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**Audit of CP140
Optimized Weapon System Support
(OWSS) Avionics Contract**

January 2013

7050-28-3 (CRS)



Canada

Table of Contents

Acronyms and Abbreviations	i
Results in Brief.....	ii
Introduction	1
Rationale for Audit.....	1
Background	1
Contract Transition Period.....	1
Objective	2
Scope	2
Methodology.....	2
Criteria.....	3
Statement of Conformance	3
Findings and Recommendations.....	4
Financial Management	4
Contract Terms and Conditions.....	7
Material Management.....	10
Cost Reduction Target	14
Performance Measurement.....	16
Risk Management	19
Conclusion	21
Annex A—Management Action Plan	A-1
Annex B—Audit Criteria	B-1
Annex C—Repair and Overhaul Variance.....	C-1
Annex D—Operational Support Objectives	D-1



Acronyms and Abbreviations

AAS	Advance Accountable Spares
ADM(Mat)	Assistant Deputy Minister (Materiel)
AIMP	Aurora Incremental Modernization Project
AMMIS	Aircraft Maintenance Management Information System
AOP	Annual Operating Plan
CDRL	Contract Data Requirement List
CF	Canadian Forces
CFSS	Canadian Forces Supply System
CRPA	Contractor Repair Parts Account
CRS	Chief Review Services
DAEBM	Director Aerospace Equipment Business Management
DAEPM(M)	Director Aerospace Equipment Program Management (Maritime)
DAP	Director Aerospace Procurement
DGAEPM	Director General Aerospace Equipment Program Management
DND	Department of National Defence
DRMIS	Defence Resource Management Information System
FFP	Firm Fixed Price
FY	Fiscal Year
GFOS	Government-Furnished Overhaul Spares
HPR	High-Priority Request
N/A	Not Applicable
NDQAR	National Defence Quality Assurance Representative
OPI	Office of Primary interest
OWSM	Optimized Weapon System Management
OWSS	Optimized Weapon System Support
PIF	Pre-Installation Failure
PWGSC	Public Works and Government Services Canada
R&O	Repair and Overhaul
YFR	Yearly Flying Rate



It is recommended that the risk associated with R&O

Material Management. Not all inventory controls were in place to optimize the effective management of material unique to the CP140 Aurora avionics.

³

The audit identified up to 4,510 unique CP140 avionics line items that still need to be transferred to the contractor as the designated supply manager in addition to the 12, 313 line items planned at the time of audit—an increase of 37 percent.

To ensure the most effective management of DND material,

Cost Reduction Target. By the end of the transition period, the contract requires a 15-percent savings based on the recurring baseline activity costs for the CP140 avionics at the outset of the contract. Each year, adjustments were needed for the original cost baseline activities and actual costs to determine if the 15-percent cost-saving target was met.

It is recommended the contract basis of payment be amended to accurately reflect cost baseline activities

In conclusion, fully exercising all contract and material management controls could improve value for money.

Note: For a more detailed list of CRS recommendations and management response, please refer to [Annex A](#)—Management Action Plan.

³



Introduction

Rationale for Audit

Given the high number of active contracts in DND, CRS routinely conducts a risk-based analysis to select contracts that should be included in the Risk-Based Audit Plan. To identify contracts that exhibited high-risk attributes, CRS conducted such a risk analysis⁴ of 8,932 active contracts with a cumulative value of \$25.4 billion. The results indicated that the CP140 OWSS avionics contract was one of 47 higher-risk contracts that were later examined in the CRS Contract Terms of Payment audit. For each contract, a sample of payments was examined to identify systemic contracting issues.

Background

Maritime Patrol Aircraft Fleet. The contract provides in-service support to a fleet of 18 CP140 Aurora aircraft acquired in 1981, and three CP140A Arcturus aircraft acquired in 1993. At the time of contract award, these aircraft flew 9,766 hours per year. By 2015, the fleet will be reduced to 11 aircraft with a yearly flying rate (YFR) of 7,000 hours. Although the fleet equipment life expectancy was up to 2010, it will be extended to 2025. There were 84 avionics systems on the aircraft and five ground trainers at the outset of the contract. The Aurora Incremental Modernization Program (AIMP) aims at replacing 43 obsolete avionics systems in a three-phased program from 2005 to 2015.⁵

OWSS Avionics Contract. The competitively tendered, ten-year, \$343.2-million OWSS avionics contract was awarded to a single bidder in June 2005. It is a performance-based contract with 10 one-year options that may be awarded as incentives. The OWSS avionics contractor provides six lines of service to the fleet and ground-based facilities: program management, integrated logistics support, material support, maintenance support, engineer support, and AIMP support to the fleet of 21 maritime patrol aircraft.

Contract Transition Period

The contract provides a three-year transition period for the contractor to gradually increase the scope of work when there are no longer cost benefits for DND to perform the work, and efficiencies can be achieved through the consolidation of other CP140 avionics contracts. At the time of the audit,

⁴ CRS *Risk Analysis of Contracts*, October 2009.

⁵

Criteria

The audit criteria are outlined in [Annex B](#).

Statement of Conformance

The audit findings and conclusions contained in this report are based on sufficient and appropriate audit evidence gathered in accordance with procedures that meet the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing*. The audit thus conforms with the Internal Auditing Standards for the Government of Canada, as supported by the results of the quality assurance and improvement program. The opinions expressed in this report are based on conditions as they existed at the time of the audit, and apply only to the entity examined.



Findings and Recommendations

Financial Management

There were some control shortfalls in ||| DND task authorizations, and payment certifications.

Sub-contract Rates

|||

Good Practices

- |||⁶
- |||

Task Authorizations

Basis of Payment. |||

The OWSS avionics contract requires an estimate of the work and cost for each fiscal year to be proposed by the contractor and approved by DND. This is known as the Annual Operating Plan (AOP). As depicted in Table 1, for the first seven years of the contract (AOP 1 to 7), the baseline activity work was ||| that had a basis of payment of |||. The remaining ||| expenditures were task authorizations with monthly progress payments. |||⁸

The increase in task authorizations requires more supporting documentation for progress claims and will significantly increase the payment certification work load.

⁶ Baseline activity work is the annual recurring services that have been provided by the contractor since contract award.

⁷ |||

⁸ |||

	Actual (\$M)	Estimate (\$M)		Total (\$M)
Year of contract	AOP 1 to 7	AOP 8 to 10	AOP 11	AOP 1 to 11
Fiscal Years (FY)	FY 2005/06 to FY 2011/12	FY 2012/13 to FY 2014/15	FY 2015/16	FY 2005/06 to FY 2015/16
Baseline Activity Work				
Total				

Table 1. Contract Cash Flow.

Task Cost and Schedule. At the time of the audit, there had been 43 approved task authorizations with payments | Due in part to changes in the financial system in 2009, the following observations are made:

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-

Payment Certifications

Task authorizations required detailed supporting documentation with each monthly progress claim.

Although the ten claims with missing signatures appeared legitimate, controls need to be improved in this area in future years.

Year-end Reconciliation. The contract requires an annual year-end reconciliation of all baseline activity work to be submitted by the contractor,⁹ with the exception of FFP elements. To validate the contractor’s reconciliation each year, a post-payment verification of a directed sample was examined over four years by the Crown. The post-payment verification

⁹ Approximately 52 percent of total firm monthly payments in AOP 8.

sampling strategy could have benefited from being risk-based. |||

Procurement Fees. |||

|||

Recommendation

1. ||| and improve the rigour of payment certifications and DND cost/schedule controls for task authorizations.

OPI: ADM(Mat)



Contract Terms and Conditions

Contract amendments were required to add clarity to the basis of payment and to update the content of contractor reports.

Forecasted versus Actual Repairs

For each AOP, the contract provides the flexibility to determine

Although it is DGAEPM’s policy to ensure 40 percent of payments are FFP when the recurring work is well established,¹⁰

However, as portrayed in [Annex C](#) Table 4

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The transition to 24 new Block 3 avionics systems to be completed in FY 2014/15 will make the prediction of R&O work more difficult;

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Good Practices

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¹⁰ DGAEPM Directive OWSS “The Way Ahead,” version 27, 12 January 2010.



				11				

Basis of Payment Clarity

recently amended.			

Contract Report Content

|||||
||||| Four of the reports
provided monthly activities and the status of R&O work engineering services, and
publications used to monitor the progress of work. The other two reports were the Project
Management Plan that provides the organization and functions of the contractor and the
AOP. |||||
|||||

In an effort to rationalize the frequency of routine reports generated each year by the
contractor, the number of reports was reduced from 71 to 29 in October 2009. Monthly
status reports for R&O, engineering support and publications were combined in the
monthly activity report. However, |||||
||||| The original
format for these status reports are still contained in the contract and need to be updated.

11 |||||
|||||

Recommendation

2. |||||
|||||
|||||

OPI: ADM(Mat)



Material Management

Not all inventory controls are in place to optimize the management of material unique to the CP140 Aurora avionics.

Since 2009, there has been a gradual transition of CP140 avionics material management to the CP140 OWSS avionics contractor. At the time of the audit, 6,739 CF depot line items that were previously managed by DND in-house supply managers had been transferred to the OWSS contractor. As depicted in Table 2, there are \$204 million worth of spares located at CF depots and 14 and 19 Wings warehouses that support the CP 140 Aurora fleet. An additional 3,996 depot line items will transition to the contractor in AOP 8. As well, over 14,000 line items worth \$64 million of DND inventory is held by the contractor.

Good Practices

- 100-percent stocktaking of contractor-held DND inventory was done every two years.
- A gradual transfer of avionics spares to the OWSS contractor validated the business case for transition of the supply function.

Stock Particulars	Supply Depots Line Items	Supply Depots Stock Value (\$M)	14 and 19 Wings Line Items	14 and 19 Wings Stock Value (\$M)	Held by Contractor Line Items	Held by Contractor Stock Value (\$M)
Managed by OWSS contractor	6,739	\$158	1,740	\$46	N/A	N/A
To be transferred	3,996	\$22	2,323	\$21	N/A	N/A
Contractor Held DND Inventory ¹²	N/A	N/A	N/A	N/A	14,317	\$64
Total¹³	10,735	\$180	4,063	\$67	14,317	\$64

Legend:

N/A – Not Applicable

Table 2. DND Inventory Managed under the Avionics OWSS Contract (Holdings as of 31 March 2012). CF depots, 14 and 19 Wings warehouses are still operated by DND, but the contractor is now responsible for procurement, disposal and setting reorder points for the depots, which resupply the Wings.

¹² Includes AAS, government-furnished overhaul spares (GFOS), repairable materiel accounts (RMA), a contractor repair parts account (CRPA), and Bonded Stock issued to the principal sub-contractors. AAS, GFOS and Bonded Stock worth \$4.3 million do not represent the true value since the items are undervalued.

¹³ The same line items are held at the different locations in Tables 2 and 3.

Inventory-Level Settings

To ensure there are sufficient inventory holdings to meet operational requirements, the CFSS inventory-level settings need to be fully utilized. Stock-level settings such as maximum/minimum, re-order point/re-order quantity generate automated demands in the CFSS and material requirement lists for procurement action. However, ||| The maximum/minimum settings at the two Wing warehouses are set by DND, even though the settings impact the contractor’s performance incentives.

Location	High-Usage Line Items	Line Items without re-order point and re-order quantity	Line items without Maximum/Minimum	Percentage without Settings
CF Depots				
14 & 19 Wing				
CRPA				

Legend:
N/A – Not Applicable

Table 3. CP140 Avionics High-Usage Line Items Inventory Settings. |||

Management of Unique Avionics Items

||| To provide a focal point for inventory management accountability, the OWSS contractor “will include all fleet/system unique parts and common parts for which the fleet/system is the majority user.”¹⁴ Accordingly, there were 12,969 line items unique to the CP140 avionics in the Canadian Government Cataloguing System database that could be managed by the OWSS contractor. It was observed that

- 6,704 unique line items were managed by the contractor’s supply managers, but 797 of these avionics line items, with a stock value of \$4.4 million, were located in warehouses that did not support the CP140 Aurora fleet.
- Up to 4,510 out of 12,969 unique line items will still be managed by DND supply managers ||| If a unique CP140 item is managed by a DND supply manager, the OWSS contractor |||

¹⁴ Aeromedical Evacuation Program Manager OWSM Program Guidance – “THE WAY AHEAD” (Revised draft), 10 January 2012.

Repair Priority Code

15) |||||
||||| 16) |||||
|||||
|||||

Nil Usage

|||||
|||||
||||| Almost all these nil usage items were catalogued prior to the award of the OWSS avionics contract and, therefore, could be legacy spares that are no longer in use due to the AIMP. The Department's priority is to eliminate high-volume surplus stock before addressing the obsolete low-volume items such as avionics.

Pricing of Non-Catalogued Items

Contractor-held DND inventory includes AAS, GFOS and Bonded Stock (worth \$4.3 million¹⁷) that are not catalogued in the CFSS. The contractor is obligated to provide annual stock-take reports on these items to DND, given that there is no visibility of these items in the CFSS. |||||

- |||||
- |||||

||||| Pricing information for the value of contractor-held inventory is important for the stewardship of government-owned assets.

Contractor Inventory Adjustment

The contractor is required to seek approval from the resident National Defence Quality Assurance Representative (NDQAR) for any contractor-held DND inventory adjustment transactions that result from stock taking and system record variances. |||||

15) |||||
|||||
|||||
16) |||||
17) |||||

||||| some oversight of controls by DND is
required. There are some controls such as maximum/minimum levels at wing warehouses
that should be devolved to the contractor to ensure clear accountability.

Recommendation

3. To ensure the most effective management of DND’s assets, the inventory-level setting, supply manager designation, repair priority codes, nil usage, pricing and inventory adjustments controls for the CP140 Aurora avionics stock should be fully exercised.

OPI: ADM(Mat)



Cost Reduction Target

Due to staff turnover and shortages, adjustments to both the cost baseline and actual costs for annual CP140 avionics recurring baseline activity work were needed to determine if the 15-percent reduction target was achievable by the end of the transition period.

Reduction Target

||||| of a 15-percent reduction in annual recurring maintenance costs, this reduction target was directed for all Air Force OWSS contracts in 2003. Accordingly, the CP140 OWSS avionics contract required a reduction to the 2004 baseline annual fleet support costs by not less than 15 percent within a three year transition period. Due to delays in the transfer of scope to the contractor, this period was extended ||||| Without an effective activity-based costing tool in place, |||||

Good Practices

- For annual adjustments to the original cost baseline, an aircraft aging factor of ||||| and a planned YFR versus actual variance factor of |||||
- In May 2008 and February 2012, |||||

Cost Baseline Activities

The contract basis of payment identified a list of task authorizations to be included or excluded from the cost baseline activity calculation. ||||| To determine if the contract transition period saving target is met, accurate definitions of baseline activities in task authorizations are needed. Otherwise, the cost baseline cannot be accurately adjusted, and actual costs cannot be captured.

Cost Baseline Adjustments

Prior to contract award, the DND 2004 cost baseline reflected the Government’s CP140 avionics fleet support annual costs associated with national procurement, government personnel, accommodation, operations, maintenance and distribution and warehousing. The baseline was required to be reviewed and updated by DND and mutually agreed to by the contractor, at least once a year, to ensure that it remained relevant to the OWSS full contract scope. However, due to staff turnover and shortages, the cost baseline and actual costs had only been adjusted up to FY 2008/09 at the outset of the audit. Based on the audit of the DND cost saving estimates that had been recently calculated up to FY 2010/11, the following adjustments were made to the \$36.6 million cost baseline:

Performance Measurement

Some performance indicators proposed by the contractor could be revised to improve the measurement of the OWSS contract outputs.

A performance measurement framework is an essential element of the CP140 OWSS avionics contract to provide an incentive to the contractor to improve the efficiency and effectiveness of in-service support. ||| in order to assess the achievement of the contract’s 18 operational-support objectives.

Performance Measure Service Levels

At the time of the audit, an agreement had been reached to eliminate ||| measures by the consolidation of ||| report measures into ||| measures. Of the remaining ||| performance measures prepared by the contractor, ||| of them were being tracked and reported on. ||| In AOP 8 (FY 2012/13), each performance measure has a standard service level, a maximum objective service level, and a minimum threshold service level.

Good Practices

- The award of contract option years is an effective incentive for the contractor.
- Performance metrics were trended for three years before establishing the objective, standard and threshold service levels.
- A small ||| incentive pool was introduced until the performance measures are mature.

Notwithstanding the difference in operational impacts of some of the performance measures, there should be |||

Performance Measure Definitions

The definitions of the five following performance measures could be revised to ensure the service levels are appropriately measured and influence the outcomes as intended. Some measures are still under development and |||

Contractor Risk Reporting

- |||||
- |||||
|||||
|||||
|||||
- |||||
|||||
|||||

There are other reports, progress review meetings and performance measures that mitigate some of the avionics OWSS technical risks. Although there is considerable effort to identify and mitigate technical risk, the project management plan could be revised to reflect the most current practices by the contractor to report program risks to DND.

If Air Force risk management policy had been complied with, risk mitigation plans for the OWSS avionics contract could have been developed as a priority. Currently, |||||
|||||
|||||

Recommendation

6. Enhance risk management by continuing to populate the DND CP140 program risk register with avionics OWSS specific risks and |||||
|||||
|||||

OPI: ADM(Mat)

Annex A

Discussions continue on the development of a performance metric to track dormant stock. All repairables are reviewed on their annual parent quarter as a minimum and as required on an exception basis.

Pricing of AAS and GFOS inventory is reported annually and the observations noted by CRS have been corrected. Inventory adjustments are a potential byproduct of stocktaking. The contractor performs a 100-percent review every two years. The NDQAR has been reminded of the requirement to ensure required support documentation is provided.

OPI: ADM(Mat)/DGAEPM/DAP 6

Target Date: Complete

Cost Reduction Target (Moderate Significance)

CRS Recommendation

- 4. Request PWGSC to amend the contract basis of payment to

Management Action

Action 4.1—DAP 6 will formally request PWGSC to amend the contract basis of payment to

Action 4.2—

OPI: ADM(Mat)/DGAEPM/DAP 6

Target Date: 31 December 2012

Performance Measurement (Moderate Significance)

CRS Recommendation

- 5. Continue to negotiate and implement improved performance measure definitions and monitor the achievement of the contract operational support objectives that are still relevant.

Management Action

Action 5.1—Improving upon the performance measures is an ongoing process that evolves with the operational support requirement. As such, it is embedded in the AOP development and approval process (Appendix 8 to the Performance Work Statement). No specific action is required that is not currently part of the performance measures and AOP development processes. Therefore, this action is complete.

Action 5.2—||||| With respect to the operational support requirements, these are collective objectives which apply to all parts of the CP140 OWSM program. As such, they also form part of the ||||| Given their strategic nature, it is appropriate to review their achievement (or non-achievement) at the annual commencement of the AOP development process which includes also the Long Term Plan development.

OPI: ADM(Mat)/DGAEPM/DAEPMM 2

Target Date: 31 December 2012



Annex B—Audit Criteria

Objective

To assess whether risk-management practices, governance structures and internal controls are in place to effectively administer the contract and maximize value for money.

Criteria

- Roles and responsibilities of the contract management staff are adequate to provide oversight, and an adequate monitoring process is in place with accurate information for decision making.²³
- Financial management is in accordance with the *Financial Administration Act* and Treasury Board Contracting Policy, DND and AF9000.²⁴
- DND assets are safeguarded/accounted for and managed efficiently.²⁵
- Contract includes adequate clauses to ensure risk to the Crown is minimized.²⁶
- The contract and its management meet the operational support objectives to achieve airworthiness accreditation, reduced in-service support costs, improved life cycle support performance outcomes.²⁷
- Risks are identified, assessed, ranked, mitigated, and quantified with cost impact and reported in accordance with relevant policy and best practices.²⁸

Source

- Core Management Controls: A Guide for Internal Auditors.

²³ G-2, G-6, AC-1, AC-2, AC-3.

²⁴ ST-7, ST-10, ST-12, ST-13, ST-15, ST-18, ST-20, RP-3.

²⁵ ST-8, ST-9, ST-14.

²⁶ ST-22, RP-2.

²⁷ ST-16, RP-1, RP-2, RP-3.

²⁸ RM-2, RM-4, RM-5, RM-6.



Annex D—Operational Support Objectives

Serial	Operational Support Objectives	Performance Measures	Status
1.	Simplify weapon system management, planning, reporting.	N/A (Reduced the number of reports)	
2.	Improve quality, accuracy, timeliness of reports.	(B7) Publications accuracy* (D2) Accurate AMMIS data*	
3.	Improve asset visibility.	N/A (24 hours help desk)	
4.	Reduce effort to execute program, accept CDRLs.	N/A (OWSS website)	
5.	Improve equipment reliability, maintainability, supportability.	(B3) Assigned Systems Red	
6.	Reduce aircraft and equipment maintenance down time.	(B1) Maintaining Assets Positioned (HPR)	
7.	Reduce time for engineering tasks, design changes, modifications.	(D1) Correctness of Repairs (PIFs)	
8.	Reduce publication distribution time.	(B5) Bilingual publications (B6) Unilingual publications	
9.	Reduce time to process repairable equipment.	(D3) Time to Repair Assets*	
10.	Reduce material shortfall rates.	(C1) Recommended Order Buy*	
11.	Reduce material shortage response time.	(B2) Systemic Provisioning (Repeat HPR)	
12.	Reduce inventory levels.	(D4) Nil Usage of Inventory* (C4) Inventory Efficiency*	
13.	Reduce long lead time and critical shortage items.	(C2) Satisfy PR1 HPRs (C3) Satisfy PR2 HPRs*	
14.	Optimize preventive corrective maintenance programs.	N/A (2 nd Line maintenance now 3rd line)	
15.	Optimize logistics support plans.	N/A (No compelling case to close depots)	
16.	Reduce time to process operational, engineering and technical requests.	(E1) Service Requests quantity (E2) Service Requests timeliness	
17.	Reduce technical airworthiness risk.	(B4) Assigned System Yellow*	
18.	Execute support within budget year resources.	(A1) Overall Execution of AOP (A2) Financial goals	

Table 5. Status of Operational Support Objectives.

