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RETHINKING THE CANADIAN ARMY ANTI-ARMOUR PROCUREMENT STRATEGY

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RETHINKING THE CANADIAN ARMY ANTI-ARMOUR PROCUREMENT STRATEGY

AIM

1. The mission of the Canadian Army (CA) is to generate combat-effective, multi-purpose land forces to meet Canada's defence objectives.¹ However, the CA cannot fully meet its implied obligation to be ready to complete any mission within the spectrum of conflict. To address one specific concern, the aim of this paper is to make recommendations on what the CA procurement strategy must consider in order to field a coherent, layered anti-armour (AA) capability.

INTRODUCTION

2. The current AA investment and divestment strategy has led to the situation illustrated in Figure 1. When viewed as a system of systems, it is clear that beyond an engagement range of 300m, the CA has few assets that can defeat armoured vehicles, and very few assets that can defeat modern tanks. As AA systems have been gradually phased out due to obsolescence, service downsizing, or other reason, they have not been replaced. The CA procurement strategy for the last ten years has focused upon the delivery of a multi-role automatic grenade launcher (AGL) capable of both anti-armour and area suppression fire support.

¹ Department of National Defence, *B-GL-300-000/AG-003 Waypoint 2018: The Canadian Army Advancing Towards Land Operations 2021* (Kingston: DND Canada, 2015), 1.

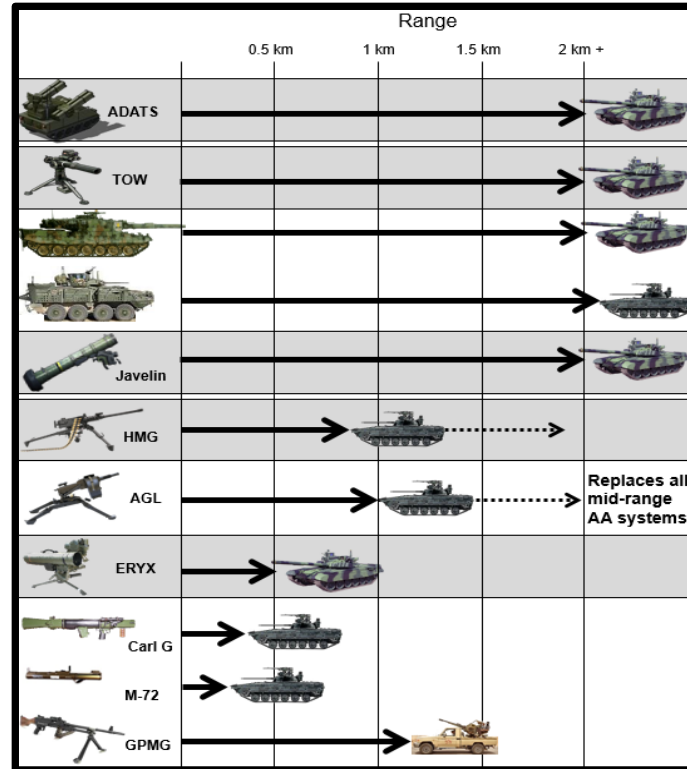


Figure 1 – Canadian Army Anti-Armour Capability (Divested capabilities in grey)

3. The discussion below begins with the argument for a Canadian AA capability. It then details recent major divestments and investments, and attempts to explain why such decisions were made. This analysis generates several recommendations that should be taken into consideration by those who manage the capability development of the CA.

DISCUSSION

The Need for Anti-Armour Systems

4. Most first-world armies have maintained an AA capability with an effective range of at least 4,000m, and many are actively pursuing capabilities well beyond this range.² Many smaller armies, as well as non-state actors such as ISIS, also have armoured vehicles and a long-range

² Richard Jones and Leland Ness, *IHS Jane's Weapons: Infantry 2013-2014* (Coulson, UK: IHS Global Limited, 2014).

AA capability. To defeat these adversaries, the CA needs to be able to effectively engage these threats at similar or greater stand-off.

5. US Forces are increasing their AA capability based on the threat posed by next generation soviet infantry fighting vehicles (IFV). Recognizing that the 12.7mm heavy machine gun (50cal HMG) and even the Bushmaster 25mm cannon³ may not be effective against these new threats, entire fleets of US vehicles, such as the wheeled Strykers from the Germany-based 2nd Cavalry Regiment, and most tracked Bradley IFV, are being refitted with 30mm cannons.⁴ US Army Training and Doctrine Command (TRADOC) has committed to studying the potential for a broader application across the forces as the 30mm has a large enough calibre to support additional ammunition types such as a grenade-style airburst round capable of hitting combatants hiding behind walls.

6. The CA is seen as a liability rather than a partner in operations within a more heavily-armed coalition, such as Op REASSURANCE in the Ukraine.⁵ We either rely on others to provide our assets with protection from long range AA weapons, or we enter into a battlespace without firepower parity. In order to preserve Canadian combat power and to ensure interoperability with our allies, Canada must participate in the long-range AA battle.

Divestment and Investment

7. Divestment is a natural component of the life cycle of all equipment, but divestment of a weapons system is not synonymous with divestment of a capability. It is accepted that equipment such as the aging 50cal HMG becomes worn out and must be removed from service. However, unless the resulting gap in the engagement range or target type is covered by a replacement AA

³ The Bushmaster 25mm cannon is used in Canadian LAV III vehicles.

⁴ Peter Bechtel, *Operational Needs Statement (ONS) for Increased Lethality for the 2nd Cavalry Regiment* (US Army Europe: HQDA ONS 15-20590, 22 April 2015).

⁵ CONTEL with Director of Land Requirements 5-6, Maj Jun, 1 Feb 2016.

capability (new or adapted existing weapon system), disposing of antiquated equipment is not the same as following a divestment strategy. Having a strategy implies that the capability gap has been predicted and that proactive measures, including the aversion of future defence commitments that might require that capability, have been taken in order to minimize the risk of mission failure. This level of coordination seems to be lacking; the CA has neither invested in a full suite of replacement weapons systems nor avoided mission areas requiring AA weapon systems. In fact, current operations in the Ukraine bring the CA into close proximity with the same modern forces that have motivated other Allied nations to increase their own AA weapon lethality.

Divestment

8. *General.* There are several divested weapon systems that warrant particular attention in this discussion, including the Air Defence Anti-Tank System (ADATS), the 50cal HMG, and the tube-launched, optically-tracked, wire-guided (TOW) anti-tank missiles. In each case, the divestment has left a gap in AA coverage.

9. *ADATS.* This mounted system was divested for a well-justified and inarguable reason: it was never employed. Conceived and built to provide the CA with a ground-based long range missile system, the ADATS entered service in 1989. Its only deployment was to secure the airspace for the 2002 G8 Summit in Kananaskis, AB. With its drain on manpower and training, as well as its \$1.1B program cost, there was significant pressure to cut this unused capability. However, its divestment has left a hole in the layered AA suite in the air defence and the mobile long range AA capabilities.

10. *50cal HMG.* The divestment of this capability was shocking to most operational army personnel. Capable of destroying medium armour and breaching concrete walls in urban fighting, the 50cal HMG was broadly used in mounted and dismounted roles, in offensive and defensive

roles. When the existing guns reached the end of their natural life cycle, they were disposed of with no HMG replacement. The Royal Canadian Navy and Canadian SOF replaced their holdings of these guns with a modern 50cal HMG. The disappearance of the 50cal HMG from the CA arsenal has significantly decreased its direct fire capability as the 7.62mm general purpose machine gun (GPMG) does not provide equivalent penetrative power.⁶

11. *TOW Missile Systems.* Initially divested two decades ago, the TOW missile system capability has been temporarily reintroduced due to pressure from the Canadian Infantry. Recognizing and respecting the need for a standoff AA capability, over the last two years more than 40 TOW systems with an improved target acquisition system (ITAS) are available for service, should the CA decide to invest in manpower and training to develop the capability. This system no longer requires wire guidance and has an effective range out to 4,250m. The Directorate of Land Requirements (DLR) is initiating the Anti-Tank Guided Missile Replacement (ATGMR) Project as a permanent solution.

Investment

12. *General.* Notwithstanding the revival of the TOW systems, the AGL is the one major AA capability deliverable recently received by the CA. There are several, mutually-supporting projects that may lead to AA capability enhancement in the 5 to 15 year timeframe, including: the ATGMR, 84mm Recoilless Gun (Carl Gustaf) Upgrade, and the Light Forces Enhancement (LFE) Omnibus projects. More coherence between capability divestment and the current procurement initiatives is required in order to ensure that these programs are better synchronized.

13. *AGL - 40mm Close Area Suppression Weapon (CASW).* The AGL project has achieved 80% delivery of weapon systems and training to the CA and SOF. This system was initially

⁶ Department of National Defence, B-GL-361-301/FP-003 Ballistic Protection (Kingston: DND Canada, 2015), 14

conceived as a next-generation replacement to the aging 60mm mortar, providing suppressive fire and obscuration smoke in close combat⁷; however, due to its excellent targeting and multiple ammunition options, it has since evolved to fill many breaching and AA roles. Such applications were broadly supported by computer simulations as will be discussed below. Yet despite its success in simulations, the AGL has received broad criticism from end users, including

- a. It requires a 3-man team to operate, drawing combat power from fighting forces;
- b. It is heavy and awkward when compared to the 60mm mortar and 50cal HMG, taking a disproportionate amount of space in, or on, combat vehicles for the value that it brings to the fight;
- c. It is not as widely distributed as the 50cal HMG, and as such, units that would normally have such firepower for rear area security (RAS) are reduced to using the 7.62mm GPMG;
- d. Moving targets are difficult to hit;
- e. Ammunition consumption rates are very high, limiting the operator's flexibility to "walk-on" to a target, and causing a high logistics burden; and
- f. Not all ammunition types have been purchased to provide the required AA effects for its evolved role.⁸

14. Regardless, the CASW has largely replaced the 60mm mortar and 50cal HMG, and occupies the mid-range AA capability as shown in Figure 1. This is clearly an example of the marginalized value of user feedback to the current AA investment program.

15. *Anti-Tank Guided Missile Replacement (ATGMR)*. This is a new project for DLR that seeks to provide the CA with "new multipurpose anti-armour, anti-structure weapon systems".⁹

⁷ Department of National Defence, *Project C 000562: Close Area Suppression Weapon (CASW)*, Capability Investment Database. Last accessed 27 January 2016. http://cid-bic.forces.mil.ca/cid/intro_e.asp.

⁸ CONTEL with field operators from 1 Royal Canadian Regiment (RCR) and 2 RCR, 2014.

The intention is to determine the next generation AA systems for targets beyond 300m. There is currently no Project Director and there will likely be no deliverables for at least ten years.

16. *84mm Carl Gustaf (Carl G) Upgrade*: Slightly ahead of the ATGMR project, the Carl G Upgrade project will provide the CA with enhanced sighting for this short-range weapon system, making it more compatible with advanced high explosive anti-tank (HEAT) rounds. The result of this project will be a modest increase in the effective range of this tank-killing weapon up to 4-500m, if conditions permit. Delivery timelines for this project are 5-10 years.

17. *Light Forces Enhancement (LFE)*. Amongst other deliverables, this omnibus project seeks to restore the firepower required for the light infantry to fulfil its role¹⁰. The CASW and Carl G will form part of the solution, but there is still a requirement for an enhanced man-portable AA system that can fire out to roughly 2,500m, a role previously occupied by the Javelin system. As currently proposed, this approach will not see a long-range AA system, and may undermine such initiatives in the ATGMR.

Capability Development Decision-Making

18. *Army Capability Development*. The capability development process has become increasingly complex since the end of the cold war. It faces an increasing number of challenges from immediate, unforecasted operational requirements (UOR), which disrupt existing project development cycles and often significantly impact long-term capability management.¹¹ Working under the Director General Land Capability Development (Chief of Staff Land Strategy), the Army Capability Development Board (ACDB) is comprised of subject matter experts, including the Chief of Staff Land Strategy Directors, the Directors of Army Doctrine and Training, Arms

⁹ Department of National Defence, *Project CA 1421: Anti-Tank Guided Missile Replacement (ATGMR)*, Capability Investment Database. Last accessed 27 January 2016. http://cid-bic.forces.mil.ca/cid/intro_e.asp.

¹⁰ *Ibid.*, *Project 1502: Light Forces Enhancement (LFE)*.

¹¹ Andrew Godefroy, "Chasing the Silver Bullet: The Evolution of Capability Development in the Canadian Army," *Canadian Army Journal* (online), July 2008.

and Branch Advisors, and representatives from the Science and Technology community. It works with direct support and collaboration from other Land Staff and Chief of Force Development Directorates to establish what capabilities the CA will need into the future.¹² The ideas that come from the ACDB are scrutinized, run through budget and manpower assessments, and ultimately result in divestment and investment decisions.

19. *Science and Technology Representation.* The scientific community has a critical role in the development of capabilities for the CA. Often best suited to offer critical advice on existing and evolving technologies, research scientists have long been the honest broker for an army that is constantly pressured by the defence industry to adopt new equipment. The scientific community works with field trials units to test concepts prior to capability rollout. This includes simulations and actual field testing.

20. Simulations are a cost-effective and constantly improving means to test employment concepts for new weapons and new force employment concepts. However, they are only as good as the data that are provided at the outset of the simulation. Of particular concern for AA simulation is the likelihood of weapon success, namely the “Probability of hit” (P_{hit}) and “Probability of kill” (P_{kill}) data that are used to determine weapon effectiveness. Slight changes to these data, such as a grenade P_{kill} radius of 3m vice 2m, can have significant effect on the outcome of the simulation. Most of such data is either estimated by the project team or provided by the manufacturer¹³, calling into question the value of simulations such as the 2005 Infantry Urban Weapon Mix Study which compared the effects, among other things, of the CASW to the

¹² Department of National Defence, *B-GL-300-000/AG-001 Designing Canada’s Army of Tomorrow: A Land Operations 2021 Publication* (Kingston, DND Canada, 2011), 35.

¹³ CONTEL with Director of Land Requirements 5-5, Maj Gendron, 2014.

25mm, 50cal HMG and 60mm mortar in a variety of scenarios¹⁴. Despite the significant number of caveats that were carefully articulated throughout that report (including P_{hit} and P_{kill} data sources and the effects of daylight, weather, soldier fatigue, and ammunition consumption), it underwrote the CA endorsement of the CASW and the divestment of the 50cal HMG and 60mm mortar.

21. *End-User Representation.* Field trials, such as those conducted by the Land Forces Trials and Evaluation Unit (LFTEU) support simulations and/or confirm expectations of capability performance. This is also the time when end-user feedback is considered. Experience with the CASW shows that despite negative push-back from field units such as 1 RCR and 2 RCR, very few changes were made to the CASW implementation program, and no reversal was made to the decision as to whether the 50cal HMG or 60mm mortar should be retained in service. In all of these cases, end-user feedback was too late to reverse ACDB decisions.

CONCLUSION

22. The CA has a gap in its medium-long range AA capability that presents a vulnerability in current and future operations. The TOW ITAS is an excellent temporary solution to this vulnerability, but is an example of a reaction, rather than of a proactive procurement strategy.

23. The AA capability investment program is not coherent. Many weapon systems have been divested with no replacement to fill the resulting capability gap; others have been replaced with multi-purpose systems like the CASW that do not satisfactorily perform the required role. Similarly, programs such as the ATGMR and LFE may actually work at crossed purposes, where economy of effort drives a common solution rather than providing different solutions for different engagement ranges.

¹⁴ Department of National Defence, "TR 2005-12: Infantry Urban Weapon Mix Study," Defence Research and Development Canada, 2005.

24. While simulation offers tremendous value to the development and employment of new capabilities, program managers must understand the limitations and caveats that come with simulation. The value of end-user field trials cannot be understated. They must be conducted early in the procurement process in order to ensure that the correct systems are being chosen.

RECOMMENDATIONS

25. Conduct a holistic needs analysis of the AA capability and determine whether the divestment and investment strategies are adequate and not in conflict with each other.

26. If the above assessment indicates a capability gap that affects current operations, consider a UOR to temporarily address the issue until a formal program can deliver an enduring solution.

27. Understand and acknowledge the limitations of simulation, especially the influence of P_{hit} and P_{kill} data.

28. Involve end-users earlier in the procurement process.

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