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## Audit of Wheeled Light Armoured Vehicle Life Cycle Support Contracts

June 2006

7053-30-12 (CRS)



Canada 

## SYNOPSIS

*This report documents an audit of the contract management of two Wheeled Light Armoured Vehicle (WLAV) life cycle support contracts: a six-year Interim Contract Support (ICS) obligation of \$68 million that expired in March 2004, and a three-year follow-on \$198 million Optimized Weapon System Support (OWSS) contract. This is the first of a series of high-risk contract audits that were identified as a result of the contract risk analysis directed by the Deputy Minister in August 2003.*

*The information for decision-making, control and risk management frameworks for the WLAV life cycle support contracts require significant improvements. Accordingly, the results of the audit precludes us from providing assurance that contract payments are made in accordance with current policies, appropriate monitoring and reporting strategies are in place, and risks are understood and appropriately managed. The ICS contract lacked suitable management controls to monitor expenditures and ensure value for money. On two occasions, the ICS contract overspent the contract ceiling due to ..... growth in fixed management fees, ..... and insufficient oversight of sub-contract labour rates.....*

*The OWSS contract is one of the Department's first long-term, "one stop shopping," bundled contracts for repair and overhaul of a major combat system. A 30-year, ..... contracting strategy, the WLAV OWSS was designated as a major Crown project by Treasury Board. Although some best practices were observed in the management control framework for the OWSS contract, inherent risks in this new contracting strategy have not yet been mitigated. There are opportunities for significant improvement in OWSS value for money once it reaches steady state—\$80 million over the next 10 years of the contract. .... Critical information for decision-making was not available for the approval of the OWSS contracting strategy, and information enablers for day-to-day repair and procurement decisions were not reliable. To address the value-for-money issues Assistant Deputy Minister (Materiel) (ADM(Mat)) will take measures to optimize in-house resources, benchmark materiel prices, and ..... Corrupted or missing inventory management information is now being adjusted, and improved query and forecasting tools will be implemented by 2007 to assist procurement and repair decision-making.*

*For both the ICS and OWSS contracts, the payment verification process did not comply with the Financial Administration Act (FAA) due to the lack of visibility of prime contract repair line mark-ups/profits and sub-contract labour/materiel costs, rates, terms and conditions. The division of FAA Section 34 payment certification duties between the Department of National Defence (DND) and Public Works Government Services Canada (PWGSC) detracts from the accountability of public disbursements. Given that DND is ultimately accountable for the sign-off of FAA Sections 34 and 33, it should also be the lead department on the verification of progress claims. ADM(Mat) and Assistant Deputy Minister (Finance and Corporate Services) are addressing this concern with PWGSC—in particular the price verification of sub-contract work prior to payment.*

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## RESULTS IN BRIEF

### Background

In 2003, Chief Review Services (CRS) developed a methodology to identify contracts exhibiting higher-risk attributes. Application of this analysis identified Interim Contract Support (ICS) for the Wheeled Light Armoured Vehicle (WLAV) as warranting audit attention. As this contract expired in March 2004, the follow-on WLAV Optimized Weapon System Support (OWSS) contract was also included as part of this audit.

**WLAV ICS.** The ICS was established in May 1998 to provide life cycle support to the 203 Coyote WLAVs delivered in 1997. The scope of the contract was amended in December 2001 to include 651 LAVIIs, for which delivery was to occur over the period 1998 and 2007. The ICS was flagged for the following reasons:

- Growth in contract value (a two-year \$4.3-million contract evolved into a six-year \$67.9-million contract);
- A sole-sourced contract with the WLAV manufacturer;
- Significant sub-contracted labour and material (\$23 million of \$48 million actual expenditures);
- “Time and material cost plus” terms of payment with no performance incentives; and
- A centrally managed contract that served army customers across Canada.

**WLAV OWSS Contract.** The ICS was replaced in May 2004 by the WLAV OWSS contract, the first of several large, long-term “bundled” contracts that the Department of National Defence (DND) has arranged for major equipment repair and overhaul (R&O). Awarded to the same prime contractor as the ICS, the WLAV OWSS specifics are as follows:

- 30-year, ..... contracting strategy designated as a major Crown project;
- A sole-source, \$198-million (net GST), three-year contract with two option years (\$95 million in the first option year; \$99 million in the second option year);
- By 2007, life cycle support of 1,503 WLAV vehicle fleets (subsequent scope reduction due to retirement of 450 WLAVs);
- Vendor steady state definition in year three of contract could lead to performance incentives; and

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- Average annual cash flow of \$78 million (73 percent sub-contracted labour and material) over first five years with breakdown as follows:
  - \$46.5 million—spare parts, materiel sub-contracts,
  - \$10.6 million—R&O line, sub-contracted labour and material,
  - \$5.4 million—technical engineer maintenance support (TEMS) tasks, and
  - \$15.5 million—contracted fleet management fixed fees (61 people).

## Overall Assessment

Significant improvements are required for controls, risk management measures and information for decision-making for the WLAV life cycle support contracts. In particular, the payment verification process did not comply with the *Financial Administration Act* (FAA) because of the lack of visibility of contract repair-line mark-ups/profits and sub-contract costs, rates, terms and conditions. For a sample of \$30 million payments, nearly \$15 million (i.e., 50 percent) were made with insufficient supporting documentation on file. .... There are significant opportunities to achieve savings and better value for money. The results of the audit preclude us from providing assurance that:

- Contract payments are made in compliance with applicable policies/regulation;
- Appropriate monitoring and reporting strategies are in place; and
- Risks are understood and appropriately managed.

**ICS (Contract).** There were insufficient measures to monitor expenditures and value for money. On two occasions in the first three years, ICS expenditures exceeded the contract ceiling. This was mainly due to:

- .....
- Growth in contracted fleet management fees; and
- Insufficient oversight of sub-contract labour rates .....

**OWSS Contract.** Inherent risks in the new contracting strategy have yet to be appropriately mitigated. ....

..... There are opportunities for significant improvements in value for money related to OWSS—at least \$80 million over the next 10 years of the contract. Further, critical information for decision-making was not available at the time of approval of the OWSS contracting strategy, and information enablers for day-to-day repair and procurement decisions were either not reliable or available.

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Notwithstanding the above, several unique best practices in the management of the OWSS contract were noted:

- Tracking of vendor performance metrics for spares and R&O delivery times;
- Provision of government electronic tendering system to vendor for competitive prices from suppliers; and
- Progress review meetings with the vendor as part of an allied WLAV User Nation Group.

## Main Observations

### Potential OWSS Economies (\$8–\$13 million annually).

Analysis of the ICS and OWSS contracts, task files and expenditures found excessive fleet management costs,.....  
 ..... and limited use of in-house resources. For example, fixed-fee contract management charges have accounted for 24 to 56 percent of the total annual contract expenditures since fiscal year (FY) 2001/02—.....  
 ..... By rationalizing the number/mix of fixed-fee contract manager positions, benchmarking prices for spare parts as well as fixed-price repair costs, and by optimizing in-house resources such as 202 Workshop, the Department could realize economies of between \$8 million and \$13.5 million per year.

Value for Money Improvements	Savings/Yr Minimum	Savings/Yr Maximum
No. of contracted fleet managers	\$1.7M	\$1.7M
Mix of contracted fleet managers	\$0.9M	\$1.0M
.....	.....	.....
.....	.....	.....
Optimized use of 202 Workshop	.....	.....
<b>Total Potential Economies</b>	.....	.....

**Table 1. Potential OWSS Savings.** *Most economies can be achieved with optimization of labour resources and spares price benchmarking.*

**OWSS Approved Submissions—Proprietary Rights for Spare Parts.** The OWSS contracting strategy was approved based on incomplete and unreliable information, in particular the decision to purchase all spares through the prime contractor. With the  
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**Certification of Payments.** The division of duties between DND and Public Works and Government Services Canada (PWGSC) affects the quality of certifications pursuant to FAA Section 34 by seriously diminishing accountability for public disbursements. Of concern is DND's reliance on PWGSC price verification for progress claims that involve sub-contracts when there is no visibility of the sub-contracted work performed, materiel, rates, terms and conditions. In a \$30-million sample of progress claims, payments totalling \$10 million for sub-contracted work with insufficient backup were noted. ....

Although contract expenditures are funded from a DND budget and are certified under FAA Section 34 by DND, the current DND/PWGSC responsibility matrix identifies PWGSC as the lead in the certification process. However, DND should be the lead department and should be provided more visibility of sub-contract costs prior to payment. Recent policy from the Assistant Deputy Minister (Finance and Corporate Services) (ADM(Fin CS)) has directed that, for payments greater than \$250,000, all sub-contract invoices must be reviewed prior to payment.

**Information for Contract Management.** Complete and reliable information has not been available for OWSS contract repair and procurement decisions to account for inventory and to support the incorporation of effective performance incentives.

- **Repair Decisions.** At least \$2.3 million in annual repair costs could be deferred for a three-year period because there is already sufficient stock on hand for the items involved—a non-recurring saving of \$6.9 million. ....
- **Procurement Decisions.** Information available for inventories was incomplete insofar as supporting timely procurement decisions. .... A report such as that generated by CRS (Annex C) would enhance procurement decisions. Such a report, .... is essential for managing fleet inventory levels.
- **Visibility of Assets.** .... A National Defence Quality Assurance Representative (NDQAR) should initiate stocktaking of materiel accounts every two years. ....

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- Performance Incentives.** The performance incentives necessary to effectively manage the OWSS contract have not been fully defined. The OWSS contracting strategy provides for a steady state phase that would introduce performance incentives to improve the value for money to DND for OWSS deliverables. The prime contractor had to work with DND to develop performance metrics once steady state was achieved. .... Furthermore, these metrics measure performance at a micro level. These micro-level metrics can be rolled up to annual performance measurements, but a more strategic approach could reduce the level of effort required to manage incentives. Rather than developing metrics to micro-manage the turn-around and delivery times for individual R&O items and spares, other information could be consolidated towards developing strategic incentives. For example, the ultimate measure of successful inventory management is whether there are stock-outs or surplus materiel—a metric that should be available in the Canadian Forces Supply System (CFSS). In addition, with respect to third-line



maintenance, most allies operating variants of the same vehicle are outsourcing R&O to the prime contractor. ....  
.....  
.....  
.....

**Forecasting Contract Expenditures.** Forecasted expenditures for both the ICS and the OWSS contracts have not been accurate. The ICS contract overspent its ceiling twice and, at contract expiry, expended \$20 million less than the contract ceiling. The OWSS contract cash flow in the first year was forecasted to be \$55 million, but only \$18 million was spent because the ramp-up of the new contract was slower than expected. Inaccurate financial coding has contributed to forecasting inaccuracy. Of the \$30 million audited expenditures, \$7.2 million, or 24 percent, was charged to the wrong financial code.

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**Risk Management Implementation.** .....  
..... The identification of risks is hindered by the absence of a R&O risk threshold matrix that categorizes high, medium and low tolerance levels—a common tool used in other government departments and the private sector. Key enablers to identify and assess the impact of risk are risk indicators for cost, schedule and performance. As the Department spends \$1.1 billion a year on R&O, the establishment of risk threshold levels and indicators could improve the management of several high-value R&O contracts. Strategic-level risk indicators, such as inventory levels, equipment availability and schedule slippage, are critical to establishing effective performance incentives for sole-sourced R&O contracts.

The Department also lacks automated risk quantification tools that are available in the private sector. ....  
..... Furthermore, those risks that were identified by the Director Armoured Vehicle Program Management (DAVPM), the vendor and the contracting authority were not briefed to senior managers at vendor quarterly/annual progress review meetings or to Senior Review Boards (SRB).



## Management Action Plan

Ser	CRS Recommendation	OPI	Management Response/Action
1.	<b>OWSS fleet managers/in-house resources.</b> PWGSC be requested to amend the OWSS contract to optimize the number/mix of contracted versus in-house fleet managers and 202 Workshop resources.	ADM(Mat)/ DGLEPM/ DAVPM	The DAVPM initiative to address the mix of contracted versus departmental personnel will continue. Contractor downsizing has taken place and an EG 06 competition currently under way will result in hires to replace additional contractors by the summer of 2006.
2.	<b>Benchmarks, fixed costs, incentives.</b> Implement benchmarks for spares prices and prime/sub-contract rates with similar DND contracts. Introduce fixed repair costs and performance incentives.	ADM(Mat)/ DGLEPM/ DAVPM	OWSS has implemented a process to use historical information and other contracts to benchmark prices that are quoted by the contractor. In addition, they are working with the contractor to implement a buying process that flags anomalies and injects management action. Ongoing work will provide the contractor with incentives by sharing spares cost savings when the contractor is able to demonstrate them.
3.	..... ..... ..... ..... .....	ADM(Mat)/ DGLEPM/ DAVPM	..... ..... .....
4.	<b>FAA Section 34 certification.</b> DND assume the lead role in FAA Section 34 verification and certification. Obtain more visibility of sub-contract terms, rates and costs from PWGSC for high-value payments. Request PWGSC to confirm .....	ADM(Mat) DGLEPM/ DAVPM  COS(Mat)/ DMG Compt	Implemented early in the audit process, the prime contractor is now providing DND with copies of the terms and conditions of all sub-contracts. .... ..... Follow-up of FAA Section 34 execution will be conducted. A contract amendment regarding FAA Section 34 requirements will be considered. Required supporting documentation is being reviewed with ADM(Fin CS)/DAPPP. DMG Compt will facilitate a meeting with PWGSC, DGLEPM, ADM(Fin CS)/DAPPP regarding the lead role of DND in FAA Section 34 certification.

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Ser	CRS Recommendation	OPI	Management Response/Action
5.	<b>Repair component mark-ups/profits.</b> PWGSC be requested to amend the OWSS contract to include R&O line invoice mark-ups/profits.	ADM(Mat)/ DGLEPM/ DAVPM	A contract has been amended so that the R&O mark-ups and profits are now visible to OWSS management.
6.	<b>Inventory management information/vendor metrics.</b> Adjust maximum repair cost, repair priority code for R&O items/re-order levels and quantities for all fleet inventories. Continue to validate vendor-provided performance metrics with information from the CFSS and develop strategic performance incentives.	ADM(Mat)/ DGLEPM/ DAVPM  DGMSSC/ DSCO DMPP	Early in the audit process, CRS observations were acted on to adjust CFSS coding. Progress is hampered by higher operational priorities and the time to staff EG 06 positions. Work to establish performance incentives is ongoing. Completion of the Distribution Resource Program by December 2007 will improve fleet inventory management.
7.	<b>Inventory reports.</b> Develop a CFSS fleet inventory level report. Revise the corrupted quality assurance inspection codes. Monitor the biennial stocktaking by NDQARs.	ADM(Mat)/ DGMSSC DSCO DMPP	CFSS fleet inventory level reporting tools will be improved by fall of 2006. The Director Quality Assurance will correct quality assurance codes in the CFSS and provide oversight of NDQAR stocktaking by October 2006. Stocktaking of DND inventory at the contractor site is ongoing. Stocktaking of DND-owned inventory at the contractor and sub-contractor facilities is now a contract deliverable.
8.	<b>Financial management.</b> Improve the OWSS contract financial management through revision of the OWSS contract cash flow to reflect AVGP, Bison, spare parts estimates, and reconciliation of FMAS commitments with vendor reports.	ADM(Mat)/ DGLEPM/ DAVPM	The contract will be amended annually to reflect actual expenditures. Projected cash flow will be achieved through the four-year LAVIII work program, battle damage, and additional sub-contracts.
9.	<b>Identification/monitoring of risk.</b> Adopt a standard risk quantification formula along with a risk threshold matrix for R&O contracts. Ensure that DGLEPM/DAVPM includes current risk assessments in vendor quarterly/annual progress review meetings, SRBs and the OWSS Project Profile Risk Assessment.	ADM(Mat)/ DGLEPM	PM WLAV OWSS will adopt a standard risk quantification formula that reflects the ADM(Mat) Working Group on an In-Service Support Contract Framework, chaired by DGAEP/DAEBM. PM WLAV OWSS will also develop a risk plan, brief risks at the SRB, and ensure that vendor management reviews include risks.



## INTRODUCTION

### Objectives

This audit was undertaken to provide assurance that information for decision-making and management frameworks, including risk mitigation strategies, are in place to effectively manage the WLAV life cycle support contracts. The objectives of the audit are to determine if contract payments are made in accordance with current policies; appropriate monitoring and reporting strategies are in place; and risks are understood and appropriately managed.

### Scope

- Expenditures totalling \$66 million on the WLAV ICS and OWSS life cycle support contracts from May 1998 to May 2005.
- Audit of the prime contractor/sub-contractors was out of scope. During the conduct phase the audit team was advised that Consulting and Audit Canada (CAC) was performing a profit audit on the ICS and OWSS contracts.

### Methodology

- Development of detailed audit criteria, shown at Annex A, to perform audit tests on a directed sample of 130 payments totalling \$30 million (46 percent coverage).
  - Current OWSS contract—coverage \$11 million of \$18 million actual expenditures in FY 2005 (60 percent coverage).
  - Expired ICS contract—coverage \$19 million of \$48 million actual contract expenditures (41 percent coverage).
- A subsequent directed sample of 44 additional ICS progress claims (\$8.8 million in value).
- Analysis of relevant data within Financial Management Accounting System (FMAS), CFSS, Defence Integrated Human Resource System, and Defence Total Asset Visibility systems.
- Site visits to 202 Workshop, Canadian Forces Base Petawawa, United States Marine Corps Albany Maintenance Center, and NDQAR London.
- DAVPM/PWGSC contracting authority interviews and document review.



## FINDINGS AND RECOMMENDATIONS

### Potential OWSS Economies

*To date, ICS and OWSS deliverables have not provided good value for money due to the extent of ..... At steady state for the OWSS, improvement in management controls and optimization of in-house resources could result in economies ranging from \$8.0 to \$13.5 million a year—at least an \$80 million improvement in value-for-money over the next ten years.*

**Fixed Contract Management Fees.** The March 2002 SRB OWSS target of ..... as a percentage of total annual expenditures has not been met. Figure 2 illustrates that since FY 2002/03, such fees have accounted for 24 to 56 percent of total annual expenditures.

- The February 2004 OWSS business case projected a ratio of 25 vehicles/fleet manager. The current vehicle/fleet manager ratio is 14:1. With the addition of 199 Bison and 110 more LAVIII, the projected ratio is 20:1.
- At the time of the audit there were 18 on-site contracted fleet managers acting as life cycle materiel managers (LCMM) or supply managers (SM) and 36 off-site fleet managers at the vendor facility, for a total 54. Each of those contractor positions cost DND approximately ..... annually.
- To achieve the 25:1 ratio,.... of the 54 contracted positions would have to be eliminated. This could result in annual savings of \$1.7 million a year.

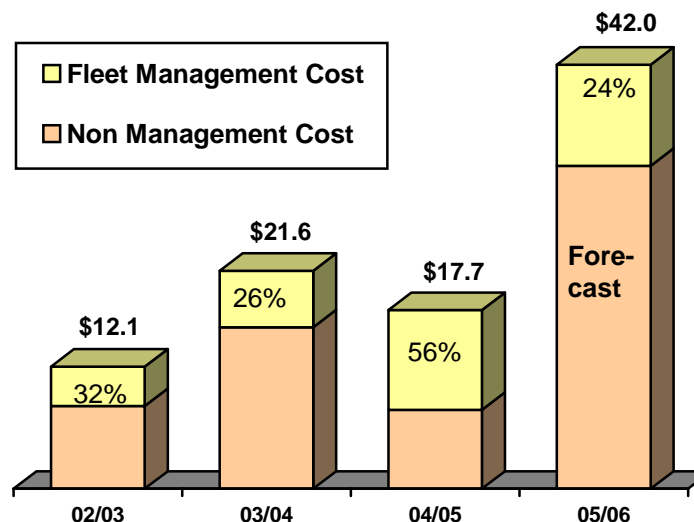


Figure 2. ICS/OWSS Expenditure Trend (\$ million). .....

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- Currently, the 18 on-site prime contractor LCMMs/SMs have been providing DAVPM all technical advice since FY 2001/02.

.....  
 .....  
 .....

**Spares Pricing.** Applying the DND Economic Historic Model (EHM)<sup>1</sup> escalation rate to recent buys of spare parts provided opportunities to better monitor the cost of spares. In the first year of the OWSS contract, \$5.9 million of spares parts was procured (610 spare part line items). As Table 2 shows, 317 of those line items were previously procured as initial provisioning.

- After factoring in the DND EHM to those 317 items, we noted that 188 were procured at a price below that of the adjusted initial provisioning price.  
 .....  
 .....
- ..... applying the DND EHM to compare with the last purchase price allows management to better monitor and assess the reasonableness of the prices charged. Based on the annual spares reprovisioning forecast of \$24 million, benchmarking with historical prices could generate as much as \$3.2 million savings annually (i.e., 12.7 percent x \$24 million).

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CRS Spare Parts Initial Provisioning Price Benchmark		
	Discount .....	% Discount ....
Matched Items .....	.....	.....
188	(\$434,633)	-10.2%
.....	.....	.....
Total Matched Items .....	Total Matched Value \$4,258,301	

**Table 2. Initial Provisioning Price Benchmark.**

.....  
 .....

### Average Repair Costs

- CRS analysis of a DAVPM database of 5,872 repair arisings totalling \$14.9 million found that average repair costs for like items .....  
 ..... (see Figure 3). All decisions to repair were made by the prime contractor.
- The DND EHM for armoured vehicle R&O over the same six years showed 7 percent escalation (see Figure 3)—.....  
 .....
- ..... For the most part, the R&O work was sub-contracted.

<sup>1</sup> The EHM is an ADM(Fin CS) publication that is updated annually to reflect the actual escalation rates for the past year for each general ledger account in the Department's finance system such as armoured vehicle spare parts.



Item	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	Esc Rate
Fire Control Equipment	.....	.....	.....	.....	.....	.....	.....

**Table 3. Average Repair Costs for Fire Control Equipment.** .....

- A sample of 79 recently repaired line items indicated that repair costs were .....  
.....  
Table 3 gives the repair cost history of one of the sampled items.
- Applying the EHM would have highlighted the fact that repair cost for this item .....  
.....  
.....
- The current repair forecast estimates are \$13.5 million a year. Negotiation of fixed average repair costs for higher volume items .....  
.....

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**TEMS** ..... An analysis of 199  
ICS/OWSS TEMS tasks valued at \$25.5 million  
highlighted ..... under the ICS  
contract and ..... under the .....  
OWSS contract .....  
.....

- For 90 ICS tasks (\$17.7 million) expenditures were .....
- All 119 OWSS tasks (\$7.8 million) experienced .....
  - o On average, 52 closed tasks took 204 days to complete .....
  - o 67 tasks in progress estimated to be completed within 203 days on average .....

Currently, there are no TEMS cost/schedule performance incentives in the OWSS contract.





**Fair Market Value of Rates.** A benchmark of ICS prime and ICS sub-contract hourly rates with similar DND contracts .....  
..... (see Annex B).

- .....  
.....  
.....
- .....  
.....  
.....
- If PWGSC continues to exercise the recent initiative to apply government prime contract negotiated rates when the same vendor is acting in a sub-contract role, .....

**Optimization of In-House Resources.** Through effective OWSS contract amendments the balance of in-house and contracted life cycle support can be optimized. The 71 military personnel and 261 civilians at 202 Workshop currently represent sunk labour costs of \$20.2 million a year for a second- and third-line maintenance capability. By 2009, 202 Workshop will have excess capacity for WLAV maintenance, as it will no longer provide R&O lines for the M109 Self-Propelled Artillery and Leopard main battle tank. Presently, only one quarter of the Leopard tank fleet is being used by the army. ....

- .....
- 136 repairable second- or third- line items with annual arisings amounting to ..... a year.

**Recommendations.** It is recommended that ADM(Mat)/DGLEPM/DAVPM, in consultation with PWGSC:

- Amend the OWSS contract to optimize the number/mix of contracted versus in-house fleet managers and 202 Workshop resources;
- Implement benchmarks for spares prices and prime/subcontract rates with similar DND contracts; and
- Introduce fixed repair costs and performance incentives.

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## OWSS Approval Submissions

*The approval of the OWSS contracting strategy was based on inconsistent and unreliable information with respect to.....*  
 .....

## Proprietary Rights

- .....  
 .....  
 .....
- .....  
 .....  
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**Option Analysis.** To transition from the ICS contract to the OWSS contract, the OWSS business case included three costed options. The .....30-year OWSS contract strategy approved by the Program Management Board (PMB) .....  
 ..... (see Table 4).

- The OWSS option was the least-cost solution (\$78 million) presented to PMB, .....  
 .....  
 .....  
 five year ramp-up average presented to PMB .....  
 .....  
 .....
- Had PMB also been presented with the Treasury Board submission, they might have opted for the .....  
 .....

	WLAV Life Cycle Support Options – Cost/Yr		
	100% Contracted	In-house	OWSS
PMB February 2004	\$83M	\$88M	\$78M
..... .....	.....	.....	.....

**Table 4. OWSS Business Case Option Analysis.** .....  
 .....



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**R&O** ..... The OWSS business case did not include .....  
.....  
.....  
..... Currently, the OWSS contract does not address this issue.

**Recommendations.** It is recommended that ADM(Mat)/DGLEPM/DAVPM:

- .....
- .....

## Certification of Payments

*There was not enough supporting documentation to support the FAA Section 34 certification for 49 percent of the \$30.2 million payment sample. .... Although improvements were observed in OWSS payment certification, serious concerns remain regarding the lack of visibility of the OWSS subcontracted labour and materiel that represent at least \$33 million of the projected annual \$50 million cash flow (66 percent). Although accountability ultimately rests with the DND FAA Section 34 signing authority, there is undue reliance on PWGSC to verify pricing on progress claims.*

**Payment Verification.** A directed sample of 130 payments totalling \$30.2 million (\$19.4 million for ICS and \$10.8 million for the OWSS contract) were verified to assess if adequate supporting documentation existed prior to certifying Section 34 of the FAA.

- As much as 60 percent of the ICS payments (\$11.7 million) and 31 percent of the OWSS-related payments (\$3.3 million) had insufficient supporting documentation on file to ensure that goods or services were received in accordance with the terms and conditions of the respective contracts. Of particular concern is that the breakdowns of sub-contractor

Observations	ICS Sample		OWSS Sample	
Sub-contract work/materiel	\$7,133,227	37%	\$2,967,562	27%
No supp docs/valid authority	\$4,562,076	23%	\$333,976	4%
Adequate certification	\$7,749,825	40%	\$7,508,317	69%
Total	\$19,445,128		\$10,809,855	

**Table 5. CRS ICS/OWSS Sample (\$30.2M—130 Payments).** Most high-risk payments were for sub-contract work with no backup documentation.

- material costs and labour hours were not provided, even though such costs amounted to nearly one third of the total sampled value (\$10.1 million). The contracting officer did not hold copies of the sub-contracts and was unaware of the rates.
- Similar weaknesses were noted for payments related to the R&O line where over \$14.9 million of invoices was paid with no reference to the mark-ups and profits stipulated in the contract. For sub-contracts with monthly firm fixed fees, such as ..... management does not know if R&O invoices included double billing for labour, .....
- If such practices continue, public funds are at significant risk, primarily since .....

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- To verify if adequate supporting documentation existed for sub-contractor work, supporting documentation was requested for 36 high-value progress claims. According to PWGSC, only the prime contractor held all related documents. Therefore, it is evident that payments for sub-contract work were made without ensuring that goods or service had been delivered. Until PWGSC can ensure that adequate supporting documentation is provided by the vendor (i.e., for sub-contract work) to support payment, public funds are at significant risk.
- PWGSC uses a post-verification approach whereby only a sample of closed tasks are verified to ensure that price is in accordance with the contract. They have no mechanism in place to validate sub-contractor hours or materiel charges. Post-verification is contrary to the pre-verification procedures recently implemented by DND. In February 2005, ADM(Fin CS) directed that, for payments greater than \$250,000, all sub-contract invoices would be examined prior to payment.

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- Assume the lead role in FAA Section 34 verification and certification;
- Obtain more visibility of sub-contract terms, rates and costs from PWGSC for high-value payments;
- Request PWGSC to amend the OWSS contract to include R&O line invoice mark-up/profits; and
- .....

## Information for Contract Management

*A lack of complete and reliable information has adversely affected OWSS contract repair and procurement decisions, quality assurance, accounting for inventory and the ability to incorporate effective performance incentives.*

### Repair Decisions. ....

- An analysis of LAVIII and Coyote repairable inventory found that.....  
..... DND inventory policy is to assign a pending repair priority code to any item that has more than three years of stock on hand and to hold the item as a repairable reserve. Repair priority codes are to be reviewed annually by LCMs—positions held by the prime contractor. ....  
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**Procurement Decisions.** Incomplete materiel management information in the CFSS prevents timely procurement decisions and effective management of inventory. An analysis of depot holdings of 7,036 line items of Coyote and LAVIII inventory (some \$126 million in value) indicated the following:

- .....  
.....  
.....  
.....
- Annex C depicts a CRS-generated fleet inventory report. While the data is from the CFSS, a report in this format is not currently available. This type of report is essential for managing fleet inventory levels and providing effective oversight of SMs. ....  
.....  
.....



**Visibility of DND Holdings at the Vendor Facility.** The management of DND materiel at the contractor's facility .....  
..... The vendor is responsible for stocktaking of DND assets every two years at the request of the NDQAR. The following observations were made:

- ..... At the time of audit, the recorded value of two DND accounts held at the vendor facility (the Contract Issues Spares and Repair Management Account) was \$42 million.
- The quality assurance representative support organization in Toronto had not provided relevant CFSS reports to the NDQAR to manage the inventory. The NDQAR, who is ultimately responsible for DND supply accounts, relies on the quality assurance representative to assist in the oversight of these accounts.
- The Toronto quality assurance representative made CFSS adjustments to these accounts amounting to \$18 million without knowledge of the NDQAR. Policy requires that the NDQAR should approve all adjustments to these accounts. This lack of oversight negatively impacts the reliability of CFSS inventory records.

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### Quality Assurance Inspection Codes

- Since the rollout of the CFSS upgrade in November 2002, there has been a serious data corruption of quality assurance inspection codes. Accurate quality assurance inspection codes are critical for the NDQAR to conduct risk-based inspections of a large quantity of inventory. At steady state, the NDQAR at the prime contractor facility will likely inspect new or repaired inventory worth \$38 million a year.
- 49 percent of the 7,036 LAVIII and Coyote line items have been incorrectly defaulted to the highest-risk quality assurance inspection code "X", a complex item that requires design or development. Until accurate inspection codes are assigned, quality assurance resources will be consumed on low-risk items and unnecessarily increase procurement and repair turn-around times.

**Vendor Performance Metrics.** ..... To share the risks in a sole-sourced contract situation, the OWSS contract includes the introduction of performance metrics and incentives in a future steady state phase of the contract.





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- The DND metrics proved most useful as DAVPM effectively worked with a LAV User Nation Group to .....  
.....
- .....  
.....  
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LAV User Nation Group Criteria	DND	.....
Spares delivered on time	54%	.....
Spares quote time average	71	....
R&O TAT < Contractual TAT	53%	.....
Average R&O TAT days late	35	....

**Table 7.** .....  
.....

..... Strategic performance incentives require high-integrity measurable information for contract management rolled up as macro indicators. Strategic-level incentives would include:

- Incentives based on agreed upon stock levels (i.e., surplus, stock-outs),
- Standard third-line WLAV maintenance costs derived from several thousand common LAV chassis maintained by the prime contractor, and
- A mutually agreed shared savings arrangement known as “value engineering.”

**Recommendations.** It is recommended that ADM(Mat) ensures that DGLEPM/DAVPM:

- Adjust maximum repair costs, repair priority codes for R&O items/re-order levels and quantities for all fleet inventories.
- Continue to validate vendor-provided performance metrics with information from the CFSS and develop strategic performance incentives.

And that DGMSSC:

- Develop a CFSS fleet inventory-level report;
- Revise the corrupted quality assurance inspection codes; and
- Monitor the biennial stocktaking by NDQARs.



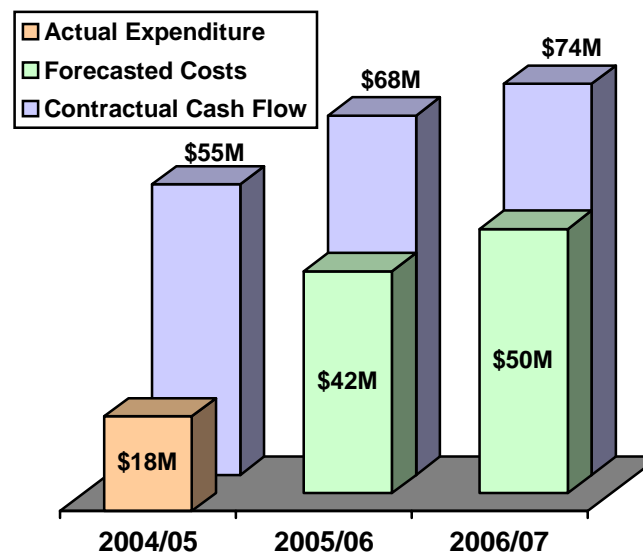
## Forecasting Contract Expenditures

*Management of the WLAV life cycle support contracts is hindered by an inability to accurately forecast contract expenditures. Inaccurate financial coding for 24 percent of the directed sample value contributed to this problem.*

**Contract Cash Flows.** ICS contract expenditures surpassed the contract ceiling on two occasions before amending the ceiling to \$48 million in August 2001. The contract ceiling was amended again in June 2003 to \$67.9 million, reflecting vendor forecasts, but total expenditures amounted to only \$47.6 million.

- The contract cash flow for first year of the OWSS contract was set at \$55 million (Figure 4). However, expenditures for that year were only \$18 million for the following reasons:
  - Armoured Vehicles General Purpose (AVGP) and Bison fleets were not incorporated into the scope of the contract, yet \$14 million a year was included for them in the cash flow;
  - Coyote and LAVIII fleets are more reliable than anticipated;
  - .....and
  - There was a six-month delay in establishing the procurement process for spare parts.
- Unless there is an improvement in the forecasting capability, an over-estimation of contract expenditures could result in excess carry-over or a lapse of O&M funding at year-end.

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**Figure 4. OWSS Contract Cash Flow vs Actual/Forecasted Costs.**  
The estimated OWSS cash flow has been significantly overestimated.



**OWSS Commitment Reporting.** Commitments in FMAS did not reflect OWSS contractual obligations. A \$17-million shortfall of OWSS commitments was recorded in FMAS.

- The fixed-fee FMAS commitments did not reflect the obligations for the full three-year contract term.
- FMAS commitments did not reflect the entire R&O line work in progress.

**Financial Coding of Expenditures.** Of the \$30.2-million sample, \$7.18 million in expenditures were coded to inappropriate general ledger accounts in FMAS. Inaccurate historical expenditures reduce the ability to accurately forecast expenditures. Also, \$3.9 million of ICS maintenance tasks that related to both the LAVIII and Coyote fleets were identified; however, the costs were coded to only one fleet. In the future, historically based forecasts will result in the overestimation of costs for one fleet and the underestimation of costs for the other fleet.

**Recommendations.** It is recommended that ADM(Mat)/DGLEPM/DAVPM improve OWSS contract financial management through revision of the OWSS contract cash flow to reflect AVGP, Bison, spare parts estimates and reconciliation of FMAS commitments with vendor reports.



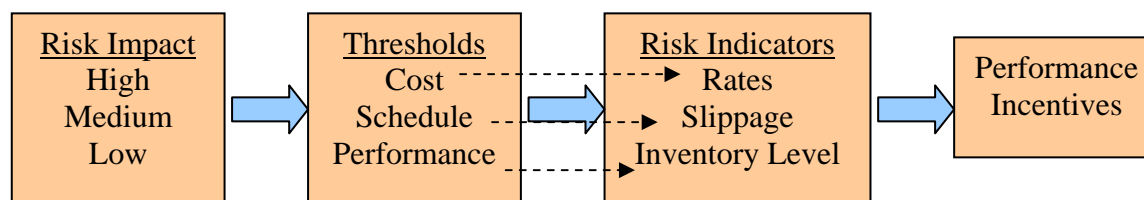
## Risk Management Implementation

*The lack of adequate risk management practices hindered the effective management of the WLAV life cycle support contracts. Standard practices of risk identification, quantification, monitoring and reporting could have mitigated the impact of many of the issues raised in this report.*

**Risk Identification.** Two years before the OWSS contract award, DAVPM successfully identified risks that would impact the implementation of the contract. However, the risk impact assessments (high, medium, low) were made without thresholds for cost, schedule and performance, a common practice in other government departments. For example, had thresholds been set for schedule slippage and inventory levels with measurable indicators, the impact of the following risks may have resulted in a more timely management response.

- Delays in OWSS incorporation of Bison/AVGP/LAV III variants—\$1.7 million a year excessive fleet management fees; and
- Surplus stock levels of repairable components—unnecessary annual repair costs of \$2.3 million a year.

A sample R&O contract risk threshold criteria, provided at Annex D, includes measurable key risk indicators such as rate increases, activity levels, schedule delays and inventory levels. As shown in Figure 5, the identification of high risks and their associated indicators is essential to the development of effective performance incentives.



**Figure 5. Risk Threshold Model.** *An effective risk identification process can derive contract performance incentives.*



Risk Monitoring and Reporting

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- Although risks were identified in the first six months of the OWSS contract, risk assessments were not tabled at quarterly or annual vendor progress review meetings.
  - .....  
..... In spite of this status, no risks were briefed to the OWSS SRB, nor was the OWSS Project Profile Risk Assessment updated to reflect new risks.
  - Risks were not quantified in terms of cost or schedule impact—a common risk management practice used by other projects. Annex D provides a CRS example of a risk quantification formula.
  - .....
- Recommendations.** It is recommended that ADM(Mat):

  - Adopt a standard risk quantification formula along with a risk threshold matrix for R&O contracts; and
  - Ensures that DGLEPM/DAVPM includes current risk assessments in vendor quarterly/annual progress review meetings, SRBs and the OWSS Project Profile Risk Assessment.

## ANNEX A—AUDIT CRITERIA SCORE CARD

Audit Criteria	Rating	Justification	Ref
<b><i>Risk Management Framework</i></b>			
Risks understood/appropriately managed	Yellow	No risk thresholds/quantification/reporting at SRB/PRM/ARMs	Pg 23
Performance bond in place	Green	OWSS contract parental guarantee	
Crown indemnification and contractor insurance	Yellow	Insurance delayed 9 months for OWSS; no insurance for ICS	DAVPM Briefed
Contract provisions for termination in place	Green	Compliant	
Warranty provisions reduce risk to the Crown	Blue	Some claims for items under warranty	DAVPM Briefed
Vendor performance measurement system in place	Blue	Metrics under development	Pg 20
Contract dispute resolution provisions in place	Green	Compliant	
<b><i>Management Control Framework</i></b>			
Roles/responsibilities are clear	Orange	PWGSC/DND FAA Section 34 accountability; 18 prime LCMM/SMs	Pg 11, 16
Contract management staff trg, experience, workload	Yellow	..... O&M major Crown project/no additional PY; no SWE/NP conversion	DAVPM Briefed
.....		.....	.....
Controls are a reasonable balance between risk & control	Yellow	No visibility of R&O invoice mark-ups/progress claims	Pg 16
.....		.....	.....
Contract payments follow FAA, TB, PWGSC regulations	Orange	FAA Section 34 certification w/o sub-contract info; 23% wrong fin codes	Pg 16, 21
Flow down of contract terms to sub-contractors	Red	Unaware of sub-contract rate, profit, terms & conditions	Pg 16
.....		.....	.....
SOW sufficiently describes op requirements	Yellow	TEMS task SOWs need milestones; no basis of estimate cost breakdowns	DAVPM Briefed
Contract addresses national security risks	Green	Compliant	
Optimum basis of payment	Yellow	Currently high-risk time & materiel; no incentives to perform	Pg 20
Shared set of values and ethics	Green	Compliant	
<b><i>Information for Decision Making</i></b>			
Commitments reflect cash flow in contract	Yellow	Vendor and DND commitments are not complete	Pg 22
Forecasting methods track expenditure trend	Orange	ICS overspent and OWSS underspent	Pg 21
.....		.....	.....
Info systems provide necessary data	Red	CFSS data management settings required	Pg 18
.....		.....	.....
Retention of contract documentation for 6 years	Green	Correspondence is available	

Satisfactory ■      Needs Minor Improvement ■      Needs Moderate Improvement ■  
 Needs Significant Improvement ■      Unsatisfactory ■

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**ANNEX B—CRS BENCHMARK OF PRIME/SUB-CONTRACT ICS HOURLY RATES**

Prime Contract Rate Comparison—Different Vendor/Same Type of Work								
Contract/Rate	Engineer		Program Mgr		Field Svc Rep		Integrated Log Sp	
	Rate	% <sup>(2)</sup> Delta	Rate	% <sup>(2)</sup> Delta	Rate	% <sup>(2)</sup> Delta	Rate	% <sup>(2)</sup> Delta
ICS 2002 <sup>(1)</sup>	.....		.....		.....		.....	
TLAV 2002 <sup>(1)</sup>	.....	.....	.....	.....	.....	.....	.....	.....
Sub-contract Rate Comparison With Other Prime Contracts—Same Vendor								
Contract/Rate	Engineer		Program Mgr		Field Svc Rep			
	Rate	% <sup>(3)</sup> Delta	Rate	% <sup>(3)</sup> Delta	Rate	% <sup>(3)</sup> Delta		
ICS TCCS Sub 2002	.....		.....					
TCCS Prime 2002	.....	.....	.....	.....				
ICS electro-optical Sub 2003	.....		.....		.....			
Electro-optical Prime 2004	.....	.....	.....	.....	.....	.....		

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- (1) Same nature of work for wheeled and Tracked Light Armoured Vehicles (TLAV). TLAV vendor lower volume of work.
- (2) .....
- (3) .....  
.....

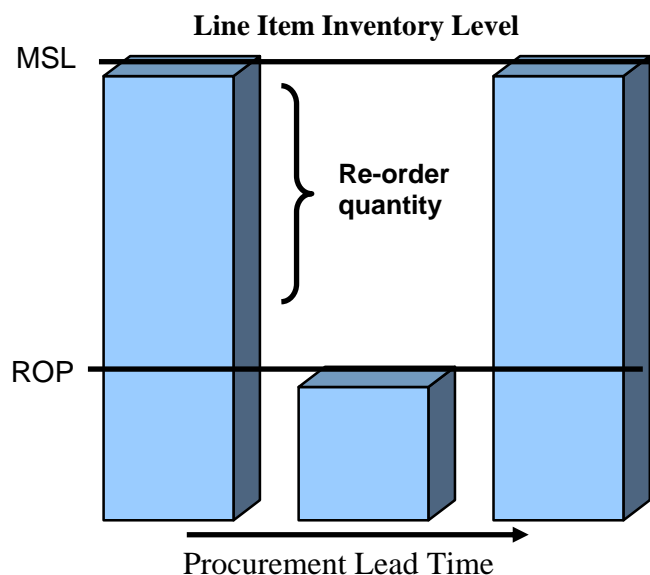




**ANNEX C—COYOTE/LAVIII FLEET INVENTORY DEPOT HOLDINGS (APRIL 2005)**

CRS was able to generate this report on Coyote/LAVIII stock levels, as of April 2005, by examining the CFSS data dictionary. To date, the Director Supply Chain Operations (DSCO) has provided this type of report for only a few air force and navy fleets as required. As the DSCO fleet inventory reporting methodology is labour-intensive, this type of report has not been included as a regular report on the CFSS query website.

Holdings Status	Line Items	% Line Items	% Value	Holdings Value	Value Delta
Max Stock Level	47	0.67%	0.09%	\$112,416	\$0
<Max >ROP <sup>(1)</sup>	60	0.85%	0.64%	\$811,240	\$438,663
< ROP <sup>(2)</sup>	247	3.51%	1.05%	\$1,319,288	\$2,202,937
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
<b>Totals</b>	<b>7,036</b>	<b>100.00%</b>	<b>100.00%</b>	<b>\$126,131,688</b>	



- (1) Most line items should be below the maximum stock level and above the re-order point.
- (2) The CFSS should automatically notify the SM once the re-order point has been breached. As most SMs try to keep one year of stock at the depot, approximately one-twelfth of the line items (one month's worth) should be below the re-order point if all of the items are active throughout the year.
- (3) .....
- (4) .....
- (5) .....

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**ANNEX D—SAMPLE R&O CONTRACT RISK THRESHOLD MATRIX/QUANTIFICATION**

A risk threshold matrix is a common practice in the government and private sector. It defines the thresholds for high-, medium-, and low-impact risks. This sample R&O risk threshold matrix defines indicators for each level of risk impact.

Impact	Cost Thresholds	Schedule Thresholds	Performance Thresholds
<b>Low</b>	Annual negotiated rates are within economic model escalation (2%). Foreign exchange rates are stable for offshore procurement.	Deliverables that result in <2% slippage of budget at year-end. Fleet modification delay of less than 1 month.	5% stock-outs due to late delivery of spares. 95% R&O component serviceability.
<b>Medium</b>	Rate increases exceed economic model (2%) up to 5%. Operational tempo increases up to 10%. Cash flow exceeds contract ceiling/TB funding level in last year of contract.	Deliverables that result in >2% slippage of budget at year-end. Fleet modification delay of 3 months.	10% stock-outs due to late delivery of spares. 85% R&O component serviceability.
<b>High</b>	Surge in activity over 10%. Rate increases greater than 5%. Foreign exchange rates increase over 5%. Contract/TB ceiling exceeded 15 months after contract award.	Deliverables that result in >10% slippage of budget at year-end. Fleet modification delay of 6 months.	15 % stock-outs due to late delivery of spares. 80% R&O component serviceability.

**CRS Example of Risk Quantification Formula**

$$\text{EVAR} = \text{EAC} \times (1 + (P \times I))$$

Estimated Value After Risk (EVAR)

Estimate at Completion (EAC)

Probability (P) ranges from 0.1 to 1.0

Impact (I) low -1.0 to -0.1, medium 0.1 to 0.5, high 0.6 to 1.0

e.g., \$2M EAC project medium probability/impact

$$\text{EVAR} = \$2\text{M} \times (1 + (0.5 \times 0.2)) = \$2.2\text{M}$$

e.g., \$2M EAC project low probability/impact

$$\text{EVAR} = \$2\text{M} \times (1 + (.2 \times (-0.5))) = \$1.8\text{M}$$



## ANNEX E—LIST OF ACRONYMS

ADM(Fin CS)	Assistant Deputy Minister (Finance and Corporate Services)	FMT	Fleet Management Team
ADM(Mat)	Assistant Deputy Minister (Materiel)	FY	Fiscal year
ARM	Annual Review Meeting	ICS	Interim Contract Support
AVGP	Armoured Vehicles General Purpose	LAVIII	Light Armoured Vehicle III
CAC	Consulting and Audit Canada	LCMM	Life cycle materiel manager
CFSS	Canadian Forces Supply System	NDQAR	National Defence Quality Assurance Representative
CIS	Contract Issues Spares	NP	National Procurement
COS(Mat)	Chief of Staff – ADM(Mat)	OWSS	Optimized Weapon System Support
CRS	Chief Review Services	PMB	Program Management Board
DAEBM	Director Aerospace Equipment Business Management	PRM	Progress Review Meeting
DAPPP	Director Accounts Processing, Pay and Pensions	PWGSC	Public Works and Government Services Canada
DAVPM	Director Armoured Vehicle Program Management	PY	Person year
DGAEPM	Director General Aerospace Equipment Program Management	R&O	Repair and overhaul
DGLEPM	Director General Land Equipment Management	RMA	Repair Management Account
DGMSSC	Director General Materiel Systems and Supply Chain	SM	Supply manager
DMG Compt	Director Materiel Group Comptroller	SOW	Statement of Work
DMIS	Director Materiel Information System	SRB	Senior Review Board
DMPP	Director Materiel Policy and Procedures	SWE	Salary Wage Envelope
DND	Department of National Defence	TAT	Turn-around times
DSCO	Director Supply Chain Operations	TCCS	Tactical Command and Control Systems
EHM	Economic Historic Model	TEMS	Technical engineer maintenance support
FAA	<i>Financial Administration Act</i>	TLAV	Tracked Light Armoured Vehicle
FMAS	Financial Management Accounting System	VCDS	Vice Chief of the Defence Staff
		WLAV	Wheeled Light Armoured Vehicle

