government policy, while permitting much-needed domestic operational UAV experience to accumulate – despite platform limitations. The eventual detailed release of the chosen platform's specifications will be an early indicator of whether or not the air force is serious about meeting Canada's Arctic policy.

³⁰ R.D. Freeman. "The Aurora Replacement: The Viability of Drones as Maritime Patrol Aircraft" (Command and Staff Program Exercise Solo Flight Paper, Canadian Forces College, 2018), 19.

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