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## ARMY STRATEGY FOR THE MODERNIZATION OF THE ARMY HEAVY LOGISTIC VEHICLE FLEET

Maj S.M. McDowell

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Maj S.M. McDowell

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# **ARMY STRATEGY FOR THE MODERNIZATION OF THE ARMY HEAVY LOGISTIC VEHICLE FLEET**

*Service paper for the Chief of Staff*

## **AIM**

1. The Heavy Logistic Vehicle Wheeled (HLVW) fleet of vehicles, brought into service in 1992, are suffering from rust out and an obsolete model of operations that necessitate their replacement. This paper will identify the key factors to consider and recommend an approach to the modernization of the heavy vehicle fleet when procuring the next generation of vehicle.

## **INTRODUCTION**

2. The HLVW fleet was brought into service immediately following the end of the Cold War, meaning the preceding procurement process was informed by a force of 120,000 soldiers expected to fight in the very contiguous and known environment of Europe against an equally known adversary. The current and future fiscal and operational environments mean a rigorous examination of the requirement needs to be undertaken on par with the effort put into the acquisition of fighting vehicles.

3. The characteristics that should be given primacy will be detailed through the logical flow from Government of Canada (GoC) policy found in the Canada First Defence Strategy (CFDS),<sup>1</sup> through the most likely operational context provided in Land Operations 2021: Adaptive Dispersed Operations (ADO). By grounding the analysis in the roles and missions that the GoC has assigned to the Canadian Armed Forces (CAF) and in consideration of the future security environment, the criteria presented to industry as high level mandatory requirements will be

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<sup>1</sup>Canada, Department of National Defence, *Canada First Defence Strategy* (Ottawa: Department of National Defence, 2008), 7-10.

defensible to a third party independent review. This will reduce the criticism and resistance which has plagued other procurement processes such as the Next Generation Strike Fighter (NGSF), resulting in prolonged delays which are unacceptable given the operational state of the current fleet. More importantly, it will ensure the option chosen addresses the needs of the Canadian Army (CA) for the duration of the fleet's service life.

4. CFDS outlines three roles and six missions for the CAF but for the purposes of the CA, and specifically when considering its lift capability, these can be distilled down considerably without losing any fidelity on the true requirement.<sup>2</sup> The roles confirm that the CA must defend Canada's interests at home and abroad thus requiring a domestic and expeditionary capability. The six missions differ only in that they articulate an expectation on the size and scope for the roles assigned.

## **DISCUSSION**

5. There are three critical capability shortfalls that must be addressed when procuring the next fleet of heavy logistic vehicles: force protection, lift and sustainability.

### **Force Protection**

6. First and foremost, the most important factor when selecting the criteria for addressing the capability gap is the *Shield* function as it applies to force protection and ensuring the freedom of action of the force against both a conventional and asymmetric threat, domestically and internationally.<sup>3</sup> The HLVW is a soft skinned vehicle in the purest sense with no protection for the operator and no ability to apply add-on armour without extensive modifications. Fire

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<sup>2</sup>This does not imply that any one capability can address the challenges in every environment where specialist equipment is required. In this instance, there is no expectation that a heavy truck would be appropriate in the Canadian North or mountainous regions to name two thus other capabilities will need to be procured for these specialist regions.

<sup>3</sup>Canada, Department of National Defence, *Canadian Forces Joint Publication: CFJP 3.0 Operation* (Ottawa: Department of National Defence, 2009), 1-6.

protection is limited to a pintle mount on the roof of the cab where an operator can affix a forward firing, small or medium machine gun. The future security environment (FSE) will be characterized by an asymmetric threat due in large part, as General Sir Michael Jackson explained, because of the overwhelming superiority in conventional warfare enjoyed by participating in a coalition with the Americans.<sup>4</sup> This combined with the absence of a clearly defined Forward Line of Own Troops (FLOT), as characterized by the Cold War paradigm, means support troops will be subject to greater threat to ambush and asymmetric threats like roadside explosives, thus increasing the requirement for tools to enhance their survivability.

Failure to respond to this known and obvious threat has certain clear implications:

- a. Potential loss of life in any conflict short of a war for national survival will erode the national will for the mission; and
  - b. The loss of a single truck represents a much larger tactical impact due to the increase in load capacity. The backbone of the Cold War support fleet was the Medium Logistic Vehicle Wheeled (MLVW), a 2 ½ tonnes truck that mitigated the loss of a single vehicle due to its limited capacity. The heavy truck envisaged here will be approximately 16 tonnes, carrying a larger percentage of the combat supplies thus making the loss of one far greater than in the past.
7. Therefore, the evolution to an asymmetric threat, combined with the support to dispersed operations as described in Land Operations 2021, means the fewer support assets are more mission critical and in need of greater force protection. This situation will persist until the

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<sup>4</sup>Mike Jackson, "The Future of Land Warfare", *The RUSI Journal* 148, no. 4 (2003), 57.

revolution of tactical support towards air assets is realized.<sup>5</sup> In short, fighting in an ADO environment implies ADO enabled support forces.

### **Lift**

8. The current fleet of vehicles, in addition to suffering from rust-out, are under classed to fulfill their role of supporting the CA. Prior to fielding the HLVW, the CA operated a suite of vehicles primarily comprising the M113 APC, the Leopard C1 main battle tank and the M109 self-propelled howitzer, each of which was procured with their own support variants on the same or comparable hulls. Shortly after the HLVW came into service, the LAV III infantry fighting vehicle (IFV) became the mainstay of the CA but the procurement did not include a support vehicle and the HLVW could not handle the weight resulting in a lengthy modification process to provide some level of support. Several initiatives to convert older infantry vehicles into support variants were started although all ended up being cancelled at various levels of maturity. The recent purchase of the Leopard 2 for the mission in Afghanistan continued the trend of buying fighting vehicles without a support variant and although the addition of a heavy truck will not solve this particular gap, it does indicate that relying on the fighting vehicle procurement processes to properly address the support requirements is not realistic.

9. At the same time, engineering lift requirements grew to outclass the MLVW and HLVW necessitating the addition of the Heavy Engineering Support Vehicle (HESV), palletized loading system vehicles were added to speed up logistic operations, and tank transporters were leased for operations from the Dutch Army. The resulting patchwork fleet of heavy support vehicles is unnecessarily cumbersome on the supply and maintenance systems and reduces the flexibility of a sustainment system that needs to be as flexible and as adaptive as the fighting echelon. One

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<sup>5</sup>Canada, Department of National Defence, *Land Operations 2021: The Force Employment Concept for Canada's Army of Tomorrow* (Kingston: Directorate of Land Concepts and Design, 2009), 32.

heavy platform with variants as required would immediately solve the flexibility gap and eliminate the duplication of effort required to maintain multiple fleets that are essentially filling the same role.

10. The current composition of the heavy logistic fleet is untenable in an army constrained by resources and professing a doctrine of flexibility and agility in order to fight in a dispersed environment. Echelon footprints are unnecessarily large to accommodate the array of vehicles required to support operations and the support chain is bogged down supporting itself instead of task force operations. Eliminating the myriad of orphan fleets with one capable, sustainable platform with integral self-protection will immediately contribute to the operational effect of the CAF.

11. The second aspect of lift that needs to be accepted and incorporated into the design of the future capability is the international standard of intermodal containers, otherwise referred to as sea containers or ISO containers. Simply put, this standardized form of transporting materiel allows cargo to seamlessly transition from sea, air and land based transportation systems including rail and truck, without having to be re-packaged.<sup>6</sup> Neither Canada, nor any large force projection military is able to economically maintain the entire gambit of sea, air and land lift required to move a task force to a theatre of operations. Extensive use of commercial sea lift and rail assets are common place amongst industrial nation's militaries and there is no reason to believe this will change. Therefore, integration with the commercial system is necessary to facilitate and enhance the deployability and sustainability of forces from the strategic, through the operational to the tactical levels.

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<sup>6</sup>Canada, Department of National Defence, *Synopsis Sheet (Identification) Logistic Vehicle Modernization* (Ottawa: Director of Land Requirements, 2010), 2.

12. The trend of optimizing the CAF to make use of intermodal containers can already be seen in the flexible nature of the mission packages the Maritime Coastal Defence Vessel (MCDV) can bring on board and the Joint Support Ship (JSS) will have the same capability. Task tailored mission packages are pre-built for the Disaster Assistance Relief Team (DART) and the operational resupply relies on sea and air lines of communication that make use of intermodal containers. The land system must match this capability as the final leg in the chain with trucks capable of moving materiel from operational support hubs to the tactical troops without lengthy bulk breaking and repackaging of supplies. A heavy truck in the 16-18 tonnes range, with the appropriate material handling equipment, is absolutely necessary to prevent a bottleneck at the interface, thus maintaining the efficiency and effectiveness of strategic and tactical mobility of the entire system.

### **Sustainability**

13. Sustainability needs to factor heavily in the criteria that will determine the solution to this capability gap. It seldom receives appropriate consideration when procuring new equipment despite the impact being repeatedly felt without the lesson being learned. The Light Support Vehicle Wheeled (LSVW) maintainability is one example of incredibly poor engineering design and the Expedient Route-Opening Capability (EROC) vehicles that were rushed to Afghanistan to meet an immediate operational requirement represent a failure to consider the support requirements of the fleet.<sup>7</sup> In both instances vehicles remained unavailable to the troops that needed them due to prolonged maintenance periods. Although never having been acceptable, this will become increasingly dire as leaner but more responsive support organizations are advocated

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<sup>7</sup>The Light Support Vehicle Wheeled (LSVW) produced by Western Star of Canada was based on an Italian design that required engine removal to replace the starter motor which was prone to catching fire. The Buffalo, Cougar and Husky vehicles made up the operational package for the Expedient Route-Opening Capability (EROC) teams in Afghanistan that had an initial sparing package for preventative maintenance but lacked spare engines and major assemblies (EMAS) including the articulated arm that was used to dig up IEDs.

throughout the military chain of command, including the former Prime Minister's demand for "more teeth and less tail".<sup>8</sup> Improvements in fleet sustainability will directly contribute to the operational readiness of the CAF and particularly when considering logistic vehicles, support to both international operations and domestic including aid to civil power and disaster relief efforts. As reported in the Departmental Performance Report 2014-2015, serviceability rates within the CA were 60% and they were actively controlling the usage of its fleets to ensure sufficient numbers are available to meet GoC priorities.<sup>9</sup> This is an unacceptably low number that requires the maintenance effort of the CA and the procurement organizations in support to work smarter.

14. However, there are some recent indications of projects that have considered readily available solutions from proven manufacturers that will provide information for future procurement officers. The Light Utility Vehicle Wheeled (LUVW) project fielded a dual fleet solution of militarized Chevrolet Silverado and Mercedes-Benz G-Wagon for the Iltis replacement and the rapidly deployed Armoured Heavy Support Vehicle (AHSVS) project selected one of the most commonly available platforms in the Actros, also from Mercedes. Each of these vehicles, filling very different roles, are produced by companies with world-wide parts and servicing networks which allows integrated support managers (ILSMs) the freedom to explore innovative support arrangements that will reduce the military overhead by reduced spares holdings, fewer facilities and potentially fewer military technicians.

15. Taken to its logical conclusion, a properly considered support contract could give the original equipment manufacturer (OEM) access to the minimum/maximum levels of a

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<sup>8</sup>Lee Berthiaume, "Troop reductions could be on the table, Canada's defence chief says," Ottawa Citizen, 19 November 2013. <http://o.canada.com/news/national/troop-reductions-could-be-on-the-table-canadas-defence-chief-says>

<sup>9</sup>Canada, Department of National Defence, *Department of National Defence and the Canadian Armed Forces 2014-15 Departmental Performance Report* (Ottawa: Department of National Defence, 2015), 116.

domestically or internationally deployed task force and institute a push system for spare parts.<sup>10</sup> The Joint Task Force Support Component (JTFC) or operational support hubs would employ company mechanics and parts managers to carry out third line (theatre level) support functions and surge to second line elements from the Airport of Debarkation (APOD) or Sea Port of Debarkation (SPOD) as an integral part of the operational support plan. This would reduce the reliance on military technicians, reduce the response times and enable a more responsive fighting echelon. However, there will be a reluctance to pursue contracts that are seen as expensive solutions but when factored against the cost of a soldier who draws a salary, receives health care and a pension, there will be instances when the contracted solution is not only viable but the preferred course of action as being cost effective and freeing up a soldier for other duties.

## CONCLUSION

16. The world and the nature of conflict have changed significantly enough that the modernization of the logistic vehicle fleet cannot be approached simply as a replacement of the existing capability. Threats have evolved into a more complex and broader risk spectrum that requires a comparable degree of intellectual rigour as applied to the acquisition of fighting platforms with the added complexity of integration into global transit systems. More so than in the past, *Shield* must be considered on equal weight with functionality amongst the high level mandatory requirements when considering the options for the modernization of this capability. Fleet sustainability, while not ranking at the same level of importance, should factor strongly when screening potential suppliers to maximize the resources available in support of operations and training.

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<sup>10</sup>Push replenishment systems are distinguished from Pull systems by the user not being required to demand commodities. Pre-identified quantities or triggers are used for the replenishment system to deliver the materiel as required.

17. *Shield* design considerations are already widespread in the fighting vehicles with both the Mine-Resistant Ambush Protected (MRAP) and Tactical Armoured Patrol Vehicle (TAPV) including V-shaped hulls and blast dissipation in their design. Subjecting the support vehicles to the same threats without comparable design considerations is not logical.

## **RECOMMENDATIONS**

18. The heavy lift capability gap exacerbated with the retirement of the HLVW needs to be addressed by:

- a. The replacement needs to have an inherent ability for self-defence with integral protection and armaments to protect the crews and stores carried. In order to respect the fiscal reality of large procurement processes and in order to maximize capability acquired the process should include the concept of “fitted for, not with”. The selected vehicles will have the ability to have armour and weapons added as the situation dictates, specifically for expeditionary operations. It is absolutely critical that the procurement of these capabilities is integral to the procurement process in numbers sufficient to deploy task forces fully equipped into the worst case scenarios.
- b. The selected vehicles must be compatible with intermodal containers to allow seamless transfer of materiel from operational organizations where loads can be task tailored to the mission requirements in secure environments, onto tactical platforms.
- c. Consideration of sustainability both in terms of vehicle design and support concept will enhance support to operations by keeping the CAF more agile and able to respond to GoC priorities.

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