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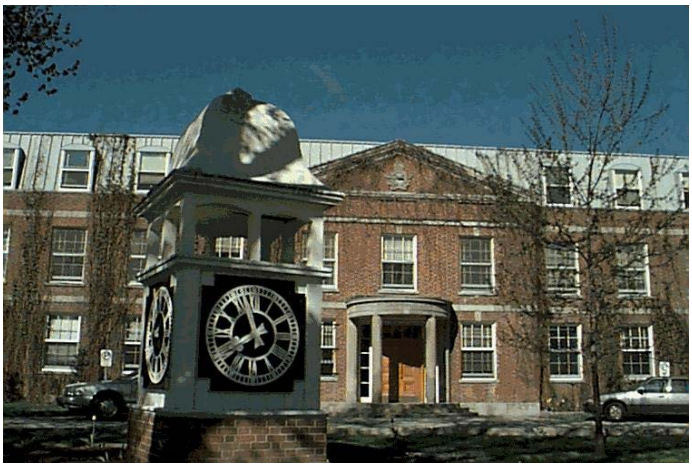

LEOPARDS WITHOUT CLAWS: THE FUTURE OF TANKS IN THE CANADIAN ARMY

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Leopards Without Claws: The Future of Tanks in the Canadian Army

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LEOPARDS WITHOUT CLAWS: THE FUTURE OF TANKS IN THE CANADIAN ARMY

AIM

1. The Leopard 2 family of vehicles (Leo 2 FoV) continues to face significant challenges with regards to its operation within the Canadian Army (CA).[1] A combination of a small fleet purchase and inadequate support resourcing has left the fleet barely usable. In effect, an extremely limited pool of vehicles has degraded significantly, with a serviceability level usually no higher than 15-20%. This small fleet cannot be balanced across three regular force regiments in a coherent or doctrinally sound fashion.[2] It is acknowledged that considerable work continues to be done, but little progress has been made in almost a decade of effort. The aim of this paper is to outline the challenges facing the Leo 2 FoV and to demonstrate that without significant investment there is no reasonable way ahead for the Leo 2 as a CA asset, the status quo is unsupportable. A full study of alternative solutions is beyond the scope of this paper, but initial recommendations on a way ahead based on the in-service Light Armoured Vehicle (LAV) platform will be briefly touched on.

INTRODUCTION

2. In 2005 the CA was moving towards divesting its tank fleet until the Leopard 1C2 was put into action in response to combat operations in Afghanistan. Although this venerable platform performed admirably it rapidly became clear that a newer vehicle was required.[3] The Leo 2 was purchased in 2007 with its detailed *Statement of Operational Requirement* following in August, 2008.[4] The existence of the Leo 2 FoV in theatre was leveraged as a means to ensure the continued existence of a tank capability within the CA. This was viewed as critical to a perceived level of commitment and "seriousness about war".[5] However, the intangible benefit of this decision must be weighed against the real life cost and second and third order effects across the CA.

3. This paper will demonstrate that the current approach to managing and employing the Leo 2 FoV is institutionally unsound, logistically unsupportable, and rapidly approaching obsolescence. The status quo provides an illusion of commitment while contributing to the degradation of overall capabilities within the CA. In effect the CA must either commit to tanks wholesale or abandon the experiment and adopt a more medium weight approach in-line with what is described within *Strong, Secure, Engaged* (SSE).

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[1] Col Robert Ritchie, *Leopard 2 Family of Vehicles (FoV) 1 Canadian Mechanized Brigade Group Outstanding Integration Concerns 2018-2019*. Headquarters 1 Canadian Mechanized Brigade Group: file 12350-1 (G4), 17 Sep 18. p 1-2.

[2] LCol D. Fontaine, "LEOBEN - Steering Committee: Canadian Update". Presentation, LEOBEN Conference 2018 - Germany, 2018.

[3] Charles O'Connor, "Main Battle Tanks in Afghanistan". Paper in support of the University of Victoria Department of History's Oral History Project, University of Victoria, 2018. p 1-2. As Operation MEDUSA concluded the challenges of battlefield mobility and precision fire support had been demonstrated. CEFCOM ordered the deployment of one squadron of Leopard 1C2 to deploy in support of battlegroups starting in Fall 2006. By early Spring 2007 the need to update the vehicle, for mine resistance especially, had become clear.

[4] Chief of the Land Staff, "Tank Replacement Project". *Statement of Operational Requirement 00001241*. Ottawa : Queen's Press, 2008. p 9-12.

[5] Maj Ted Dossev, "Leo 2 FoV CAFDWG", (Presentation, Force Development Working Group, 2018).

DISCUSSION

Institutional and Doctrinal Challenges

4. *Lack of Institutional Clarity*. As a whole the CA desires to maintain the capability to FG and force employ (FE) heavy armour in support of expeditionary operations. However, this imperative is incongruent with the direction in SSE, which does not articulate a need for heavy armour; instead, it requires an army that is "agile, scalable, and responsive".[6] The limited number of Leo 2 platforms available coupled with their complexity, maintenance requirements, and expense arguably puts the fleet at odds with the GOC's intent. The need to balance strategic aims with institutional goals is fraught with ongoing difficulties. SSE and the draft *Close Engagement* advocate for an evolution of CA capability to move towards adaptive dispersed operations (ADO).[7] The logistical difficulties associated with the Leo 2 FoV seem to preclude an effective move to ADO. *Close Engagement* argues that "in order to generate land power at home and abroad the Army will need continued investment in the core capabilities required for success in combat operations".[8] This tension between strategic mandate and institutional desire to maintain competencies has resulted in an incoherent approach to FG and FE for tank forces.

5. *Doctrinal Challenges*. Current CA structures are not aligned to support employment of the Leo 2 FoV. This contributes to an ongoing inability of the CA to establish a baseline capability for the three Canadian Mechanized Brigade Groups (CMBG). Acknowledging this reality, doctrine concerning L5 training clearly establishes that tank-infantry cooperation is no longer the required baseline skillset for combat team (L5), although it is preferred.[9] Only 1 CMBG has tank squadrons in close proximity to its brigade's home station with an appropriate training area within a reasonable distance.

6. It is often argued that with a regiment's worth of tanks available the CA could provide each of the CMBGs with one tank squadron. In theory this would allow continued development of tank based skillsets and would ensure a level of standardization for CMBG capabilities. However, as demonstrated by successive iterations of Exercise MAPLE RESOLVE (Ex MR) this solution is incorrect. Every Ex MR sees second line Leo 2 FoV support deployed as a platoon sized element from 1 Service Battalion and seconded to another CMBG.[10] Additionally, in order to provide force mobility and armoured engineer support, 1 Combat Engineer Regiment must FG a troop of AEVs as well.[11] Although enough tanks platforms exist to field three independent squadrons there are insufficient enabler and logistical platforms to support them.

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[6] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy*. Ottawa : Queen's Press, 2017. p 36.

[7] Col Pete Huet, "Record of Discussion" in *Canadian Army Forces Development Working Group Leopard 2 Fleet of Vehicles (Leo 2 FOV), 1-2 Nov 17*. Ottawa, ON : Canadian Army Headquarters, 2017. p 6.

[8] Ibid. p 7-8

[9] Dossev, "Leo 2 FoV CAFDWG".

[10] Col William Fletcher, *1 CMBG Order – Ex REFLEXE RAPIDE/MAPLE RESOLVE*. 1 Canadian Mechanized Brigade Group Headquarters: file 3350-1 (G3 Ops), 11 Apr 18.

[11] LCol Mark Lubiniecki, "FW: Leopard 2 FoV SITREP – 2 May 18." E-mail to Col William Fletcher. 2 May 18.

7. *Contingency Plan (CONPLAN) JUPITER.* SSE provides general direction on capabilities to be met by the CAF in service to Canada, including involvement in expeditionary operations.[12] CONPLAN JUPITER outlines the expected requirements for or tanks in this context:

a. 1 x 19 tank armoured squadron (M variants)

b. 5 x theatre stock replacement (M variants);

c. 4 x Armoured Engineering Vehicles (AEV);

d. 2 x Armoured Recovery Vehicles (ARV);

e. Deployable second line capability.[13]

8. CONPLAN JUPITER represents a commitment of over 60% of the available M fleet.[14] The activation of CONPLAN JUPITER would drive a continuation of the Managed Readiness Plan (MRP) and the rotational FG of tank squadrons to support it. With only 82 Leo 2 tanks available in the fleet, this leaves three 19 tank squadrons available for FG, individual training, and any other assigned tasks. CA acknowledges that it cannot meet both its operational and training mandates simultaneously.[15] In order to be successful, assumptions would have to include that no more than one squadron can be committed to expeditionary operations; IT would be conducted only at units and not the schoolhouse; battlefield attrition will be minimal; and, ongoing maintenance and periodic refit will be almost nil.

9. CA doctrine states that a squadron is the smallest independent unit of armour, yet our limited resources preclude any possibly larger deployment. The limited number of vehicles available is wholly insufficient to meet institutional or operational needs and would likely need to triple at a minimum, to achieve these goals.[16]

Logistical and Infrastructure Challenges

10. *Logistical insufficiencies*. The perennial debate on allocation and employment of the Leo 2 FoV remains but it is often overshadowed by the more real danger of fleet degradation due to logistical insufficiencies. This overall breakdown is due to several factors including, but not limited to false assumptions about Leo 2 maintenance requirements, inability to FG required

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[12] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy*. p 81.

[13] Chief of Army Operations Staff. *CONPLAN JUPITER*. Canadian Army Headquarters: file 10000-1(G3), 2017. CONPLAN JUPITER is CA's standing contingency operations plan with a scaleable response. A battlegroup postured for high kinetic operations would include one squadron of Leo 2 tanks as outlined. JUPITER is flexible enough to respond to multiple missions as outlined within SSE, so expected duration of task could have significant follow on concerns for FG.

[14] LGen Paul Wynnyk, *Leopard 2 Fleet of Vehicles (Leo 2 FOV) Initiating Directive (ID).* Canadian Army Headquarters: file 1901-1 (DLFD CI-3), Jan 18. p 6. The "M Fleet" is the deployable element of the CA Leo 2 fleet. It is comprised of a total of 40 Leo 2A4M and Leo 2A6M variants. The remaining tanks are considered non-deployable training variants. The entire tank fleet is composed of 82 vehicles, with an additional 12 ARVs and 18 AEVs in service.

[15] Maj Ted Dossev, "Armoured Direct Fire Integration". Presentation, ACDB, 2018.

[16] Dossev, "Leo 2 FoV CAFDWG". The complexity and maintenance schedule of the Leo 2 makes it akin to a helicopter and it should be considered in that light. Similar logic to the concept of "3 to get 1" for airframes should be applied. CA acknowledges that to achieve a level of "general expertise" requires a minimum of 6 squadrons (three complete regiments).

technical expertise, and inadequate infrastructure. These challenges have effectively become endemic and institutionalized, as evidenced by continued pressure at multiple levels of command over years.[17]

11. *Leo 2 Maintenance*. Original estimates for maintenance support requirements for the Leo 2 FoV were predicated on the Leopard 1.[18] In accordance with the Leo 2 FoV Implementation Order "all 1st and 2nd line maintenance was to be conducted by CAF personnel as per the Leo 1 C2".[19] Historical data demonstrates that this was a significant underestimation which has left the fleet in dire straits.[20] The C2 required on average 296 hours/year of preventative and corrective maintenance (PM/CM), whereas the Leo 2 requires 1795, an almost sevenfold increase.[21] This significant and unplanned increase in maintenance, with concurrent demand for infrastructure, technicians, and parts has contributed directly to the consistently high vehicle off road rate (VOR) of the Leo 2.

12. Beyond the difficulties associated with a more demanding maintenance schedule the Leo 2 FoV has historically faced significant shortages in critical components.[22] This has unfortunately led to a culture of cannibalizing and robbing of vehicles to ensure a minimum number of usable platforms for key exercises. Although much of this concern has now been addressed, some crucial components remain zero stocked nationally, meaning some tanks cannot technically be repaired.[23] Coupled with the challenges of previous years' shortages this has left many Leo 2 FoV platforms effectively non-repairable only two to three years into their lifespans in the CA.

13. *Royal Canadian Electrical and Mechanical Engineering (RCEME) Personnel Shortages*. The RCEME Corps is currently unable to generate the required number of technicians to meet demands to support the Leo 2 FoV. Output from the RCEME School is consistent but far below the required numbers, especially with regards to Weapons Technicians and Electronic-Optical

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[17] Ritchie, *Leopard 2 Family of Vehicles (FoV) 1 Canadian Mechanized Brigade Group Outstanding Integration Concerns 2018-2019*. p 1-2. Attachments to this letter include letters and briefing notes from 2011 onwards. This includes work by COs, Brigade Commanders, and Divisional Commanders. The challenges facing the Leo 2 FoV has been identified and articulated to the centre for almost a decade now. This is especially true with regards to maintenance and parts concerns.

[18] Dossev, "Leo 2 FoV CAFDWG".

[19] Ibid.

[20] Fontaine, "LEOBEN - Steering Committee: Canadian Update". The permissiveness of the inspection schedule remains a point of contention within the CA. At this time the KMW schedule remains extant, although it is considered a significant burden. Exacerbating this challenge is the non-doctrinal allocation of platforms across the country and the excessive cost and difficulty associated with deploying Leo 2 within Canada. This has led to a consistent usage of tanks from primarily 1 CMBG, degrading those vehicles by limiting their windows for PM/CM and driving a mentality of "outstanding usable" vice "serviceable".

[21] Ibid.

[22] LCol Paul Peyton, *Leopard 2 Parts Procurement and Distribution Proposal*. Lord Strathcona's Horse Royal Canadians: file 10000-1 (Maint O), 15 Jan 14. p 4.

[23] Capt Jared Mellow, *Briefing Note for CO LdSH(RC) for Visit of CA G4*. Lord Strathcona's Horse (Royal Canadians): no file number, 4 Feb 18. p 1-2.

Technicians.[24] Current projections show deficiencies of approximately 60 corporal equivalent technicians across all trades.[25]

14. The RCEME School has actively engaged with key stakeholders to solve this issue and has demonstrated admirable flexibility in seeking ways to outsource or program on-the-job training to address this delta. However, their predictions still point to at least ten years to meet expected needs, assuming only minimal attrition.[26] At this time, with the Leo 2 FoV unable to achieve a serviceability level higher than 30% such a delay is unfortunately unacceptable.

15. As the primary FG division for the Leo 2 FoV, 3rd Canadian Division (3 Can Div) has advocated for innovative approaches to addressing the RCEME shortage. These include the expansion of field service representatives from the original equipment manufacturer (OEM), the hiring of civilian public servants within 1 CMBG, and the creation of a rotating maintenance assistance visit to prioritize Leo 2 FoV work within units[27].

16. These efforts by the RCEME School, 3 Can Div, and 1 CMBG all represent tactical level initiatives to address a strategic level breakdown in support for the Leo 2 FoV. Although admirable, none of these plans are likely to force a large enough change in the status quo of technicians to resolve the issue.

17. *Institutional Infrastructure Inadequacies*. Canada's geography poses unique challenges to supporting the fielding of the Leo 2 FoV. There exist only two usable training areas for tanks in Canada: Wainwright and Gagetown.[28] Neither Gagetown nor Wainwright have adequate infrastructure or technical support to provide essential maintenance to the Leo 2 fleet in large quantities.

18. The currently proposed location for 3rd line and repair and overhaul (R&O) cycle work is located in Montreal. This imposes significant costs in both time and money on the movement of vehicles for required maintenance work.[29] At this time 202 Workshop in Montreal is not postured to complete 3rd line or R&O work, in effect leaving the future of required R&O and potential life extension (LE) in question.

19. *Regional Infrastructure Shortfalls*. Beyond the challenges of fleet management at the National level there are no adequate facilities located within unit home stations anywhere in Canada to properly house and maintain even a single squadron of Leo 2 tanks.[30] Although facilities for storage exist, in many cases they have been retrofitted into de facto work bays because no facilities have been designated for tank fleets. Thus, vehicles are often stored outside

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[24] Ritchie, *Leopard 2 Family of Vehicles (FoV) 1 Canadian Mechanized Brigade Group Outstanding Integration Concerns 2018-2019*. p 2.

[25] Dossev, "Leo 2 FoV CAFDWG".

[26] Maj Kayda Mercurio and Capt Santiago Duque, "RCEME School Technician FG Challenges". Presentation. 1 Service Battalion, 2018.

[27] BGen Trevor Cadieu, *Leopard 2 Family of Vehicles 3rd Canadian Division Observations and Ongoing Fleet Sustainability Issues.* 3rd Canadian Division Headquarters: file 12350-1 (G4), 22 Nov 17. p 2.

[28] LCol J.N.M. Parent, *Briefing Note for COS Army Ops - Leo 2A4/A4M/A6M Current Employment*. Canadian Army Headquarters: no file number, 23 Mar 14.

[29] Lubiniecki, "FW: Leopard 2 FoV SITREP – 2 May 18."

[30] Parent, LCol J.N.M. *Briefing Note for COS Army Ops - Leo 2 Family of Vehicles (FoV) Integration*. Canadian Army Headquarters: no file number, 10 Feb 215.

while work is done in cramped storage buildings with no overhead lift and insufficient ventilation equipment.[31] This contributes to a slowdown in maintenance production and significant inefficiencies.

20. Much like efforts to improve efficiency of technician FG and other tactical level solutions, units and brigades have actively sought methods to increase the utility of available infrastructure. This includes making using of buildings originally designated for alternate equipment, the Force Mobility Enhancement Hangar in Edmonton, as well as leveraging contacts at adjacent bases to use facilities there[32]. Considerable effort has also been put into addressing infrastructure shortfalls with appropriate leadership and departments, but at this time no projects are on the books.

Approaching Obsolescence

21. The majority of the Leo 2 FoV is composed of 2A4 and 2A6M variants.[33] Both these vehicles are approaching obsolescence as the OEM does not intend to support their turrets beyond 2020/2021.[34] Although Canada's 2A4M have been modernized with the ATTICUS sight system, this accounts for only 20 vehicles and required years to achieve. As of 2021, two-thirds of the CA's Leo 2 FoV will be considered obsolete by the OEM and no longer supported technically through spare parts and technical expertise.

22. A potential solution is the rapid development of a LE program that could see a standardization of the Leo 2 FoV with all turrets modernized. However, this will be a significant endeavor which would likely take the majority of the fleet out of action for several years in order to bring them all to a set standard.

23. At this time there is no project or funding allocated for the upgrading of the 2A4/2A6M fleet, nor is there an enduring NP plan to homogenize the fleet to a single standard, greatly reducing logistical struggles. Thus the CA finds itself in a position where half the fleet for CONPLAN JUPITER is in danger of being technically unsupportable in deployed operations.

CONCLUSION

24. The CA continues to maintain the Leo 2 FoV as a capability in name only. The small size of the fleet coupled with its significant logistical and support challenges has created a hollow capacity that could not be deployed in support of GOC direction. Continuing on our current trajectory would be a disservice to the thousands of crewmen, craftsmen, and officers that are struggling daily to maintain the fleet. Without considerable reinvestment in the Leo 2 FoV to include expansion of the number of platforms, infrastructure and training, and a critical life extension program, this capability will erode completely.

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[31] Lubiniecki, "FW: Leopard 2 FoV SITREP – 2 May 18."

[32] Ritchie, *Leopard 2 Family of Vehicles (FoV) 1 Canadian Mechanized Brigade Group Outstanding Integration Concerns 2018-2019*. p 4.

[33] Dossev, "Leo 2 FoV CAFDWG". The Leo 2A4 still employs a hydraulic turret drive and does not possess a crew commander's independent hunter-killer sight. Both it and the 2A6M still use previous generation thermal sights and systems. There is no intent by the OEM to provide technical support for them beyond 2021

[34] Directorate of Land Force Development, "Annex C: PRICE+G Matrix" in *CAFDWG Leopard 2 Fleet of Vehicles (FOV).* Ottawa, ON : Canadian Army Headquarters, 2017.

RECOMMENDATION

25. It is recommended that the CA reevaluate the role of heavy armour within the context of expeditionary operations for the CAF. Understanding the complexity and cost of maintaining a fleet of tanks that can meet the remits of the GOC a new approach must be adopted. The current state of the fleet is unsustainable and a decade of effort has yielded no clear way forward. Although a significant recapitalization of the fleet is possible, lack of technicians and infrastructure will still persist. The choice is twofold: either large scale reinvestment in the current Leo 2 FoV or the divestment of heavy armour and a move towards a medium weight "cavalry" style force. Both recommendations will require financial and political expenditures but the long term health of the CA is incumbent on a clear plan. The challenges associated with expanding the Leo 2 FoV, including an increase in technicians and the development of large amounts of infrastructure, make this option less than palatable. Based on the need to rationalize budgets, reduce NP costs and enhance efficiencies it is recommended that the "orphan" fleet of the Leo 2 be retired and a medium weight force based on the established LAV be put in its place.

26. Considerable discussion has already occurred at senior levels within the CA, in 2005 for example, on how to transition the Army to wheeled, medium weight fleet. Although short term expense would likely be considerable, the procurement of a fleet of Mobile Gun System, Anti-Tank Guided Missile, and anti-tank missile enabled 25mm turret variants of the LAV could provide the Armoured Corps with a viable role. Existing doctrine for the employment of cavalry forces can be studied from United States Army publications. Additionally, the lack of tanks has already pushed two of three Armoured regiments to begin to study possible light armour or cavalry roles. The increased ease of deployment, commonality of systems, and pre-existing facilities and trained personnel make this a desirable course of action.

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