



CLEARING THE SKIES: OVERCOMING BARRIERS TO UNLOCK THE FULL POTENTIAL OF UAVS FOR THE CANADIAN INFANTRY

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AIM

1. This paper focuses on the employment of Unmanned Aerial Vehicles (UAVs) in the Canadian Army (CA), with a specific focus on the Canadian Infantry. The current employment processes and doctrine are outdated and ineffective for the contemporary battlefield. The discussion that follows is based on lessons learned from ongoing conflicts, other components within the Canadian Armed Forces, and additional research. The recommendations are based on initiatives that have been proven within similar organizations and will likely improve both training and operational effectiveness of CA soldiers and units. This paper aims to convince the reader that the Canadian Army needs to operationalize the use of UAVs at the lowest levels in order to improve operational effectiveness and maintain relevance on the modern battlefield.
2. The scope of the paper is intended to better understand the potential impact of specific UAV technology and to focus on immediate solutions meant to operationalize the use of UAVs within CA infantry units. Recommended UAV tactics, procurement or cost analyses, ethical and legal implications, changes to established doctrine, or employment across the other branches of the CA are beyond this scope.

INTRODUCTION

3. The employment of UAVs in the Canadian Army is limited, outdated, and inefficient for both current training expectations and operations. This stems from a misconception regarding the very definition of the sensor which has led to the implementation of self-constraining policies, procurement backlogs, and archaic doctrine.
4. The Canadian Army requires a shift in mindset concerning the employment of UAVs to maximize its effectiveness during training and on the contemporary battlefield. With an ongoing large-scale, high-intensity war reaching its two-year mark at arm's reach, the Canadian Army should be onboarding each and every one of the lessons learned at rapid speed. One such lesson is the unprecedented employment of UAVs (by both parties) in the conflict, which continues to mark one of the most significant evolutions in ground war tactics from previous conflicts.

DISCUSSION

5. The CA's current UAV employment model was developed in the early 2000s with the acquisition of the Raven and Blackjack systems. These systems were provided to the artillery branch which assumed ownership and training. Their current employment on the battlefield, however, falls drastically short of the sensor requirement for increased Situational Awareness (SA) and has not been optimized for contemporary operations. While employed alongside an infantry unit, they are operated by the supporting artillery sub-unit or fires detachment and therefore the line of communications becomes stretched when trying to relay information back and forth. With one system supporting an entire infantry unit (and possibly more), the lack of

sensors on the battlefield becomes a significant issue.

6. In recent years, the conflict in Ukraine has underscored the critical role played by UAVs in modern warfare. The battlefield is “saturated with commercial quadcopters used for reconnaissance, fire correction, supply, pressure, and propaganda.”¹ Contrary to scholarly predictions at the onset of the conflict, the significant impact of UAVs on the front lines have forced the adoption and evolution of UAV tactics by both sides. While the use of small-scale UAVs was originally put forward by non-state actors throughout a variety of previous conflicts, the use of similar systems by state militaries to augment existing Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) gaps has grown significantly. As war authors Chavez & Swed put it: “they are affordable, broadly available, and user-friendly for ground troops to field them in manifold ways.”²

7. This success has led Canada’s allies to adopt and adapt their drone operations at the tactical level. European militaries are now pushing for the adaptation of their “doctrine to better integrate small drones with traditional weapon systems.”³ Dominika Kunertova, a Senior Researcher at the Center for Security Studies, suggests that military drone acquisition strategies should incorporate “1) the military potential of small drones; 2) the compound effect of low-tech commercial drones; and 3) employing drones all the way down to the squad level.”⁴ While the US Army currently uses UAVs at the platoon level, the US Army has already begun developing portable armed drones for use against enemy armour, marking another significant advancement in drone warfare tactics.⁵

8. The tactical employment of UAVs within the section, platoon, or company level will greatly increase the SA required for effective decision making and tactical action. CA doctrine states that “every soldier is a sensor” however significant personnel shortages within infantry units have resulted in far fewer sensors on the battlefield than ever before. This shortage can be mitigated by the employment of UAVs at all levels. In an article titled *The Ukraine Drone Effect on European Militaries*, the author states that the increased “battlespace awareness for small teams and even individual soldiers”⁶ has been one of the greatest evolutionary changes brought on by the arrival of micro UAVs. Drone operators are able to conduct area reconnaissance, conduct security sweeps, report on road conditions, and walk friendly forces onto enemy objectives without leaving their immediate chain of command or requesting limited brigade resources. Each of these tasks, previously conducted by soldiers, can now free up additional soldiers within a unit. The amount of battlefield SA within an organization can be increased exponentially with each additional system.

¹ Chávez, Kerry, and Ori Swed. “Emulating Underdogs: Tactical Drones in the Russia-Ukraine War.” *Contemporary Security Policy* 44, no. 4 (September 21, 2023): 592–605. <https://doi.org/10.1080/13523260.2023.2257964>. p. 592.

² Chavez & Swed, p. 596.

³ Kunertova, Dominika. “The Ukraine Drone Effect on European Militaries.” *CSS Policy Perspectives*. Vol 10/15. Dec 2022. <https://doi.org/10.3929/ethz-b-000584078>. p. 1.

⁴ Kunertova, D. p. 4.

⁵ Kunertova, Dominika. “Drones Have Boots: Learning from Russia’s War in Ukraine.” *Contemporary Security Policy* 44, no. 4 (October 2, 2023): 576–91. <https://doi.org/10.1080/13523260.2023.2262792>. p. 587.

⁶ Kunertova, D. p. 4.

9. The Canadian Special Operations Command (CANSOFCOM) has been employing micro UAVs during training and operations since 2022. These small, unarmed drones are operated by members of the detachments, allowing for enhanced Command and Control (C2) and additional SA. Without relying on external units, a mutual understanding also exists as operators are being talked onto objectives by operators. To avoid the hurdles associated with the procurement of a “UAV”, they are simply defined as Remote Operated Combat Systems (ROCS) and are purchased Commercially Off-the-Shelf (COTS).

10. COTS systems are easy to use and the average soldier can be trained in just a few hours. This eliminates the requirement for overly-complex military courses that remove candidates from operational units for weeks at a time. As a relatively cheap alternative, they are also nearly “disposable”. Because the likely uses for the systems are training environments or close-distance, immediate operations, there is no requirement for encrypted transmissions that delay or force unnecessary recovery operations in the event of a loss. A new system can simply be launched as a replacement. To facilitate both operator training and assist with loss prevention, most COTS have built-in safeguards that prevent their loss due to un-skilled operators. Sophisticated sensors prevent mid-air collisions and enable obstacle avoidance while return-to-sender functions allow for the safe retrieval of a system due to low battery power or loss of guidance signal. Contrary to our current multi-million-dollar UAVs in the CA’s arsenal, COTS systems are nearly impossible to lose.

11. There is significant hesitation within the CA to procure and employ UAVs simply because of the system’s name. While the term UAV is generic, it often misleads decision makers as they immediately associate the term with systems already in the procurement phase. These typically vary from smaller sensor platforms to large weaponized systems. The term UAV is often used interchangeably with Unmanned (or Uncrewed) Aerial System (UAS), micro-UAS, quadcopters, or drones. Small, unarmed, unencrypted quadcopters or drones are the ideal UAVs for the Canadian infantry.

12. One of the biggest barriers facing the employment of UAVs is the current policies on CAF installations, to include training areas, regarding the use of UAVs. The convoluted approval process, lack of ownership, and restrictive risk management process hinders any innovation that infantry units attempt to execute during training. It is clear that UAVs will be a significant part of the battlefield and our training areas should be adequately equipped to allow for contemporary training that meets the requirements of our next fight. In 2023, the 5th Canadian Mechanized Brigade Group produced a document highlighting various lessons learned from the Ukraine-Russia conflict. The tactical benefits of small-scale UAVs (drones, specifically) was at the top of the list. And while the document highlighted the importance of drone operations in combat, all subsequent requests by units within the formation to purchase such systems were denied.

13. Current CA doctrine is outdated and not conducive to the employment of small-scale UAVs. In both *Land Operations* and *Combat Team in Operations*, the mention of UAVs is restricted to those employed by the artillery. *Battle Group in Operations* suggests four functional areas for UAV tasks which include: Artillery tasks, surveillance tasks, contributing to deception plans, and support tasks⁷. This is not inclusive of small-scale UAVs at the tactical level which

⁷ Department of National Defence. “Battle Group in Operations.” B-GL-321-005/FP-001. p. 3B11-1.

help with the surveillance role but fall short of the target acquisition and engagement roles as defined in doctrine. Employment of UAVs at the tactical level also improve the sensor-to-shooter link⁸, allowing sub-units to conduct engagements themselves as well as Battle Damage Assessments (BDA).

14. The ability to conduct surveillance without putting boots on the ground minimizes risks to infantry personnel, making UAVs an ideal force multiplier. DJI, a company that specializes in the production of small-scale quadcopter drones, has provided drones to both Ukraine and Russia. The resulting reports have exemplified the “role affordable commercial drones can play and that their ubiquity may make it the combatant that most wisely and creatively uses drones the one that succeeds in conflict.”⁹

15. Small-scale UAVs provide a unique advantage on the battlefield to the infantry unit in battle. With the deployment of UAVs at the lowest level, situational awareness is improved from the bottom up, reversing the traditional flow of intelligence. The ability for multiple sub-units to employ UAVs also increases an infantry unit’s ability to conduct reconnaissance. A task traditionally reserved for a limited, uniquely equipped group, reconnaissance can now be conducted by a regular infantry section or platoon. This economy of effort helps preserve combat power and allows for the reduction of complex tasks for the reconnaissance platoons. Lastly, UAVs are force multipliers and improve operational efficiency both in training and on the battlefield. Equivalent to the sensor capabilities of multiple soldiers combined, UAVs can be employed in parallel to boost combat effectiveness of the units.

16. UAV employment, however, is not only restricted to training and the battlefield. Across the continuum of operations, UAVs can augment small units in the accomplishment of their tasks. Whether it is assessing the viability of a road during domestic flood response task or the extent of fire damage during wildfire response to securing an airport’s perimeter during a Non-combatant Evacuation Operation (NEO), UAVs offer a wide-variety of options that help minimize the risk to CA soldiers and augment critical SA.

17. UAVs have the potential to augment each of the operational functions. As discussed, dispersed sensors improve a unit’s ISTAR capabilities (sense), allowing for more informed decision making (command). They can be used in both offensive (act) and force protection (shield) roles, and for a wide variety of tasks across the continuum of operations. Lastly, they help preserve combat power and reduce the lines of communication (sustain).

18. One of the primary hurdles to UAV integration is the complex procurement process. The Canadian Army faces bureaucratic delays and budgetary constraints that prohibit the timely acquisition of cutting-edge technology. In addition, the requirements often vary between branches and units (i.e. the sensor requirements for an armoured reconnaissance unit vary from those of a dismounted infantry battalion). To address this challenge, streamlined procurement procedures should be implemented, allowing for the swift acquisition of UAV systems that meet the specific needs of the individual units. Due to the simplistic nature of the systems being

⁸ Department of National Defence. “Battle Group in Operations.” B-GL-321-005/FP-001. p. 9-2.

⁹ Lowthier, Adam & Siddiki, Mahbube. “Combat Drones in Ukraine.” *Air & Space Operations Review*, Vol. 1, No. 4 (Winter 2022). pg. 7.

acquired as well as the employment at the lowest tactical level, there is no requirement for interoperability at the initial procurement stage.

CONCLUSION

19. The Canadian Infantry stands at the precipice of a paradigm shift in military tactics, and the employment of UAVs can be a game-changer. The conflict in Ukraine has demonstrated the invaluable contribution of UAVs to ground forces. These uncrewed platforms provide real-time situational awareness, enhance reconnaissance capabilities, and enable precise targeting of enemy positions. The conflict in Ukraine has underscored the transformative potential of UAVs in modern warfare, and the Canadian Infantry must embrace this evolution. By addressing procurement challenges and overcoming administrative hurdles, the integration of UAVs can enhance the effectiveness and survivability of infantry units.

20. A shift in mindset is required to provide the infantry with the tools it requires on the modern battlefield. Significant procurement challenges, personnel shortages, and technological deficiencies can all be mitigated by the employment of UAVs at the tactical level. Such a mindset is currently proven effective in Ukraine and as a lessons-learned organization, it is high time we act. The employment of UAVs will not only secure the safety of Canadian infantry personnel but also bolster our ability to operate across the continuum of operations, both domestically and abroad, in an ever-evolving global security landscape.

RECOMMENDATIONS

21. To harness the benefits of UAVs swiftly, the Canadian Infantry should adopt an approach that has proven effective within CANSOFCOM. Immediate deployment of off-the-shelf UAV systems, or ROCS, can provide a quick and cost-effective solution while more advanced systems are procured. Due to the low initial costs, units are able to use existing funds to procure these systems and acquire any additional systems at each fiscal year. Unit-led procurement will also allow for different prioritization depending on the unique requirements of the various sub-units. Based on lessons learned from ongoing conflicts, and as Dominika Kunertova suggests, UAVs should be employed at the lowest tactical level possible.

22. CA units should be encouraged to use drones for both training and operations. As technology natives, many young soldiers are already familiar with these systems. To greatly increase a unit's effectiveness, any opportunities to implore soldiers to use initiative and native skills when employing micro UAVs should be maximized. Harnessing the full range of capabilities that UAVs can provide will also make our soldiers better at Build Partner Capacity missions, of which we are predicted to contribute to for the foreseeable future.

23. In is inevitable that technology will continue to outpace doctrine. As we continue to rely on published doctrine to dictate new equipment purchases, we risk becoming obsolete. A shift in mindset is recommended, allowing operators to select the equipment that is right for the task and encouraging them to share ideas and lessons learned more frequently. By allowing operators to employ new technology freely, operating procedures are driven by the immediate successes on the battlefield, and not the way a doctrine writer has envisioned them unfolding. By doing so,

shared understanding and common practices (or Tactics, Techniques, and Procedures) will spread more effectively throughout the CA.

24. The procurement of unclassified, unarmed, micro UAVs should be done by local COTS suppliers. Units and sub-units require different capabilities from their systems and therefore a pan-army procurement process is not conducive to this type of purchase. Additionally, the speed at which technology evolves does not allow for a multi-year procurement cycle. COTS purchases can be scaled and modified to meet the individual unit needs and due to the diminishing cost of the individual systems, it is more cost effective than a CA-led procurement contract.

25. Battlefield commanders will need to be comfortable with the employment of UAVs outside of the ISTAR collection plan. Due to the localized nature of their employment, it is natural that UAVs will be used to assess immediate threats or areas of interest. Flexible, decentralized, and cooperative collection plans will be required to maximize the effectiveness of the numerous battlefield sensors. ISTAR ownership will undoubtedly be a contentious debate in the foreseeable future and the siloed, top-down approach to ISTAR collection might have to be revisited¹⁰.

¹⁰ Department of National Defence. "Adaptive Dispersed Operations: The Force Employment Concept for Canada's Army of Tomorrow." D2-188/2007E. p. 12.

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