

# Something Has to Give: Why Delays Are the New Reality of Canada's Defence Procurement Strategy

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# SOMETHING HAS TO GIVE: WHY DELAYS ARE THE NEW REALITY OF CANADA'S DEFENCE PROCUREMENT STRATEGY\*†

Elinor Sloan

## SUMMARY

Recent waves of political controversy over military procurement programs, most notably the F-35 Joint Strike Fighter project, are symptoms of an ongoing and increasingly strategic choice Canada is making in the way it equips its military. From the failure to settle on a design for the Arctic/Offshore Patrol Ship (which had an originally planned delivery date of 2013), to the un-awarded contracts for new fixed-wing search and rescue aircraft (initially anticipated nearly a decade ago) and the incomplete Integrated Soldier-System Project (once expected to be active by this year); to the delay in cutting the steel for the Joint Support Ship (initial delivery planned for 2012) needed to replace vessels that are now being decommissioned, Canadians are witnessing the results of a new philosophy behind the government's procurement process.

Canadian governments have always insisted on industrial and regional benefits for Canada when buying military equipment. But the massive defence spending promised under the 2008 Canada First Defence Strategy exacerbated this approach. The emphasis has now formally been placed on favouring industrial benefits for Canada in defence acquisitions, while heightened political cautiousness has placed a higher priority on ensuring maximum value for taxpayer money with a zero tolerance for mistakes environment.

A relatively small Canadian defence budget has put pressure on military officials to be creative about ordering new equipment – in some cases, perhaps too creative. Officials have taken to commissioning vehicles and equipment that are more versatile and are capable of carrying out more than their traditional functions. In certain instances, this has meant wish lists that cannot be fulfilled in the expected time frame, or even at all.

This is the case, for example, with the Joint Support Ship, which went from a plan for new refuelling and replenishment ships to one for vessels that could also provide a command and control centre for forces ashore and sealift for ground forces, including space for helicopters on deck, making this ship unique. Another example of where fiscal prudence has resulted in procurement complications is in the Canadian Surface Combatant project: here, the Navy is trying to use a common hull for both frigates and destroyers to generate savings in crewing, training, maintenance and logistics. Often, the demand for more versatility and the need to stretch spending have led to plans for equipment that do not yet exist and are so technologically ambitious that industry cannot deliver what the Canadian government requires, as has happened with the highly problematic Maritime Helicopter Project.

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Last February the government released a Defence Procurement Strategy with the ambitious goal of maximizing Canadian industrial opportunities while at the same time equipping the Canadian Armed Forces in a timely fashion. But no procurement strategy can achieve these two goals at once: either industrial benefits will be lost as equipment is purchased “off-the-shelf”, or the forces will have to wait longer for equipment. The strategy features a rejuvenated form of the industrial and regional benefits policy that runs through most major projects and has been responsible for massive delays due to the requirement to use large teams of local suppliers.

Canadians may express a desire to see their soldiers outfitted expeditiously, but doing so would come at a political cost. When tensions inevitably arise between equipping our forces properly, in a timely fashion, and ensuring there are industrial benefits to Canada, the latter priority is destined to come out ahead. Buying equipment off the shelf is always easier, faster and almost certainly cheaper, but the government has made it clear that Canadian industry should receive some share of benefit from investing their tax dollars on defence. This is not just for populist reasons, but to nurture a permanent base of domestic capability, so as to ensure that Canada retains a permanent level of expertise and ability in equipping its own military. The government appears to have decided that delays in the acquisition of military equipment is the price it is willing to pay to preserve to preserve strategically careful procurement.

# LES RETARDS SONT LE PRIX À PAYER DE LA STRATÉGIE D'APPROVISIONNEMENT EN MATIÈRE DE DÉFENSE DU CANADA<sup>\*†</sup>

Elinor Sloan

## RÉSUMÉ

De récentes vagues de controverse politique sur les programmes d'achats militaires, dont le projet d'avions de combat interarmées F-35, sont révélatrices d'un choix de plus en plus stratégique du Canada sur la façon d'équiper son armée. De l'incapacité de s'entendre sur le design des navires de patrouille et de l'Arctique (NPEA) (dont la livraison était prévue en 2013), aux contrats non attribués pour le remplacement d'aéronefs de recherche et sauvetage à voilure fixe (en retard de près de dix ans) et le projet inachevé d'équipement intégré du soldat (qui devait entrer en service cette année), au retard de la découpe de l'acier pour les navires de soutien interarmées (dont la livraison était prévue en 2012) qui devaient remplacer les navires actuellement retirés du service, les Canadiens assistent aux résultats de la nouvelle philosophie derrière le processus d'approvisionnement public.

Les gouvernements canadiens ont toujours insisté sur l'importance des retombées industrielles et régionales pour le Canada lors de l'achat de matériel militaire, mais ce sont les dépenses massives en défense promises en 2008 dans la Stratégie de défense Le Canada d'abord qui ont exacerbé cette approche. Le gouvernement a officiellement favorisé les marchés de défense entraînant des retombées industrielles pour le Canada, dans un contexte de prudence politique accrue où la priorité est accordée au rendement maximal des deniers publics et à la tolérance zéro pour les erreurs.

Le budget relativement modeste de défense du Canada a incité les responsables militaires à faire preuve de créativité (parfois même un peu trop peut-être) lors de la commande d'équipements nouveaux. Ils ont eu l'idée de mettre en service des véhicules et de l'équipement polyvalents dotés de capacités inédites, en plus des fonctions habituelles. Cependant, leurs listes de souhaits étaient parfois irréalistes, à tout le moins dans les délais impartis.

C'est d'ailleurs ce qui s'est produit dans le dossier des navires de soutien interarmées : les responsables ont décidé que ces navires, prévus à l'origine pour le ravitaillement en mazout et le réapprovisionnement, devaient également fournir un centre de commandement et de contrôle pour les forces à terre et un transport maritime pour les forces terrestres, en plus de permettre le transport d'hélicoptères sur leur pont, ce qui en faisait des bateaux uniques en leur genre. Le projet des navires de combat de surface canadiens est un autre exemple où la prudence budgétaire a entraîné des complications en matière d'approvisionnement : dans ce cas, la Marine voulait une coque commune pour les frégates et les contre-torpilleurs afin de générer des économies en équipage, en formation, en entretien et en logistique. Comme cela arrive souvent, la contrainte de la polyvalence accrue et des dépenses réduites s'est traduite par l'ébauche de plans pour des équipements qui n'ont jamais vu le jour; en effet, les exigences du gouvernement étaient si ambitieuses sur le plan technologique que l'industrie s'est montrée incapable d'y répondre, à l'instar d'un autre projet des plus préoccupant, celui des hélicoptères maritimes.

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<sup>†</sup> L'auteur tient à remercier les lecteurs critiques anonymes de leurs commentaires judicieux.

En février dernier, le gouvernement a publié sa Stratégie d'approvisionnement en matière de défense, qui comprenait l'objectif ambitieux de maximiser les débouchés industriels du Canada tout en équipant les Forces armées canadiennes en temps opportun. Cependant, aucune stratégie d'approvisionnement ne peut atteindre ces deux objectifs à la fois : soit le gouvernement achète de l'équipement standard, au détriment des retombées industrielles, soit les forces armées prennent leur mal en patience en attendant leur équipement fait sur mesure. La stratégie repose sur une nouvelle version de la politique des retombées industrielles et régionales, qui est présente dans la plupart des grands projets et qui a causé d'énormes retards, en raison de l'obligation d'utiliser de grandes équipes de fournisseurs locaux.

Les Canadiens peuvent exprimer le désir que leurs soldats soient équipés rapidement, mais ils doivent comprendre que cette exigence a un coût politique. Il est inévitable que des tensions surgissent entre, d'une part, la nécessité d'équiper rapidement et correctement notre armée et, d'autre part, la priorité d'assurer des retombées industrielles au Canada, qui finira invariablement par l'emporter. L'achat d'équipement standard est toujours plus facile, plus rapide et presque certainement moins onéreux, mais le gouvernement a clairement indiqué son intention de faire profiter à l'industrie canadienne des retombées des investissements publics dans la défense, qui proviennent après tout de leurs impôts. Les raisons de cette prise de position du gouvernement ne sont pas purement populistes : il espère ainsi favoriser le développement des capacités nationales, afin de conférer au Canada un niveau permanent d'expertise et la capacité d'équiper lui-même son armée. Le gouvernement semble avoir décidé que les retards dans l'acquisition de l'équipement étaient le prix à payer pour préserver un approvisionnement stratégique prudent.

## INTRODUCTION

This report is the second edition of what is planned to be an annual status report on selected major Canadian defence acquisitions and initiatives. The report is premised on the view that there is a need for a comprehensive yet concise and readily understandable reference that clearly states: what major defence acquisition commitments have been made and why; what progress has been made on those acquisitions and what is their current status; and why it may be that stated and actual delivery dates differ.<sup>1</sup> The report is meant to assist the informed public and parliamentarians in assessing the government's performance and in holding the government accountable, and to assist high-level government policy-makers in doing their work.

Projects included here have been selected because they are considered imperative for Canadian Forces operations in the short to medium term, and because they are anticipated to cost more than \$100 million. This is an arbitrary threshold selected on the basis that, although lower-cost projects may also be critical for operations, the public is most likely to be interested in areas of major expenditure.

Fourteen of this year's 16 projects were in the 2013 report, which was current as of Sept. 1, 2013; they have been updated to Sept. 1, 2014. One project from the 2013 report, the creation of the Canadian Special Operations Regiment, does not appear here because it is largely considered completed. Two new projects discussed this year are the CF-18 replacement and the Land Vehicle Crew-Training System. The complete list of projects discussed in this report is as follows:

- 1) Arctic/Offshore Patrol Ships (AOPS)
- 2) Canadian Multi-mission Aircraft (CMA)
- 3) Canadian Space Surveillance System (Sapphire)
- 4) Canadian Surface Combatant (CSC)
- 5) CF-18 Replacement Project
- 6) Close-Combat Vehicle (CCV)
- 7) Fixed-Wing Search and Rescue (FWSAR)
- 8) Integrated Soldier-System Project (ISSP)
- 9) Joint Support Ship (JSS)
- 10) Joint Unmanned Surveillance Target-Acquisition System (JUSTAS)
- 11) Land Vehicle Crew-Training System (LVCTS)
- 12) Maritime Helicopter Project (MHP)
- 13) Medium-Support Vehicle System (MSVS)
- 14) Medium-to-Heavy Lift Helicopter (Chinook)
- 15) Nanisivik Naval Facility
- 16) Protected Military Satellite Communications (PMSC)

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<sup>1</sup> In June 2014, the Department of National Defence (DND) published its first Defence Acquisition Guide (DAG), a requirement of the government's Defence Procurement Strategy announced in February 2014. The DAG is a compendium of actual and potential defence acquisition projects. For each project the DAG lists the specific requirement, preliminary cost estimate, and anticipated timeline. Projects are not placed in historical context in terms of the requirement and past commitments, and there is no explanation (or indeed indication) of variances. An explanation of variances for some projects can be found in DND's annual Report on Plans and Priorities submission to the Treasury Board. See *Status Report on Major Crown Projects* under Section III: Supplementary Information.

Annex A outlines the defence procurement process in Canada, while Annex B covers the 16 projects. Project entries are divided into sections containing project details, project history and requirement overview, an explanation of variances between originally promised and currently projected delivery dates, a list of official-commitments and testimony, and the status as of Sept. 1, 2014. The report uses only publicly available sources. Information in the official-commitments sections is drawn from the Department of National Defence (DND) Report on Plans and Priorities (RPP), produced annually for Treasury Board; the Status Report on Major Crown Projects appearing separately in DND's Departmental Performance Report (DPR) until 2011-12, and within the RPP thereafter; the annual federal budget; the 2008 Canada First Defence Strategy (CFDS); and testimony by high-ranking military and civilian officials before the standing Senate committee on national security and defence. Observations and conclusions are provided immediately below, before the annexes, so that the reader can see overarching findings, before looking into the details of the evidence upon which the conclusions are based.

## **OBSERVATIONS AND CONCLUSIONS**

Between September 2013 and September 2014, most of the projects examined here had little marked change in status. As of Sept. 1, 2014, as was the case a year ago, there has been no:

- Design chosen for the Arctic/Offshore Patrol Ship, a vessel that was originally promised for first delivery in 2013;
- Design chosen for the Canadian Surface Combatant, a vessel that is now estimated for first delivery in 2025 rather than the originally promised 2016/17;
- Contract award (or completed negotiation in the context of a 2006 memorandum of understanding) for a CF-18 replacement, originally planned for 2012 and now projected for between 2018 and 2020;
- Contract award for fixed-wing search and rescue aircraft, originally anticipated for 2005;
- Contract award for the Integrated Soldier-System Project, at one time planned to be fielded starting in 2013;
- Steel cut for the Joint Support Ship, originally targeted for first delivery in 2012;
- Request for Proposals (RFP) issued for the Joint Unmanned Surveillance Target-Acquisition System, originally expected in 2009;
- Delivery of compliant maritime helicopters, once promised to start in 2008 and now planned for 2018; or
- Contract award for the 1,300 military-patterned vehicles that are part of the Medium-Support Vehicle System, originally promised to start arriving in 2008.

Beyond these essentially neutral developments there were substantive changes in the status of some programs:

- The Army's close-combat vehicle, originally to be fielded by 2013, was cancelled as a project at the end of 2013;

- The Canadian Multi-mission Aircraft project has been halted and will be restarted, with new, much longer timelines and a smaller aircraft in consideration. Existing Auroras are to be further upgraded;
- In fall 2013 the Nunavut Impact Review Board ruled the Nanisivik Naval Facility project could go ahead without a full environmental review, thereby removing a major obstacle to carrying out the scaled-down project;
- The last of the 15 Chinook helicopters that are part of the Medium-to-Heavy Lift Helicopter project was delivered in summer 2014; and
- The Sapphire satellite that is the core of the Canadian Space Surveillance System reached full operational capability in January 2014.

## THE PROBLEM BEING EXAMINED

It is not the purpose of this report to provide a detailed study of Canadian defence procurement across a range of projects and to definitively say why the military procurement process in Canada is experiencing so many problems. To this author's knowledge such an assessment has not been done, although industry-focused magazines like *Frontline*, *Canadian Defence Review* and *Vanguard* provide learned opinions on the problems of the system as a whole (some of which are quoted here). Nonetheless, the limited evidence that has emerged in the course of documenting promises made, and current project status, points to five common themes:

- 1) **Pursuing ambitious developmental projects to fulfill requirements.** The maritime helicopter that DND asked for in 2004 existed only on paper and turned out to be much more complex than was fully appreciated at the time by either DND or the contractor. The Joint Strike Fighter (JSF) is developmental and the project has had difficulty achieving its technological promises. The original vision for the Joint Support Ship (JSS) was for a vessel that at that time (2004) did not exist anywhere. The upshot in all cases was increased costs, delays, and general uncertainty. The original JSS was cancelled; the government might have cancelled the Cyclone maritime helicopter in fall 2013 if a substantial amount of money had not already been committed; and, as of September 2014, it is unknown what decision the government will make on the JSF. These examples indicate a pattern of pursuing unrealistic capabilities, technologically or otherwise, in a platform replacement.<sup>2</sup> "Too often," a former vice-chief of defence staff argued in 2013, "requirement definitions turn into more of a 'wish list' than an operational requirement. There is a clear need for a challenge function for establishing operational and technical requirements," beyond what currently exists within the vice-chief of defence staff's office within DND.<sup>3</sup>

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<sup>2</sup> The question of "why" this is the case is beyond the scope of this study. One possible explanation, however, is Canada's scale of military commitment. Canada's defence budget is not large enough to support, for example, a separate class of ships for each of supply, fuelling, sealift and offshore command and control for ground-force operations. It is therefore tempting and reasonable to attempt to accommodate as many functions within a military platform as possible. Canada achieved this with its Protecteur-class auxiliary oil replenishers, which uniquely combined fuelling and supply. The challenge is to determine at what point integrating additional functions will prove to be a budgetary bridge too far, and to make a policy decision as to what capabilities the Canadian military will do without.

<sup>3</sup> Admiral (retired) Ron Buck, "Blue Ribbon Panel for Defence Procurement," *Frontline Defence* 2 (2013): 8.



- 2) **In-house preferences that are exposed as such once they leave DND.** The fixed-wing search and rescue (FWSAR) project experienced delays because the original Statement of Requirement (SOR) appeared to be written with one aircraft in mind, the C-27J. Although the vice-chief of defence staff signed off on the SOR in a timely fashion, once it left DND, it was challenged as it became evident to outside agencies that the SOR was not created for an openly competitive process. The upshot was a National Research Council review and report that largely confirmed concerns and led to the project having to be restarted. Similarly, in 2012 the Office of the Auditor General (OAG) found that the Joint Strike Fighter was the platform of choice within DND from 2006 onward and that this influenced how risks inherent in the project were presented to decision-makers. The purchase announcement in 2010 invited, for the first time, concerted attention and scrutiny, and ultimately exposed a lack of due process.
- 3) **Changing requirements as a result of battlefield experience.** Treasury Board approved the Medium-to-Heavy Lift Helicopter (Chinook) project in 2006, but DND added on several mandatory requirements at a later date and a 2010 auditor general's report found that this caused a delay in the helicopter delivery.<sup>4</sup> Similarly, additional armour was added to the military-pattern vehicle component of the Medium-Support Vehicle System project that was not reflected in the original SOR, leading to project delay. In both cases, the Canadian Armed Forces (CAF) was responding to developments in Afghanistan and new requirements to protect our troops. They were costly changes, but they were also necessary in light of the demands of warfare. Such circumstances will no doubt arise again. Ideally the procurement process would be designed so that it can accommodate these sorts of necessary "in-program revisions."
- 4) **Rough order of magnitude costs that do not change over time.** During the options-analysis phase of a procurement project, the industry is asked to provide a "rough order of magnitude" (ROM) cost of the particular platform or capability in question. Once Treasury Board gives preliminary project approval, it establishes a dollar amount for the project, based on the ROM inputs. Historically it has been the case that this figure becomes essentially set in stone and does not change over time with inflation or with the discovery of higher costs. The Joint Support Ship design that went to an awarded contract in 2006, for example, did not exist anywhere else and was therefore difficult to fully and accurately cost in advance. When bid responses came in significantly higher than the established budget, the government rejected them. The OAG raised the ROM problem in its 2013 report, pointing out that budgets for the Arctic/Offshore Patrol Ships and Canadian Service Combatant had not been revised since 2008, and because of this that it would not be possible for Canada to purchase the number of vessels promised. The OAG recommended "budgets not be capped until definition activities are sufficiently advanced to develop substantive cost estimates."<sup>5</sup> In reply, Public Works and Government Services Canada (PWGCS) and DND committed to provide Treasury Board with updated cost estimates at the end of the definition phase of each shipbuilding project.

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<sup>4</sup> Office of the Auditor General, *Report of the Auditor General of Canada to the House of Commons: Chapter 6 – Acquisition of Military Helicopters* (Ottawa: OAG, Fall 2010), para 6.56.

<sup>5</sup> Office of the Auditor General of Canada, *Report of the Auditor General of Canada: Chapter 3 – National Shipbuilding Procurement Strategy* (Ottawa: OAG, Fall 2013), para 3.64.

- 5) **No single point of accountability.** Historically there have been three federal departments involved in military procurement and none with overriding authority. A major procurement could and did — in the case of the Medium-Support Vehicle System (MSVS) and the close-combat vehicle (CCV), for example — go through all 12 steps described in Annex A and still be cancelled by the government, with no one held “responsible” for the project going off track.

## A SOLUTION?

In February 2014, the government announced a Defence Procurement Strategy (DPS) designed “to better ensure that purchases of defence equipment create economic opportunities for Canadians and that defence procurement outcomes improve.”<sup>6</sup> The strategy has three key objectives: (1) to deliver equipment to the CAF in a timely manner, by publishing an annual defence-acquisition guide and establishing within DND a third-party challenge function; (2) to leverage the purchase of defence equipment to create jobs in Canada, by evaluating projects in terms of their economic benefits to Canada (a value proposition) and specifically their support of key industrial capabilities (KICS);<sup>7</sup> and, (3) to streamline defence procurement processes by establishing a permanent working group of ministers, a permanent deputy minister’s governance committee, and a Defence Procurement Secretariat within PWGSC. The Defence Procurement Strategy was strongly informed by the findings of a panel led by Tom Jenkins, special adviser to the minister of PWGSC, which had been tasked in 2012 (reporting in 2013) to develop a defence procurement strategy “that meets the operational requirements in a timely, cost-effective manner, while maximizing related job creation, supporting Canadian manufacturing capabilities and innovation, and bolstering economic growth.”<sup>8</sup>

It is evident in its Defence Procurement Strategy that the government is seeking both to (1) maximize Canadian industrial opportunity; and, at the same time (2) improve procurement outcomes and equip the CAF in a timely fashion. But some would argue that these two objectives are in tension. The point is made that the Industrial and Regional Benefits (now Industrial and Technological Benefits or ITBs) policy that runs through many of the projects in this study has been responsible for massive delays due to the requirement to use large teams of local suppliers.<sup>9</sup> More often than not, the most cost-effective and time-efficient means of equipping the CAF is to purchase a pre-existing platform off the shelf from another country. This is how Canada acquired C-17s so quickly, as well as many battlefield requirements for Canadian soldiers in Afghanistan.

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<sup>6</sup> PWGSC Press Release, “Defence Procurement Strategy,” February 5, 2014.

<sup>7</sup> These are: Arctic and maritime security; protecting the soldier; command and support; cyber-security; training systems; and in-service support. The six KICS clusters were determined by the Jenkins panel and were considered as tentative and subject to further analysis. See Tom Jenkins, *Canada First: Leveraging Defence Procurement Through Key Industrial Capabilities* (Ottawa: Public Works and Government Services Canada, February 2013), xv.

<sup>8</sup> Jenkins, *Canada First*, viii.

<sup>9</sup> Anonymous reviewer of this paper, September 9, 2014.

The genesis of the DPS, first informed by the Emerson report of 2012,<sup>10</sup> was to determine a means of harnessing the billions of defence dollars to be spent under the Canada First Defence Strategy to create a strengthened Canadian defence industrial base. Therefore, when tensions arise between the two objectives listed above — maximizing Canadian industrial opportunity and improving procurement outcomes and appropriately equipping the Forces — we can expect them to be resolved in favour of the former of the two (that is, favouring Canadian industry). In light of this, the long-term success of the DPS will have to be judged more on the degree to which it achieves its primary and overarching goal of creating a strong domestic defence industrial base, and less on the extent to which it reduces variances between promised and actual delivery dates of major capital acquisitions. There is “no obvious evidence,” argues a former vice-chief of defence staff, that the new DPS will speed up the procurement process. “If anything, changes... may complicate and slow it down even further.”<sup>11</sup>

That being said, the DPS should have a positive impact on some of the five issues identified above. The strategy creates a new challenge function within DND under which there will be a third-party review of high-level mandatory requirements at the options-analysis stage. An internal review panel will make recommendations to the deputy minister of DND based on the third-party review. Having a built-in external challenge function within DND from the early stages can help avoid the pitfalls of pursuing ambitious developmental projects and in-house preferences, making it more likely a project will progress beyond DND without major setbacks, thereby saving time. The internal review panel will, however, have to be open to one of the other issues noted above, changing requirements as a result of battlefield experience. The DPS also creates a Defence Procurement Secretariat charged with, among other things, ensuring a co-ordinated approach across multiple departments, including National Defence, PWGSC and Industry Canada. Having people from Defence, Industry and Public Works working formally together (it was always informally the practice) at a relatively early stage will also serve to remove the issue of in-house preferences, and it will help eliminate the duplication of effort that currently exists between departments. As for the problem of rough order-magnitude costs that do not change over time, the DPS does not appear to directly address this issue; it can therefore be expected to be a recurring issue, as the OAG identified in its fall 2013 report.

Where the DPS falls most notably short is in the single point of accountability. The secretariat is to report to the governance committee of deputy ministers from Public Works, Defence, Industry Canada and Treasury Board. Chaired by the deputy minister of PWGSC, the committee is to be the key decision-making body for the implementation of the DPS. The committee, in turn, will report to the working group of ministers, including the defence, PWGSC and industry ministers, among others. With a committee of many deputy ministers and a working group of many ministers in charge, rather than accountability placed within one office, it will still be possible for a project to be abruptly cancelled after having gone through

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<sup>10</sup> David Emerson, et al., *Beyond the Horizon: Canada's Interests and Future in Aerospace* (Ottawa: Public Works and Government Services Canada, November 2012).

<sup>11</sup> George Macdonald, “New Defence Procurement Process: The Devil is in the Details,” *FrontLine Defence* 2 (2014): 9.

all procurements steps — with no one held responsible. “What needs to be fixed is the fragmentation of accountability,” argues a former assistant deputy minister of materiel within DND;<sup>12</sup> the DPS has not done so. The disadvantaged party in this scenario is not only the CAF, which must do without the necessary equipment for a still longer period of time, but also industry, which has invested sometimes millions of dollars in responding to a bid and building a prototype, only to see the project cancelled. Given that the DPS is driven in the first instance by the goal of supporting Canadian industry, the failure to create a single point of accountability is a glaring shortcoming of the strategy.

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<sup>12</sup> Dan Ross, “Is Defence Procurement Broken, or is this Normal?” *FrontLine Defence* 6 (2013): 8.

## ANNEX A: THE DEFENCE PROCUREMENT PROCESS

The Treasury Board Secretariat mandates the process for all major defence capital acquisitions. Every project is different, and the process itself is detailed and complex.

The breakdown below is consistent with the project approval process for DND briefly outlined in the 2014 Defence Acquisition Guide,<sup>13</sup> and discussed in great detail in an internal (to DND) project approval directive.<sup>14</sup> At this writing it is not certain what the impact of the DPS will be and specifically at what step the process will move to the new secretariat in PWGSC. Logically this would be at step 6 below, after a project receives preliminary project approval.

In simplified form the defence procurement process as follows:

### STAGE 1 – PROJECT IDENTIFICATION

- (1) **Capabilities and platforms.** From the prevailing defence policy, and from an ongoing process of looking at the future security environment and potential threats, force planners in National Defence draw up planning scenarios and identify capabilities necessary to address the threats. Particular attention is placed on identifying capability deficiencies or gaps.
- (2) **Statement of Requirements (SOR).** The requirements staff writes the original, detailed, Statement of Requirement for a particular platform or capability that is necessary. (The final version is not completed until the project-definition phase; the final must link back to the original with all changes tracked and approved.)
- (3) **Project Brief.** The requirements staff also draws up a project brief of the proposed project for the Treasury Board Secretariat. Based on the project brief, Treasury Board may or may not approve this as a new procurement project worth examining further.

### STAGE 2 – OPTIONS ANALYSIS

- (4) **Options Analysis.** If given the green light from Treasury Board, the original idea is now officially a “project” and it enters the options-analysis phase. During this stage the department “analyse[s] options to determine the optimal method to fill the capability gap.”<sup>15</sup>
- (5) **Industry Engagement.** Letters of interest may be sent to the industry, which will be asked to provide a “rough order of magnitude” (ROM) cost of the particular platform or capability in question. After this “Department of National Defence leadership will determine the option to proceed with based on the project business case analysis.”<sup>16</sup> According to the DPS, the third-party review will take place concurrently with the options-analysis stage of a project.

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<sup>13</sup> *Defence Acquisition Guide 2014*, “Project Approval Process” (2014), <http://www.forces.gc.ca/en/business-defence-acquisition-guide/index.page#tab-1399883175626-5>.

<sup>14</sup> DND’s Project Approval Directive, dated Oct. 11, 2011, is 257 pages long.

<sup>15</sup> *Defence Acquisition Guide 2014*, “Project Approval.”

<sup>16</sup> *ibid.*

### STAGE 3 – DEFINITION

- (6) **Preliminary Project Approval (PPA).** Based on feedback from the options-analysis phase, Treasury Board may give preliminary project approval. If so, money is now committed to set up a project office, including staff and consultants. In addition, Treasury Board will establish a dollar amount or budget for the project, based on the ROM-cost inputs, and also on the requirement to support industrial and regional benefits (now ITBs). “This [stage] marks the transition from determining what should be done to mitigate a deficiency, to determining how the preferred option will be implemented.”<sup>17</sup>
- (7) **Statement of Interest and Qualification (SOIQ).** At this stage, the project office might ask potential industry bidders to complete a statement of interest and qualification (SOIQ). The SOIQ is normally only used on high-risk projects and is essentially a questionnaire asking a company to prove in advance that it is capable of answering the eventual RFP. DND, Industry Canada and PWGSC will use the SOIQ to “pre-qualify” bidders that should receive the tender.

### STAGE 4 – IMPLEMENTATION

- (8) **Effective Project Approval (EPA).** Upon completion of the SOIQ and the identification of potential bidders, the project receives effective project approval, which is essentially the “go and buy” decision. “Implementation approval enables the Department of National Defence to have the contract awarded through Public Works and Government Services Canada.”<sup>18</sup> In some of the more recent projects (for example the Integrated Soldier-System Project), the EPA step has been delayed until after the RFP. That is to say, the government has waited to see what proposals it gets before giving the “go and buy” decision.
- (9) **Draft RFP and Industry Day.** Before issuing a formal RFP to industry bidders, PWGSC may issue a draft RFP and then host an industry day to generate feedback.
- (10) **Request for Proposals (RFP).** Taking into account the feedback received, PWGSC issues the formal request for proposals. There may also be another industry day. Typically a formal RFP will close two to six months after issue, at which time phase one of the bid is complete and all companies wanting to bid on the project must have submitted their response to the RFP.
- (11) **Prototype.** In some cases the bid now enters a second phase in which qualifiers must build a prototype of the platform or capability. This is a formal part of the bid evaluation.
- (12) **Decision.** Based on an assessment of the company bids and the prototypes produced, PWGSC announces the winner of the contract. If the government decides there are no compliant bids, the RFP is cancelled. The project returns to step 9, to the stage of drafting the RFP and consulting the industry.

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<sup>17</sup> *ibid.*

<sup>18</sup> *ibid.*

## ANNEX B: PROJECTS AND COMMITMENTS

### 1. ARCTIC/OFFSHORE PATROL SHIPS (AOPS)

#### Project details

The AOPS project is to deliver between six and eight Arctic/Offshore Patrol Ships capable of conducting armed seaborne surveillance of Canadian waters out to the exclusive economic zone limit, including in the Arctic, and assisting with search and rescue and supporting other government departments. The AOPS must be able to sustain operations for up to four months at a time, have a range of 6,800 nautical miles, and be able to operate year round in ice up to one-metre thick (but not to provide icebreaking services to other ships). It is also to have a gun armament. The AOPS project also includes the construction of a refuelling facility at Nanisivik, Nunavut.

#### Project history and requirement overview

This project has its origins in an ambitious Conservative party pledge during the 2005–06 election to significantly boost Canada’s military presence in the Arctic. Recognizing that the Canadian military has no ice-capable ships, the party said that, if elected, it would station three new armed, heavy naval icebreakers in Iqaluit, and man them with regular force personnel.<sup>19</sup> Despite the pledge, for more than a year after its election, the new Conservative government made no mention of armed icebreakers. Faced with a pending requirement to replace the Navy’s auxiliary oil-replenishment ships (i.e., supply ships), as well as its destroyers, it soon became clear the purchase of military icebreakers would be unaffordable. A more feasible option was a smaller class of ice-capable patrol ships, coupled with a new polar-class icebreaker for the Canadian Coast Guard.

In summer 2007, the government announced Canada would purchase between six and eight Arctic patrol vessels. Driving forces behind the project include the melting Arctic, more navigable waterways in the summer, and the requirement for Canada to have a vessel that is at least minimally ice capable to promote sovereignty and carry out possible enforcement missions in its Arctic exclusive economic zone (EEZ). Moreover, for years Canada has needed a vessel that can do these same things off the east and west coasts: while the Navy’s frigates are too big and expensive to use in a sustained maritime control role, its maritime coastal defence vessels are too small to operate to the limits of the EEZ. The original project was renamed with the addition of “offshore” to the title, in recognition of the ships’ eventual three-ocean role.

After the official announcement in 2007, substantial planning work was done within DND to determine the ships’ requirements and design. Yet the project did not progress beyond the definition phase to a request for proposals. In 2008, Peter MacKay, then the defence minister, pledged to get the various shipbuilding programs “back on track,”<sup>20</sup> but in 2009 the government decided to delay sending letters of intent to shipbuilders.

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<sup>19</sup> Conservative Party of Canada, “Harper Stands Up for Arctic Sovereignty,” News Release, December 22, 2005.

<sup>20</sup> Mike Blanchfield, “Tories Vow to Get Ship Shape in the Arctic,” *Ottawa Citizen*, December 16, 2008, A12.



In summer 2010, the government announced the launch of a National Shipbuilding Procurement Strategy (NSPS). As part of the strategy, it issued an RFP to identify two shipyards to build several classes of ships. One shipyard would build combat ships (the Arctic/Offshore Patrol Ships and the Canadian Surface Combatant), while the other would build the non-combat vessels (the Joint Support Ship and a coast guard icebreaker). An inter-departmental NSPS office was established to evaluate the bids. The winners were announced in October 2011: Irving Shipbuilding in Halifax for the combat ships and Seaspan Shipyards in Vancouver for the non-combat vessels.

In March 2013, the government awarded Irving Shipyards a definition contract to draw up the preliminary design for a final product. The contract contains seven assigned tasks, the first two of which have been completed: project management and Phase One engineering. In March 2014 the government authorized Irving to proceed with the next two tasks, involving additional engineering work and 3D modeling. Actual design of the ship will be done in Denmark by Danish naval architectural firm Odense Maritime Technology.

### **Explanation of variances**

The government has not offered an explanation for how the AOPS project has gone from an originally promised (in 2007) first-ship delivery date of 2013 to a currently promised first-ship delivery date of 2018, but it is likely that a number of factors have come into the mix. Timelines suggest that one consideration may have been the concurrent Joint Support Ship (JSS) project and the government's rejection of those bids in summer 2008 (see below). It may have wanted to avoid a similar fate for the AOPS. Moreover, the JSS outcome was followed in short order by a global economic crisis that prompted massive government expenditures — in non-defence areas — to stave off recession.

It is too early to know if placing the AOPS within an overall Canadian shipbuilding strategy will serve to produce these ships in a timely manner. The NSPS ultimately seeks to devise a more efficient means of delivering Canada's many combatant and non-combatant ship requirements, while at the same time ensuring maximum industrial benefits for Canada. Critically, the NSPS seeks a steady state of ship building to halt the boom-and-bust scenario of Canada having to recreate ship building expertise and capacity with every generation.

### **Official commitments and testimony**

**May 2007:** Treasury Board preliminary project approval.

**2007–08 DPR:** Delivery of first ship scheduled for fall 2013.

**2008 CFDS (p. 4):** Restates the government has announced plans to acquire six to eight Arctic/Offshore Patrol Ships.

**2008–09 DPR:** States that first ship will be delivered in fall 2014.

**2009 Senate Testimony:** “Arctic/Offshore Patrol Ships are at the development stage. We are finalizing the plans. We will be coming forward with proposals. It is a unique ship we are creating.”<sup>21</sup>

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<sup>21</sup> William Pentney, then-Associate Minister of National Defence, Testimony Before the Standing Senate Committee on National Security and Defence, May 25, 2009.



**2009 Senate Testimony:** The first AOPS will be delivered in 2014.<sup>22</sup>

**2009–10 RPP (p. 21):** “[T]he government...has announced *possible* plans to acquire...Arctic/Offshore Patrol Ships” (emphasis added).

**2009–10 DPR:** States that the Arctic/Offshore Patrol Ship’s procurement approach was revised to align with NSPS. Delivery of the first AOPS is expected in 2014 with initial operational capability in 2015.

**2010–11 DPR:** Delivery of the first ship will be in 2015; initial operating capability of first ship in 2016.<sup>23</sup>

**2012 Senate Testimony:** “I would expect to see the specific contract to build the AOPS negotiated this year such that steel would be cut in 2013 with that first ship arriving in 2015–16.”

**2011–12 DPR:** Delivery of the first ship will be in 2018; initial operating capability of first ship in 2019.

**February 2013 Senate Testimony:** The Arctic/Offshore Patrol Ship is in project-definition phase, and is being advanced within the framework of the National Shipbuilding Procurement Strategy. Steel on the first hull will be cut in 2015 with delivery around 2018.<sup>24</sup>

**March 2013 Senate Testimony:** The AOPS is in its definition stages.<sup>25</sup>

**March 2013 Federal Budget (p. 110):** Construction of Arctic/Offshore Patrol Ships will begin in 2015.

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Arctic/Offshore Patrol Ship.

**October 2013 Government News Release:** “The [AOPS] project is on track for steel to be cut in 2015.”<sup>26</sup>

**2014–15 RPP, Status Report on Major Crown Projects:** Lists major milestones as implementation contract in 2015 and first ship delivery in 2018.

**June 2014 Defence Acquisition Guide:** Anticipates contract award in 2015 and final delivery between 2021 and 2025.

**September 2014, President of Irving Shipbuilding:** States that most of the AOPS design is complete and construction of the vessels is still scheduled to begin in September 2015.<sup>27</sup>

#### **Status as of Sept. 1, 2014**

The AOPS is about halfway through its seven-task definition contract. Contract award is anticipated for 2015.

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<sup>22</sup> Vice-Admiral (retired) Denis Rouleau, then-Vice-Chief of the Defence Staff, Testimony Before the Standing Senate Committee on National Security and Defence, May 25, 2009.

<sup>23</sup> Vice-Admiral (retired) Paul Maddison, then-Commander of the Royal Canadian Navy, Testimony Before the Standing Senate Committee on National Security and Defence, February 27, 2012.

<sup>24</sup> Vice-Admiral (retired) Paul Maddison, then-Commander of the Royal Canadian Navy, Testimony Before the Standing Senate Committee on National Security and Defence, February 25, 2013.

<sup>25</sup> General Tom Lawson, Chief of Defence Staff, Testimony Before the Standing Senate Committee on National Security and Defence, March 18, 2013.

<sup>26</sup> Government of Canada, “National Shipbuilding Procurement Strategy Secretariat Announces Vancouver Shipyards to Build the Joint Support Ships in 2016,” Canada News Centre, October 11, 2013.

<sup>27</sup> “Design of Arctic Patrol Vessels on Time and Under Budget,” Canadian Press, September 3, 2014.

## 2. CANADIAN MULTI-MISSION AIRCRAFT (CMA)

### Project history and requirement overview

Purchased by the Trudeau government in 1980 as a platform for anti-submarine warfare, Canada's long-range patrol aircraft, the Aurora, is critical for Canadian sovereignty missions and has also been used in overseas operations. The Aurora is the primary maritime surveillance aircraft for our vast ocean approaches. It conducts missions up and down the east and west coasts on a regular basis, and also flies over the Arctic. In 1998 Canada launched the Aurora Incremental Modernization Project (AIMP) to extend the life of our 18 Auroras to about 2025 with structural and technology upgrades. An important consideration was to make the aircraft relevant to the broader range of post-Cold War security situations. The project therefore included an imaging radar to give the aircraft a ground-moving-target indicator capability, enabling it to collect surveillance imagery over land and littoral (coastal) areas, in addition to traditional maritime surveillance. Canada deployed Auroras to the NATO mission in and around Libya in 2011. Whereas at first the aircraft conducted traditional maritime patrols, as the conflict continued, the Air Force started using them to help direct naval gun fire against ground positions.

In September 2007, on the recommendation of the Canadian military, the government temporarily halted the modernization project. Structural concerns were larger than expected and — it was argued — the technology upgrades would be out of date as soon as they were complete. Rather than spending additional money on modernizing Cold War-era aircraft, it was thought better to fly them in their existing condition, while proceeding sooner rather than later with a replacement plane, the CMA. By the end of 2007, the decision was taken to halt the upgrades on eight aircraft while completing the AIMP upgrades on the remaining 10 and further extending the life of these 10 aircraft through an Aurora Structural Life Extension Project. At the same time, the Air Force would begin the process of acquiring a replacement aircraft, and the money was set aside for this purpose.<sup>28</sup> Possible contenders were seen as the U.S. Navy's Poseidon maritime aircraft built by America's Boeing; or, Britain's (smaller) ASTOR (Airborne Stand-Off Reconnaissance) surveillance aircraft built by Canada's Bombardier.

Because the eight non-upgraded aircraft were to be removed from the flight line by 2015, analysts at the time indicated the process of procuring a new maritime patrol plane should start in 2008 or, at the latest, 2009. But it was not until 2012 that the CMA project moved into the options-analysis phase. At this time DND spokespersons were still stating the government would buy 10 or 12 aircraft to replace its Auroras by 2020.<sup>29</sup> However, in early 2014 the government announced it would not buy new aircraft after all, and instead would further upgrade 14 of the original 18 aircraft to extend their operational life from 2020 to 2030. This third set of upgrades is to take place between 2014 and 2021. The total cost of the new Aurora Extension Proposal (2014), along with the original AIMP (1998) and the Aurora Structural Life-Extension Project (2008), is more than \$2 billion.

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<sup>28</sup> Ken Pole, "Commander Interview: Canadian Skies Connects with RCAF Commander Lieutenant General Blondin," *RCAF Today* (2013), 18.

<sup>29</sup> David Pugliese, "Canada Moves on \$7B Patrol Plane Plan," *Defense News*, May 21, 2012, 4.

## Explanation of variances

The primary reason for the delay in replacing the Aurora appears to be monetary. The 2008 recession, the massive government stimulus that followed, and now the need for cutbacks to reduce those debts incurred, have inevitably had an impact. “Five years ago we went quickly into trying to figure out what we’d need for the future and identify all those requirements,” the commander of the Royal Canadian Air Force (RCAF) stated in 2013 testimony. “When money gets tighter, you tend to look a lot more at whether there are other options.”<sup>30</sup> One of the possibilities raised at the time was to push the 10 Auroras being upgraded under the 2008 life-extension project “to the right” and keeping them flying until 2025. The decision has now been taken to go ahead with this option — pushing them even further to 2030 — while also life-extending and modernizing four additional aircraft. At the same time it is expected that, due to funding, the eventual Aurora replacement will be a smaller aircraft than a P-8 Poseidon, perhaps the ASTOR or an Airbus C-295 configured with technology developed for the Poseidon.<sup>31</sup>

## Official commitments and testimony

**2008 CFDS (p. 4):** States that the government will replace the Forces’ core equipment fleets, including 10 to 12 maritime patrol aircraft.

**2008 Senate Testimony:** Points out that although the Aurora aircraft has gone through a modernization program, they would run out of fatigue life on the structure. A new project has been started to define the mandatory capabilities of a replacement aircraft, which will be delivered in 2020.<sup>32</sup>

**2009–10 RPP (p. 22):** States maritime patrol aircraft as a planned acquisition.

**2010–11 RPP (p. 23):** Does *not* include maritime patrol aircraft as one of the major project acquisitions planned or underway.

**2011–12 RPP (p. 33):** Does *not* include maritime patrol aircraft as one of the major project acquisitions planned or underway.

**2012–13 RPP (p. 44):** Lists Canadian Multi-mission Aircraft as a project that will support CFDS objectives.

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Canadian Multi-Mission Aircraft.

**March 2014:** Government announces Aurora Extension Proposal under which it will further upgrade the original Aurora aircraft to extend their operational life.

**June 2014 Defence Acquisition Guide:** Anticipates a contract award for Canadian Multi-mission Aircraft by 2025, with delivery between 2026 and 2035.

## Status as of Sept. 1, 2014

The Canadian Multi-Mission Aircraft remains in the preliminary definition stage.

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<sup>30</sup> Blondin, as quoted in Pole, “Commander Interview.”

<sup>31</sup> David Pugliese, “Canada to Seek Less Expensive Maritime Patrol Plane, Upgrade More Auroras,” *Defense News*, March 30, 2014.

<sup>32</sup> Lieutenant General (retired) Angus Watt, then-Chief of the Air Staff, Testimony Before the Standing Senate Committee on National Security and Defence, June 2, 2008.

### 3. CANADIAN SPACE SURVEILLANCE SYSTEM (SAPPHIRE)

#### Project details

The Canadian Space Surveillance System comprises a surveillance-of-space satellite called Sapphire; two ground stations (at Abbotsford, B.C. and Guildford in the U.K.) to which the surveillance data is downlinked; a space control centre to control and monitor the satellite in orbit; a Sapphire processing and scheduling facility to receive and process surveillance data, and transmit it to a sensor system operations centre (SSOC); and, an SSOC functioning as the interface between Sapphire and America's Space Surveillance Network (SSN). The satellite operates in sun-synchronous circular orbit at about 750 km above the earth. It has an optical sensor that looks outward to track objects in orbits between 6,000 and 40,000 km above earth.

#### Project history and requirement overview

The existence of hundreds of satellites orbiting the earth, along with thousands of pieces of "space junk,"<sup>33</sup> makes it essential to be able to track satellites and objects in space as closely as possible to avoid collisions. The United States has been doing this with ground-based systems since the late 1950s, and for about three decades ending in 1992 (when the technology changed) Canada had ground-based space cameras/telescopes in two locations, feeding information into America's SSN. With the decommissioning of these cameras Canada's contribution came to an end. By virtue of its membership in the bi-national North American Aerospace Defense Command (NORAD) Canada maintained its access to SSN information on satellites and space debris. Nonetheless, there was concern about having assured access in the long term. In the late 1990s Canada — which, in 1962, became the world's third country in space, after the Soviet Union and the United States — began to think about a unique space-based contribution to the SSN. A June 1999 report for the chief of defence staff argued that a space sensor would provide a tangible contribution for Canada's military partnership with the United States. The advantage of a space-based sensor over a ground-based telescope is that it would not be affected by weather and time of day.

DND established a Surveillance of Space project office in the early 2000s. At that time, the office indicated an RFP for a space-based sensor called Sapphire would be released in 2002, while the satellite would be launched sometime between 2005 and 2007. Later, in 2004, the office indicated a call for bids had been issued for firms interested in designing and building the satellite, that a company would be chosen that fall, and that a launch would take place in 2009 or 2010. The project received Treasury Board approval in mid-2007, and in October that year DND awarded a contract to MacDonald, Dettwiler and Associates of Richmond, B.C. to build and develop the satellite. By this time the launch was planned for mid-2011, with full operational capability by the end of 2011. The satellite was finally launched in February 2013 (by the India Space Research Organization) and in January 2014 it reached full operational capability with the U.S. Air Force, accepting tasks from the U.S. Joint Space Operations Center.

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<sup>33</sup> Defined as objects that are 10 centimetres across or more and that therefore could seriously damage another object if there were a collision.

## **Explanation of variances**

A satellite that was originally supposed to be launched between 2005 and 2007 was finally launched in 2013 and became fully operational in 2014. Key reasons for the delay were the cost of the satellite, the prioritization of other national defence projects during this time period, and the logistics of finding a launch location.

## **Status as of Sept. 1, 2014**

The Sapphire Mission satellite has been launched and as of January 2014 is fully operational. Its design life is five years but it is expected to be operational for at least 10 years.<sup>34</sup> The 2014 Defence Acquisition Guide references a “Surveillance of Space 2” project, consisting of a sensor or a system of sensors, that Canada will pursue to ensure continuity of the surveillance-of-space capability. The guide states an expected timeframe for the follow-on project as definition approval by 2015, RFP release by 2017, and contract award by 2019.

## **4. CANADIAN SURFACE COMBATANT (CSC)**

### **Project details**

This project is to replace Canada’s three destroyers and 12 frigates. The target is for 15 Canadian surface combatants, divided into a destroyer and a frigate variant with a common hull design. The destroyer variant is to be built first.

### **Project history and requirement overview**

Canada conducts most of its naval missions abroad in the context of naval task groups comprised of a destroyer, a frigate, and a supply ship, and occasionally a submarine. It also contributes destroyers and frigates to multinational operations led by NATO and the United States. While its 12 Halifax-class frigates are relatively new — purchased in the 1990s and recently modernized with new technology — its three destroyers date to the early 1970s and have always been anticipated to reach the end of their operational life in 2015. It was announced in September 2014 that two of the three will be decommissioned. Destroyers are necessary for area air defence and to command a task group of several ships. To bridge the gap between the destroyers’ decommissioning and when a new command-and-control ship is operational, part of the Halifax-class upgrade has involved giving the frigates a command-and-control capability (it is not possible to give them a commensurate area air defence capability). Ultimately, however, both the destroyers and frigates will need to be replaced, and the destroyers much sooner than later.

In 2007 the Navy put forward the concept that a common hull could be used as the basis for each of the frigate and destroyer capabilities. The idea was to pursue system commonality in design and acquisition in an effort to generate cost savings in areas like crewing, training,

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<sup>34</sup> Chris MacLean, “Surveillance of Space: Interview with DND Director General Space,” *Frontline Defence* 11, 1 (2014).

maintenance and logistics. The Canadian Surface Combatant (CSC) will thus have two variants built on the same basic hull design, with the Area Air Defence and Task Group Command and Control variant being prioritized in the shipbuilding line-up. The CSC was part of the NSPS and will be built in Halifax by Irving Shipyards after the AOPS are completed. The procurement approach for the project-definition phase was to have been determined in fall 2013,<sup>35</sup> however this does not appear to have happened. A DND website updated in December 2013 states: “Recognizing the complexity of the CSC project, the Government is taking a measured approach to project definition. First, extensive industry consultation will take place...Canada will then work with the industry to determine the optimal ship design, costs, and timelines.” To this end, in spring 2014 the government issued a request for information from the industry on the types of technology available relevant to the project.

### **Explanation of variances**

Whereas in 2007 it was expected that a new destroyer would be delivered by the middle of this decade, the estimate in the most recent Report on Plans and Priorities is for delivery by 2025. The project has slipped by almost a decade. Circumstances surrounding the Joint Support Ship (see below), the recession and the resultant NSPS process will have all played a role. The fact that, of the two combatant ships being built in Halifax — the AOPS and the CSC — it is the AOPS that are to be built first, indicates a relatively greater prioritization by this government of North American missions over missions abroad. The stopgap measure of giving the Halifax-class frigates a command-and-control capability may also have reduced the urgency with which it is deemed necessary to replace the destroyers. Budgetary factors are likely to impact the degree to which this project is implemented over the coming years: the fall 2013 Report of the Auditor General found that the CSC budget, based on rough order-magnitude costing “is insufficient to replace Canada’s 3 destroyers and 12 frigates with 15 modern warships with similar capabilities.”<sup>36</sup>

### **Official commitments and testimony**

**2007 Senate Testimony:** “The next priority...is preparing for a future surface combatant. We must replace the [destroyers and frigates] in the period beginning 2016–17. This summer my intent is to stand up a small team to begin the requirements definition work for the replacement.”<sup>37</sup>

**2008 CFDS (p. 4):** States that the government will replace the Forces’ core equipment fleets, including 15 ships to replace existing destroyers and frigates.

**2009–10 RPP (p. 22):** States the replacement of destroyers and frigates as a planned acquisition.

**2009–10 DPR Estimates (p. 22):** The planned acquisition to replace destroyers and frigates has progressed; options analysis has begun to be conducted.

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<sup>35</sup> Government of Canada, October 11, 2013.

<sup>36</sup> Office of the Auditor General, *Report*, Fall 2013, para 3.63.

<sup>37</sup> Vice-Admiral (retired) Drew Robertson, then-Chief of the Maritime Staff, Testimony Before the Standing Senate Committee on National Security and Defence, February 26, 2007.



**2010–11 DPR:** “Due to the pressing need to replace the IROQUOIS Class destroyers, the CSC project will begin with the acquisition of a replacement for Area Air Defence and Task Group Command and Control capabilities, forming the basis for subsequent acquisition of general-purpose warships.” In this DPR, all major milestones with the exception of the identification-phase approval are “to be determined,” pending the outcome of the NSPS.

**2011–12 DPR:** States that the contract will be awarded in 2016, with initial operational capability in the mid-2020s; full operational capability (all vessels delivered) by 2036.

**February 2012 Senate Testimony:** “We are expecting the first [Canadian Surface Combatant] to be delivered in the 2022 time frame.”<sup>38</sup>

**February 2013 Senate Testimony:** The Canadian Surface Combatant is in the project-definition stage, and is being advanced within the framework of the National Shipbuilding Procurement Strategy.<sup>39</sup>

**March 2013 Senate Testimony:** Indicates CSC has not entered definition stage or at least is not at the same definition stage as the AOPS and JSS.<sup>40</sup>

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Canadian Surface Combatant.

**2014–15 RPP, Status Report on Major Crown Projects:** Lists major milestones as a contract award for 2018 and the first delivery in 2025.

**June 2014 Defence Acquisition Guide:** Anticipates and RFP release by 2016; a contract award by 2020; and final delivery sometime after 2035. No initial delivery date is indicated.

#### **Status as of Sept. 1, 2014**

The CSC is in definition phase.

## **5. CF-18 REPLACEMENT PROJECT**

### **Project Details**

This project is to replace Canada’s current fleet of 80 manned fighter jets with a new fleet capable of continental defence and overseas operations.

### **Project history and requirement overview**

Canada needs manned fighter aircraft both for continental defence and to contribute to overseas missions. Two essential roles for the aircraft are air-to-air combat and air-to-ground strike in support of Canadian and allied ground forces. The air-to-air combat role is largely a continental one, i.e., for intercepting threatening aircraft approaching North American airspace. The former Soviet Union’s Bear Bomber patrols over the Arctic were halted in 1989, only to be resumed

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<sup>38</sup> Maddison, Testimony, February 27, 2012.

<sup>39</sup> Maddison, Testimony, February 25, 2013.

<sup>40</sup> Lawson, Testimony.

by Russia in 2007. In addition, there may be a growing air-to-air role abroad (the dominant role during the Cold War). Throughout the 1990s and 2000s, the West had “air superiority,” meaning its manned and (later) unmanned combat aircraft could operate essentially with impunity. Today, the window of western air superiority is coming to an end with the growing sophistication of Russian and especially Chinese fighter capabilities.

The second airpower role is air-to-ground in close air support of land forces, or against strategic targets like ammunition factories, as demonstrated in places like Bosnia and Kosovo, and later Afghanistan, Iraq and Libya. Implicit in these examples is that the air-to-ground role is primarily an overseas one; there is only a limited air-to-ground role in North America, perhaps against threatening ships (air-to-surface) in the continent’s maritime approaches. There is also a third, arguably optional, role for Canada’s fighter aircraft and that is air-to-ground strike in suppression of enemy air defences. The key requirement here is stealth, i.e., low observability on radar. For example, the United States took part in the first few days of the 2011 Libya air campaign, using its stealth aircraft to eliminate the enemy air-defense threat, before handing over to other NATO members, like Canada, who do not have stealth aircraft.

Canada purchased its current fleet of fourth-generation CF-18s under the Trudeau government, with some 140 aircraft delivered in the 1980s. In the early 2000s, 80 of these aircraft were significantly upgraded with advanced communications technologies and data links, and measures to improve both air-to-ground and air-to-air capabilities. But the airframe itself cannot be upgraded and will eventually wear out. For this reason, starting in the 1990s, Canada began to prepare for a new aircraft to replace the CF-18s in the 2017 to 2020 time period.

The United States conceived of the Joint Strike Fighter in the 1990s, seeking an aircraft that was both “joint” in that three of its services (Air Force, Navy, Marine Corps) would use a version of the aircraft and therefore reduce costs, and “fifth generation” in that it is stealthy (largely due to the shape of its airframe) and has advanced avionics giving it superior situational awareness and the ability to communicate seamlessly with ground and sea elements. In the late 1990s, the United States ran a design competition for the JSF; Lockheed Martin won that competition over Boeing in October 2001.

The Joint Strike Fighter project was also unique in that it sought international partners to share in the costs and benefits of development. In 1997, Canada joined the first phase of the Joint Strike Fighter program as an “informed partner,” paying US\$10 million to have access to the technology being developed within the program and to allow Canadian companies to compete for contracts. Five years later Canada joined the second phase of the aircraft’s development with a payment of US\$100 million, and in 2006 it signed a memorandum of understanding (MOU) to join the third phase, agreeing to pay US\$500 million over four decades. Canada’s primary goal in this early period was economic — to ensure Canadian companies were in a position to win a share of the contracts for what was to be the world’s largest-ever defence purchase.<sup>41</sup> Unlike some of the other partners in the project, Canada made no commitment to actually buy the aircraft.

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<sup>41</sup> As of winter 2014, companies in Canada had secured \$587 million in contracts. See Industry Canada, *Canadian Industrial Participation in the F-35 Joint Strike Fighter Program* (Summer 2014) [https://www.ic.gc.ca/eic/site/ad-ad.nsf/vwapj/Summer\\_2014\\_Report\\_Parliament.pdf/\\$file/Summer\\_2014\\_Report\\_Parliament.pdf](https://www.ic.gc.ca/eic/site/ad-ad.nsf/vwapj/Summer_2014_Report_Parliament.pdf/$file/Summer_2014_Report_Parliament.pdf).



National Defence set up a Next-Generation Fighter Capability office in 2007 to determine its requirements, including what mix Canada might want between manned fighters and increasingly sophisticated unmanned combat aerial vehicles. At the time it was expected that Canada would make a decision on its future fighter aircraft by 2012, for delivery starting in 2016. The 2008 Canada First Defence Strategy announced that Canada would buy 65 next-generation fighter aircraft for continental and international operations, but did not specify this would be the Joint Strike Fighter. In was in summer 2010 that Ottawa announced that Canada would proceed with a sole-source purchase of the JSF on the basis that only this was the only fifth-generation fighter aircraft available; two other fifth-generation fighters were being developed by China and Russia, separately. The statement was a verbal commitment to purchase; no actual contract was signed because the aircraft was to be purchased in tranches, with each batch being the subject of individual contract negotiations. When the announcement was made, it was anticipated that the government would sign a contract for the first tranche in late 2013.

The sole-source decision became the subject of heated debate. Manufacturers of rival aircraft, like the Boeing Super Hornet and Eurofighter Typhoon, are in favour of an open competition for Canada's next-generation fighter capability. At the same time, the JSF, which is ultimately a developmental aircraft, has had a multitude of cost overruns and technical delays. Other concerns also arose, among them: unlike other fighters, the JSF is a single-engine aircraft; the initial batch of fighters delivered will not be able to communicate with ground forces in a close air-support role until an upgrade several years later; the JSF is incompatible with Canada's refuelling aircraft; and, the JSF will not be able to communicate in the North, again without an upgrade (which, in turn, may make the aircraft no longer stealthy).

Growing controversy surrounding the JSF brought the aircraft under review by the auditor general of Canada. In its spring 2012 report, the OAG found that although the JSF announcement was made in 2010, DND had decided as far back as 2006 that it would be purchasing the JSF. As a result, DND did not exercise "due diligence" in choosing the JSF. Specifically, it did not clearly highlight to decision-makers the risk factors in purchasing the aircraft, such as the fact that it was a developmental, not pre-existing, aircraft and that the exact cost of the aircraft was a "best estimate" by the Pentagon, not a firm figure. An options analysis of competing aircraft was completed on two occasions, in 2005 and 2008. DND repeatedly justified the choice of the JSF on the basis of projected but not substantiated industrial benefits to Canada that would accrue only if Canada committed to buying the JSF; on the low cost of this aircraft as compared to competitors, even though the final cost was a moving target; and on the fact that this is the only fifth-generation fighter available apart from those being developed by China and Russia. On this latter point, since it is possible to put advanced technologies for air-ground communication and situational awareness into other aircraft, the bottom line really does come down to stealth — that is, whether Canada needs a stealth aircraft and indeed whether the JSF would still be stealthy once modified for Canadian purposes (such as for operations in the North).

In April 2012, the government announced a seven-point plan to address the auditor general's concerns. They included, among other things: freezing the funding envelope for the acquisition of the F-35; creating a new JSF secretariat within PWGSC; and, commissioning an independent review of the project, to be made public. Canada would not sign a contract for new aircraft until these steps were taken. The secretariat was established and, over the next 18 months, the review was completed. But contrary to the statement in the seven-point plan, the results of the review, submitted to government in January 2014, have not been made public. Inexplicably, the June 2014 Defence Acquisition Guide states that there will be an RFP released between 2017 and 2019 and a contract award between 2018 and 2020 — neither step being necessary if, under the terms of the 2006 MOU, a contract is negotiated for a first tranche of Joint Strike Fighters. Moreover, final delivery is stated as being between 2026 and 2035, leaving unspecified the date of first delivery.

Meanwhile the CF-18 aircraft can be expected to fly longer. Since the late 1990s the Air Force had consistently stated that the airframe of the CF-18 would structurally be unable to fly beyond the 2017 to 2020 time period. In 2013 testimony, however, the commander of the Royal Canadian Air Force stated that, in fact, the aircraft can easily fly until the mid-2020s — the discrepancy being due to decade-old calculations that did not take into account higher flying altitudes, and therefore less of the air drag that causes aircraft fatigue, which were made possible by the advent and acquisition of GPS-guided precision munitions.

### **Explanation of variances**

When the Harper government came into power, it was expected that either a contract award (from an open competition) or a completed contract negotiation for a first tranche of Joint Strike Fighters (in the context of the 2006 MOU) on a future-fighter capability would be made by 2012, for first delivery in 2016. In 2017 the RCAF would begin to retire the oldest of its CF-18s. But the 2014 Defence Acquisition Guide anticipates a contract award by 2018 at the earliest, with an unstated date for first delivery and final deliveries between 2026 and 2035, well past the current RCAF commander's stated comfort zone for flying the CF-18s. The best-case scenario contract award date has slipped from 2012 to 2018, putting the program at least six years behind schedule.

The explanation for variance in this case is best articulated by the OAG report of 2012. That is, a lack of due diligence within DND between 2006 and 2012 in analyzing and fully presenting the risks and benefits of various aircraft, including the fact that the JSF was developmental in nature (much like the Cyclone maritime helicopter), that there was in effect no fixed price, and that industrial benefits to Canada were projected, not guaranteed. The summer 2010 announcement that Canada would proceed with a sole-source purchase of 65 JSFs put a spotlight on the program, drawing criticism, House committee hearings and, ultimately, the OAG report. This in turn halted the program and set the stage for a reset.

## **Official commitments and testimony**

**2008 CFDS:** “The Government has committed to renewing the Forces’ core equipment platforms [including] Starting in 2017, 65 next-generation fighter aircraft to replace the existing fleet of CF-18s.”

**2008 Senate Testimony:** “Ultimately, when we mature those specifications that we want from [the next-generation fighter] and we go to the various aircraft manufacturers, one of the competitors will be the joint strike fighter, but there may be others. If there are more than one, we will compete the program and choose the best one for Canada.”<sup>42</sup>

**2009 Senate Testimony:** “The Joint Strike Fighter is one of a series of candidates that will be examined to replace our F-18s. Our F-18s are one of the [CF’s] challenges at the end of the next decade [the 2010s] because that is when they run out of structural life.”<sup>43</sup>

**July 2010, Minister of National Defence:** “The Government of Canada is...committing today to acquire 65 Joint Strike Fighter F-35 aircraft...We expect to begin taking delivery of the aircraft in 2016.”<sup>44</sup>

**2013–14 RPP, Status Report on Major Crown Projects:** CF-18 replacement appears in this report for the first time. All major milestones, including contract award, first delivery and full operational capability are listed as “to be determined.”

**2013 Senate Testimony:** “I am very comfortable flying the F-18 until 2025...The airplane can easily fly until the mid-2020s, but there are some systems that we may need to modernize, depending on how far we go into the 2020s.”<sup>45</sup>

**2014–15 RPP, Status Report on Major Crown Projects:** All major milestones, including contract award, first delivery and full operational capability are listed as “to be determined.”

**June 2014 Defence Acquisition Guide:** Future-fighter-capability anticipated timeline is stated as definition approval by 2017; request for proposal release by 2019; contract award by 2020; and final delivery between 2026 and 2035.

## **Status as of Sept. 1, 2014**

The project is officially in options-analysis phase.

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<sup>42</sup> Watt, Testimony, June 9, 2008.

<sup>43</sup> Lieutenant-General Angus Watt, then-Chief of the Air Staff, Testimony Before the Standing Senate Committee on National Security and Defence, March 9, 2009.

<sup>44</sup> Peter MacKay, then-Minister of National Defence, “Next Generation Fighter Announcement,” July 16, 2010.

<sup>45</sup> Lieutenant-General Yvan Blondin, Chief of the Air Staff, Testimony Before the Standing Senate Committee on National Security and Defence, March 25, 2013.

## 6. CLOSE-COMBAT VEHICLE (CCV)

### Project details

The CCV was to be a well-protected armoured vehicle with high tactical mobility. At between 25 and 40 tons it would have essentially been a light tank, meant to deliver a Canadian infantry section in close combat while operating in support of main battle tanks during battle. The government had planned to buy 108 CCVs with the option for up to 30 more vehicles.

### Project history and requirement overview

The CCV was to be one component of a “family” of land-combat systems, all with unique specifications but designed to work together on the battlefield. The program was meant to replace and modernize the current fleet of land-combat vehicles. The concept of a family of vehicles is similar to that of the Future Combat System, a large U.S. military program launched by the Pentagon around 2000 that would have been comprised of more than a dozen platforms, all designed to work together. Former U.S. secretary of defense Robert Gates cancelled this program in 2009, deeming it of less relevance than other programs to the counterinsurgency missions in which America was then engaged. Canada’s family of systems is smaller in scale than was the FCS. Until the CCV was cancelled, it comprised four systems: the CCV, a tactical armoured patrol vehicle, an armoured engineering vehicle and a modernized version of the existing Light Armoured Vehicle (LAV) III fleet.

The June 2008 CFDS stated that Canada would buy a family of combat vehicles and in summer 2009 Minister MacKay announced government approval of the CCV program. But less than six months later, with no release of a solicitation of interest to the industry, the program ground to a standstill out of concern about whether the capability it would have provided should be a priority, and therefore about the timing for its entry into service.<sup>46</sup> The program was later restarted, only to see all bidders disqualified in summer 2010 because their vehicles on offer did not meet the stated standard of protective capability. Specifications were clarified and rewritten to be in line with those of NATO, and a new solicitation of interest was issued, but in spring 2012 all of these, too, were rejected. A new RFP released to pre-qualified bidders closed that fall and in spring 2013 the government announced that a winning bidder would be identified by fall 2013. On the Friday before Christmas 2013 the government announced that Canada would not be proceeding with the close-combat vehicle.

### Explanation of variances

The CCV was at least three years behind schedule when it was cancelled at the end of 2013. One reason for the delay was clearly that on two occasions in three years the government had found there to be no technically compliant bidders. But the bigger background picture was that in an era of constrained defence budgets, where the Canadian Army budget has been sharply reduced, the Army’s preference was to prioritize other acquisitions and functions above the CCV. The press release announcing the cancellation noted that the modernized LAV IIIs were to be far superior to those envisioned in 2009 when the family of vehicles was launched, thereby enabling the LAV III to fill the role of accompanying tanks on the battlefield.<sup>47</sup>

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<sup>46</sup> Ken Pole, “CF ‘Family’ of Vehicles,” *Frontline Defence* 3 (2012): 36.

<sup>47</sup> Department of National Defence, “Statement on the Decision not to Proceed with the Procurement Process for the Close Combat Vehicle,” Press Release, December 20, 2013.

## **Official commitments and testimony**

**2008 CFDS (p. 4):** States that the government will replace the Forces' core equipment fleets, including a fleet of land-combat vehicles and systems.

**2008–09 RPP (p. 59):** The family of land-combat systems “will consist of several distinct projects...such as close combat vehicles...the definition phase of this programme will be sought in 2009.”

**2009–10 RPP (p. 22):** States land-combat vehicles and systems as a planned acquisition.

**2010–11 DPR:** Foresees Treasury Board project approval in spring 2012; contract award in summer 2012; first vehicle delivery in 2013.

**2011–12 DPR:** Notes the project successfully completed the solicitation-of-interest and qualification process in 2010–11 and there were five pre-qualified buyers. The RFP was issued in 2011 and closed later that year. It was determined that no bidder met the mandatory technical requirements so the RFP was cancelled.

**2012 Senate Testimony:** Stated the CCV RFP was cancelled because none of the close-combat vehicles were found compliant. In this regard “the system worked exactly as it should.”<sup>48</sup>

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the close-combat vehicle.

**2013–14 RPP, Status Report on Major Crown Projects:** States major milestones of contract award in 2013 and first vehicle delivery in 2015.

### **Status as of Sept. 1, 2014**

The project was cancelled on Dec. 20, 2013.

## **7. FIXED-WING SEARCH AND RESCUE (FWSAR)**

### **Project details**

The aim of this project is to replace the military search and rescue capability currently being provided by Buffalo and Hercules aircraft. This involves aircraft that can fly from one of the four current search and rescue (SAR) bases to undertake a search for a minimum of one hour before having to return to an airfield. In the past, there has been mention of up to 17 aircraft, all of the same type, as opposed to a mix of fleets. A recent draft RFP does not mention aircraft type or numbers.

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<sup>48</sup> Peter MacKay, then-Minister of National Defence, Testimony Before the Standing Senate Committee on National Security and Defence, April 30, 2012.

## Project history and requirement overview

Fixed-wing search and rescue aircraft are necessary to provide immediate assistance in distress cases anywhere in an 18 million square kilometre Canadian SAR area of responsibility. Since 1947, the Canadian military has been the lead agency responsible for SAR in Canada, working in conjunction with the Canadian Coast Guard, RCMP, and provincial and territorial governments. Military search and rescue operates from four bases across Canada — Greenwood, Trenton, Winnipeg and Comox — using a mix of six Buffalo and 13 C-130 Hercules aircraft. Well suited to mountainous terrain, all six Buffalo are stationed at CFB Comox.

A persistent issue for military search and rescue over the past decade has been the age of the assets dedicated to this mission. The Buffalos were purchased in 1967, while the H-model Hercules aircraft that are used for search and rescue are more than 20 years old. Time spent on maintenance, and the difficulty of finding spare parts for the Buffalo, have inevitably reduced the availability of aircraft. In 2013, Canada's auditor general declared Canada's search and rescue aircraft to be at the breaking point.<sup>49</sup>

New search and rescue aircraft have been on the books for some time. In 2003, then-chief of defence staff General Ray Henault announced it as an equipment priority, while in 2004 the Liberal government said it was fast-tracking the project and would go to the industry later that year to begin the competition process for 15 FWSAR aircraft.<sup>50</sup> The idea was to award a contract by summer 2005, but by the time the government changed, there was not yet an RFP. The election of the new Conservative government in January 2006 coincided with an increased Canadian commitment in Afghanistan, which had the effect of pushing aside procurement projects not related to the Afghan operation.

In 2009, Canada's defence minister announced plans to fast-track the purchase of up to 17 C-27J search and rescue aircraft under an advance contract-award notice where a preferred aircraft is identified and firms are given 30 days to make a counter proposal. But other government departments, objecting to the possibility of a sole-source purchase that may not ensure maximum Canadian industrial benefits, blocked the approach.<sup>51</sup> The government changed its approach, inviting the industry to come up with solutions for a cost-effective search and rescue capability. But still critics argued the specifications in the SOR had been written to favour a specific aircraft (the C-27J). In 2010, the National Research Council was tasked with conducting an independent review of the original 2004 SOR and the report seemed to validate the critics' concerns. A key recommendation was that the SOR should reflect a capability-based approach instead of a platform-centric one.<sup>52</sup>

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<sup>49</sup> Office of the Auditor General, *Report of the Auditor General of Canada to the House of Commons: Chapter 7 – Federal Search and Rescue Activities* (Ottawa: OAG, Spring 2013).

<sup>50</sup> David Pugliese, "Afghan War Leaves Forces Unable to Buy New Rescue Planes," *Ottawa Citizen*, April 26, 2007.

<sup>51</sup> David Pugliese, "Canadian Defense Minister To Seek OK for SAR Planes," *Defense News*, March 23, 2009, 6.

<sup>52</sup> Peter Pigott, "The Sorry Saga of FWSAR," *Frontline Defence* 2 (2013): 25.



The FWSAR project was re-launched in January 2012, with the government setting up a dedicated secretariat in PWGSC. The renewed project entered definition phase in March 2012 when it received Treasury Board expenditure authority and, beginning in January 2013, the government began sharing draft concepts with the industry, inviting feedback and letters of interest. Yet the long path to an actual RFP took another twist in spring 2014 when it was announced that the industry would be required to propose not just what type of aircraft would fulfill the requirement, but also the number and location of bases to meet the required level of service.

### **Explanation of variances**

The basic underlying reason for the many delays in the FWSAR and indeed the need for an entirely new launch in 2012 appears to be differences of opinion in the SOR. When the original SOR was drafted, guidance was taken from existing search and rescue capabilities leading to, in essence, a replication of that capability using new aircraft based at the same four locations. Critics argued this “southern focus” meant that people needing rescue in the North were unlikely to survive. Moreover, it cut out some aircraft contenders because only two (the C-130J Hercules and the C-27J) had the speed and range to carry out the mission within established parameters. Some pointed out that in cost-benefit terms it was better to focus on the South, as had always been the case, because the vast majority of search and rescue cases take place near the Canada-U.S. border. But others made the case that northern bases such as Iqaluit and Yellowknife should be considered. This would improve response time in the North, and it opened the competition to at least two more aircraft contenders.

A second contending aspect was whether to focus relatively more on the search or rescue component of the search and rescue mission. Focusing on search would require relatively greater emphasis on state-of-the-art sensor technology, something that did not figure strongly in the original SOR. Sorting through contending perspectives, which also need to be seen in light of the Harper government’s overall focus on Arctic sovereignty, has taken many years and prompted a complete rethink of the mission. This in turn has impacted the length of time the project has been in the definition phase, and has delayed the RFP.

### **Official commitments and testimony**

**December 2005 Conservative Party Platform:** States that a Conservative government will station new fixed-wing search and rescue aircraft in Yellowknife.<sup>53</sup>

**2006–07 RPP (pp. 24 and 46):** “High priority will be given to...Fixed Wing Search and Rescue capabilities...The project is currently in predefinition phase.”

**2007 Senate Testimony:** “The Buffalo is scheduled to leave service in 2010...we will not get there by 2010. We have to extend the life of the Buffalo.”<sup>54</sup>

**2008 CFDS (p. 4):** States that the government will replace the Forces’ core equipment fleets, including 17 fixed-wing search and rescue aircraft.

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<sup>53</sup> Conservative Party of Canada, “Harper Stands.”

<sup>54</sup> Lieutenant General (retired) Steve Lucas, then-Chief of the Air Staff, Testimony Before the Standing Senate Committee on National Security and Defence, February 26, 2007.

**2008 Senate Testimony:** The Air Force is at the point of determining solid specifications for the replacement aircraft to take to government for approval. The project is in the pre-definition stage.<sup>55</sup>

**2008–09 RPP (p. 58):** “It is intended that this project proceed into its definition phase as soon as possible and may be ready for approval in 2008. Delivery...will begin by fiscal year 2014-2015.”

**2009 Senate Testimony:** On fixed-wing search and rescue aircraft, “We are about ready to go as soon as there is a consensus on how to proceed.”<sup>56</sup>

**2009–10 RPP (p. 22):** States fixed-wing search and rescue aircraft as a planned acquisition.

**2009–10 DPR:** States that the FWSAR project will enter the project-definition phase as soon as preliminary project approval is received from Treasury Board.

**2010 Senate Testimony:** With respect to acquiring FWSAR aircraft “the latest development is that Defence and Research Development Canada and NRCan [Natural Resources Canada] have looked at the requirements and validated them. People are poring over the report right now.”<sup>57</sup>

**2011–12 DPR:** The FWSAR received Treasury Board expenditure authority and entered project-definition stage in March 2012. The contract is expected to be awarded 2015; delivery of first aircraft 2017.

**2012 Senate Testimony:** Fixed-wing search and rescue aircraft, “out of necessity, have to be replaced.”<sup>58</sup>

**2013 Senate Testimony:** “We have the fixed wing search and rescue airplane program going on. It has taken longer than we would have wanted. It is into the definition phase... We expect to go into requests for proposals in 2014.”<sup>59</sup>

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the FWSAR project.

**2014–15 RPP, Status Report on Major Crown Projects:** States contract award in winter 2014–15 as a major milestone and first delivery of aircraft in 2017–18.

**June 2014 Defence Acquisition Guide:** States anticipated timeline for RFP release is 2014, with a contract award in 2015 and delivery between 2021 and 2025.

### **Status as of Sept. 1, 2014**

Draft RFPs have been shared with the industry, however no official RFP has been released.

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<sup>55</sup> Watt, Testimony, June 2, 2008.

<sup>56</sup> Robert Fonberg, then-Deputy Minister of National Defence, Testimony Before the Standing Senate Committee on National Security and Defence, May 25, 2009.

<sup>57</sup> General (retired) Walt Natynczyk, then-Chief of Defence Staff, Testimony Before the Standing Senate Committee on National Security and Defence, June 7, 2010.

<sup>58</sup> MacKay, Testimony.

<sup>59</sup> Blondin, Testimony.



## 8. INTEGRATED SOLDIER-SYSTEM PROJECT (ISSP)

### Project details

This project will provide up to 6,624 suites of equipment to be carried by the soldier. As lightweight as possible, and linked to the global positioning system, the equipment will enable the soldier to seamlessly share data and voice communications through a network with fellow soldiers and with a low-level command centre. It will include weapons accessories, electronic devices, sensors, and specialized clothing. The project comprises two contracts going to one bidder: one contract for 1,600 units and the option for an additional 5,042 units, over four years; and a second contract for in-service support over 11 years.

### Project history and requirement overview

The ISSP has its origins in the modern nature of warfare, which demands that all soldiers on a battlefield be technologically linked to one another, to a tactical command center, and to various battlefield assets (such as unmanned aerial vehicles providing imagery). The objective is enhanced soldier performance and fewer friendly-fire casualties through more comprehensive situational awareness, real-time tactical information sharing, and increased ability to synchronize activity. Many NATO allies have a future-soldier-system program underway. Canada's program began with extensive experimentation by Defence Research and Development in the early part of the last decade. In 2008, once the options-analysis phase was complete, the ISSP received preliminary project approval from the defence minister and went to Treasury Board for funding approval for the definition phase.

News reports from 2008 state the intention was to field a fully integrated suite of equipment for the soldier between 2013 and 2018. But it was not until early 2012 that the government released a request for proposals. The anticipated contract award date moved to late 2013, with equipment to be delivered over four years starting in 2015. The RFP closed in June 2012, but in January 2013 the government announced that of the five bids submitted in response to the RFP, none were compliant. After some engagement with industry, the government released a new RFP in April 2013, with a closing date of August 2013, and contract award expected in December 2014. The ISSP does not appear in the 2014 Defence Acquisition Guide.<sup>60</sup>

### Explanation of variances

Whereas in the mid-2000s it was expected that initial ISSP deliveries would begin in 2010, the current projection is for sometime after 2015. Key reasons for the delay include the complexity of the program and Canada's procurement rules. The RFP was released in three volumes consisting of over 1,700 pages and containing 2,500 specific requirements. Canada's procurement rules specify that failing just one requirement will cause a bid to be rejected. In each bid's case, one or more of the requirements were not met; in some cases, this involved a relatively innocuous specification such as whether a person named in the contract had a security clearance. The overarching reason for such strict rules is to protect taxpayer money,

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<sup>60</sup> The follow on Soldier System 2030 appears in the 2014 Defence Acquisition Guide as a program that will be in options analysis in 2026.

and to ensure the system is not manipulated. In the wake of the ISSP's bid rejections, the government introduced on a pilot basis a provision to allow defence firms to repair their bids on military equipment programs to avoid minor infractions. Critics are concerned this will open the system up to the potential to favour a company that should be disqualified by giving it a second chance. Ultimately it will come down to what sorts of things are classified as "minor infractions."

#### **Status as of Sept. 1, 2014**

The RFP closed in summer 2013 and bids are being evaluated. The first-phase contract award is expected in December 2014.

## **9. JOINT SUPPORT SHIP (JSS)**

### **Project history and requirement overview**

The Joint Support Ship project aims to replace Canada's two auxiliary oil replenishment (AOR) ships, commonly referred to as supply ships, which are used to replenish naval task groups at sea with fuel and other supplies. The AORs were commissioned in the late 1960s and DND first began planning for a replacement Afloat Logistics Sealift Capability (ALSC) program in the late 1980s. In the early 2000s the ALSC was renamed the Joint Support Ship project because of the decision to integrate capabilities beyond naval refuelling and replenishment. Influenced by the 1990s experience of projecting naval power onto land (beginning in Bosnia and then in Kosovo), and also by Canada's lack of military sealift capability, the new JSS project was more ambitious than the old ALSC. It sought to integrate three capabilities: (1) refuelling and resupply; (2) a command and control function for directing forces ashore; and (3) sealift for ground forces and their equipment. There was also to be room for three or four maritime helicopters on deck. The initial plan was to purchase three Joint Support Ships.

This vision survived the early 2006 change in government. DND announced an RFP to select two industry teams for a project-definition phase incorporating all three capabilities, stating that "based on these plans, one team will be selected to build the three ships, with delivery of the first ship targeted for 2012."<sup>61</sup> Two teams were awarded a contract in late 2006, and were given until spring 2008 to complete a proposal covering the design and building of the ships, and long-term in-service support. But both bids came in higher than the established budget, mainly as a result of the ambitious scope of capabilities the ships were to include, but also because of a large increase in the price of steel. In summer 2008 the government rejected both bids. By the following year the Navy had completed a scaled-down redefinition of requirements, but the JSS procurement process was put on hold again pending the outcome of shipyard bids under the National Shipbuilding Procurement Strategy.

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<sup>61</sup> Department of National Defence, "Canada First" Defence Procurement – Joint Support Ship," Press Release, June 26, 2006.

After it was announced in 2011 that Seaspan Shipyards in Vancouver would build the JSS, the next step was to pick a ship design. The idea was to maintain the refuel-and-resupply component in its entirety, while scaling back the aspects of the original JSS vision that included sealift and support to forces ashore in order to ensure affordability. Design work on the desired JSS had continued within the Navy, with a particular focus on whether it would go with a Spanish or German design — this time off the shelf. Rather than buying three ships, the contract would now be for two, with the option for a third.<sup>62</sup> Following an in-depth inter-departmental assessment based on operational capability, cost and risk, in June 2013 the government announced it had selected the Berlin-class ship design offered by ThyssenKrupp Marine Systems Canada. During this period, concerns were raised about a shipyard bottleneck delaying the JSS since both the JSS and the coast guard's icebreaker cannot be built at the same time at the Vancouver shipyard. But in fall 2013, the government announced the JSS would be built first, with contract award anticipated in late 2016 and delivery dates in 2019 and 2020.<sup>63</sup>

### **Explanation of variances**

Vessels that were originally to be delivered starting in 2012 will now be delivered starting in 2019 at the earliest. A major factor behind the delay in the JSS program was the large number of requirements the Navy attempted to integrate into a single platform. In combining refuelling and supply, the AORs were already a unique platform since most navies have separate refuelling and supply ships. The JSS, as originally conceived, would have gone a step further, combining the AOR functions with still two more: sealift and command-and-control ashore. Such a ship only existed in the minds of Canadian officers; there is no such ship currently in existence. It was an ambitious vision that could not be achieved within the established budget.

### **Official commitments and testimony**

**2006–07 RPP (p. 23):** “Starting in 2012 the first Joint Support Ship (JSS) will be delivered as a replacement to the Protecteur class replenishment vessels.”

**2007 Federal Budget (p. 253):** “The procurement of major equipment has progressed with the approval and announcement of the acquisition of joint support ships, a medium-sized logistics truck fleet [and] medium-to heavy-lift helicopters.”<sup>64</sup>

**2007 Senate Testimony:** “In December 2006, two contracts were awarded for the next phase of development work...we will stand up a small team this summer [2007] that will focus exclusively on delivering that future class of ships. In late 2008, we will select one and provide an order to build...The lead ship will be ready by 2012, and the other two will be ready in 2013 and 2015.”

**2007–08 RPP (p. 37):** States that formal effective project approval will be sought in 2008.

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<sup>62</sup> Department of National Defence, “Government of Canada to Acquire New Joint Support Ship,” Press Release, July 14, 2010.

<sup>63</sup> Government of Canada, “National Shipbuilding Procurement Strategy Secretariat Announces Vancouver Shipyards to Build the Joint Support Ships in 2016,” Press Release, October 11, 2013.

<sup>64</sup> Robertson, Testimony.

**2008–09 RPP (p. 57):** States that the intention is to deliver the first vessel in 2012, and that formal effective project approval will be sought in 2008.

**2008 CFDS (p. 4):** Restates that the government has announced plans to acquire three replenishment ships.

**August 2008:** The government announces the termination of the procurement process to acquire three Joint Support Ships. After receiving and evaluating the bids against the criteria, it was determined the proposals were not compliant with the RFP.<sup>65</sup>

**2009 Senate Testimony:** “We will have a Joint Support Ship. We went out with a budget and certain specifications...the pricing came in at a significant premium over that. We do not have that space in the budget, so we are looking at the capabilities associated with that platform.”<sup>66</sup>

**2009–10 RPP (p. 21):** “[T]he government...has announced *possible* plans to acquire...replenishment ships” (emphasis added).

**2009–10 DPR Estimates (p. 22):** Procurement plans for the JSS have been re-evaluated and work continues on attaining preliminary project approval.

**2010–11 DPR:** The JSS project will acquire two new support ships, with the option for a third if additional funding is found. This is the first formal statement that purchasing three ships may not be possible. Anticipates project approval by September 2013; first ship delivery in spring 2017.

**October 2011:** NSPS secretariat announced Vancouver Shipyards would build the JSS.

**DPR 2011–12:** First JSS expected to be delivered in 2018.

**February 2013 Senate Testimony:** The Joint Support Ship is in project-definition phase and is being advanced within the framework of the National Shipbuilding Procurement Strategy. The hope is the first JSS will be delivered in 2017 and the second shortly after, so that both replenishment ships will be at sea by the end of the decade.<sup>67</sup>

**March 2013 Senate Testimony:** The Joint Support Ship is in its definition stages.<sup>68</sup>

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Joint Support Ship.

**2014–15 RPP, Status Report on Major Crown Projects:** Major milestones include award of implementation contract in 2016 and initial delivery in 2019.

**June 2014 Defence Acquisition Guide:** Anticipates contract award in 2016 and final delivery in 2020.

#### **Status as of Sept. 1, 2014**

The JSS is in definition phase.

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<sup>65</sup> As stated in DND’s 2010–11 Departmental Performance Report.

<sup>66</sup> Fonberg, Testimony.

<sup>67</sup> Maddison, Testimony, February 25, 2013.

<sup>68</sup> Lawson, Testimony.

## 10. JOINT UNMANNED SURVEILLANCE TARGET-ACQUISITION SYSTEM (JUSTAS)

### Project details

This project is to deliver a medium-altitude long-endurance unmanned aircraft (drone) system that meets the objectives of the Canada First Defence Strategy, including domestic and international operations. It is driven by three requirements:

- (1) To conduct long-range surveillance patrols over the Arctic;
- (2) To assist in maritime patrol along the east and west coasts out 1,000 miles to sea, including in support of search and rescue. Here, JUSTAS platforms would augment Aurora long-range patrol aircraft and their eventual replacement (the Canadian Multi-mission Aircraft); and
- (3) To support troops on overseas operations, including the range of missions from warfighting to humanitarian assistance.

Of the three areas, the RCAF considers the ability to carry out Arctic patrols as the “first and foremost” capability requirement. Although surveillance is of primary importance, the RCAF would like the drone to have some payload capacity, including the ability to carry and drop a search-and-rescue package when patrolling the Arctic, and the ability to carry weapons in an overseas warfighting environment.<sup>69</sup> The overall idea is for an unmanned aerial vehicle (UAV) that is flexible and can undertake many sorts of missions. Reports indicate the UAV must be able to transit 1,000 nautical miles, loiter for 12 hours at a time, and return to base. Other requirements include an overland capability to track targets as small as humans, and a maritime-surveillance capability that can track ships along the coasts.

### Project history and requirement overview

With thousands of square kilometres of uninhabited northern areas, and lengthy coasts on three oceans, Canada has a huge task carrying out maritime and territorial surveillance and control. Not surprisingly, the Canadian Air Force is looking at medium-altitude long-endurance UAVs as a means of making the task more manageable. In 2005, the Air Force began work on a JUSTAS program calling for the acquisition of a fleet of medium-altitude UAVs by 2010.<sup>70</sup> As part of its 2005 election campaign, the Conservative party said that, if elected, it would station new long-range UAV squadrons at CFB Goose Bay and CFB Comox for Eastern and Western Arctic air surveillance.<sup>71</sup> In mid-2006 there was reference to the acquisition of a fleet of 18 drones,<sup>72</sup> but in 2007, a DND plan to sole-source purchase America’s well-known Predator UAV was reportedly stopped by the government in favour of holding a competition.<sup>73</sup> In September 2008, DND and PWGSC released a letter of interest to the industry outlining a project to acquire UAVs,<sup>74</sup> and a request for proposals was to be released by the end of 2009 for the acquisition of 18 UAVs.<sup>75</sup> As of September 2014 this has not happened.

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<sup>69</sup> Blondin, Testimony.

<sup>70</sup> David Pugliese, “Canada Shapes Plan for UAV Buy,” *Defense News*, December 5, 2005.

<sup>71</sup> Conservative Party of Canada, “Harper Stands.”

<sup>72</sup> Bruce Champion-Smith, “Drones on Military Wish List,” *Toronto Star*, July 4, 2006.

<sup>73</sup> David Pugliese, “Tories Kill Sole-Source DND Contract,” *Ottawa Citizen*, April 20, 2007.

<sup>74</sup> David Pugliese, “Afghanistan Combat to Help Shape Canadian Budget,” *Defense News*, September 22, 2008, 20.

<sup>75</sup> David Pugliese, “Canada Plans Long-Range UAV Fleet,” *Defense News*, February 16, 2009, 20.

## Explanation of variances

Whereas, at one time, medium-altitude long-endurance UAVs were anticipated by 2010, to date their acquisition is not on the horizon. Apart from delays brought on by funding constraints as a result of the mission in Afghanistan in earlier years, and a reduced defence budget more recently, the key hurdle to progressing with the JUSTAS project is the complexity of determining the requirement. One aspect is the scope of the project. Should Canada pursue UAVs only for surveillance, or should it seek unmanned *combat* aerial vehicles (UCAVs) for surveillance *and* precision strike? While the RCAF seeks the latter, the government as a whole has not gone in this direction. A second aspect is overlap with other military assets. The proposed UAV fleet is closely linked to the Canadian Multi-mission Aircraft project because some of the surveillance missions carried out by long-range patrol aircraft could, in the future, be conducted by long-endurance UAVs. Such platforms could also assist in the search component of search and rescue. And any UCAV acquisition would have to be pursued in light of the CF-18 replacement project and finding the right mix of manned and unmanned combat aircraft. The fact that it is difficult to pursue the JUSTAS project in isolation from several other projects — such as the CF-18 replacement, CMA and FWSAR — makes it especially vulnerable to project delays.

## Official commitments and testimony

**June 2008 CFDS:** Does not mention joint unmanned aerial vehicles.

**2008–09 RPP (p. 58):** “The JUSTAS project will bring the CF a fleet of medium-altitude UAVs capable of overland operations in Canada and abroad. The project is aiming to deliver an initial operational capability in 2011.”

**2011–12 DPR:** The project is in options-analysis stage. All major milestones, including project approval, contract award and aircraft delivery date are designated as “to be determined.”

**2012–13 RPP, Status Report on Major Crown Projects:** All major milestones listed as “to be determined.”

**March 2013 Senate Testimony:** JUSTAS is at the options-analysis stage. The Air Force is looking at what platforms are available and is trying to define exactly what is required for the future.<sup>76</sup>

**2013–14 RPP, Status Report on Major Crown Projects:** All major milestones listed as “to be determined.”

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Joint Unmanned Surveillance and Target-Acquisition System.

**2014–15 RPP, Status Report on Major Crown Projects:** All major milestones listed as “to be determined.”

**June 2014 Defence Acquisition Guide:** Anticipates definition approval by 2018; RFP release by 2019; contract award by 2020; and all deliveries by 2025.

## Status as of Sept. 1, 2014

The JUSTAS project remains at the options-analysis stage.

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<sup>76</sup> *ibid.*



## 11. LAND VEHICLE CREW-TRAINING SYSTEM

### Project details

To set up five vehicle-simulation and -training centres across Canada that will provide crew commander, gunnery and driver training. The project will install computer-generated imagery and simulators for soldiers crewing upgraded LAV IIIs and Leopard 2 tanks and build the associated infrastructure at Canadian Forces Bases Gagetown, Valcartier, Petawawa, Shilo and Edmonton.

### Project history and requirement overview

As the cost of live training exercises goes up, Canada is increasingly turning to simulators to assist in (but not completely replace) live training exercises. Live exercises are still necessary, but troops can gain valuable training with ever more technologically advanced, and therefore realistic, simulators before going to the field. When it was originally conceived, the Land Vehicle Crew-Training System (LVCTS) was to involve simulators for crews operating Leopard 2 tanks, Light Armoured Vehicles, and the close-combat vehicle. With the latter now cancelled, the focus is on Canada's large LAV III fleet, as well as its Leopard 2s.

The LVCTS project sits within DND's Directorate of Land Requirements. In 2011 the directorate expected preliminary project approval by the end of 2011, with initial operability by the end of 2015.<sup>77</sup> The directorate published a letter of interest to solicit industry input to the options-analysis phase.<sup>78</sup> A year later, the project was still at the options-analysis stage, awaiting Treasury Board funding/preliminary project approval by the end of 2012 in order to begin the definition phase in spring 2013, and follow with an RFP in late 2015.<sup>79</sup> Most recently, the June 2014 Defence Acquisition Guide anticipates an RFP in 2017, a contract award in 2018, and final delivery between 2021 and 2025.

### Explanation of variances

A project that was expected at one time to have initial operating capability by the end of 2015 will now not begin to be delivered before 2019, indicating a minimum a four-year delay from original expectations. A likely reason for the timeline variance is uncertainty surrounding the CCV, one of the key platforms that was to have been simulated within LVCTS. The project's scope will have to be re-examined in light of the CCV cancellation in December 2013.

### Official commitments and testimony

**June 2014 Defence Acquisition Guide:** Anticipates RFP release in 2017 and contract award in 2018.

### Status as of Sept. 1, 2014

The project remains in the options-analysis stage.

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<sup>77</sup> David Pugliese, "Canada to Boost Simulation as Budgets Tighten," *Defense News*, April 18, 2011.

<sup>78</sup> Brad Cain and Vlad Zotov, *Proposed Scientific Support to the LVCTS Project Requirements Definition* (Toronto: Defence R&D Canada, January 2013), i.

<sup>79</sup> Chris Thatcher, "Combat Vehicle Crew Trainer Delivers a Technological Leap," *Vanguard Magazine*, October/November 2012.



## 12. MARITIME HELICOPTER PROJECT (MHP)

### Project details

The purpose of the Maritime Helicopter Project is to replace Canada's existing Sea King helicopters with a fleet of 28 new maritime helicopters. These are to be the CH-148 Cyclone helicopters, built by Sikorsky International Operations Inc. (of Connecticut), with the onboard mission system being developed by General Dynamics Canada (of Ottawa).

### Project history and requirement overview

Maritime helicopters operate off of Canada's frigates and destroyers. They are critical operational and logistical assets: operationally they significantly increase a ship's maritime surveillance and interdiction capability by extending its range of view outward, well beyond the horizon; logistically they are used almost daily to transport forces and cargo back and forth between ship and shore. Canada's Sea King helicopters have performed these roles since they were acquired in the 1960s.

In 1986, the Mulroney government launched a replacement process for a new maritime helicopter. This resulted in a 1992 contract to purchase the EH101 helicopter, but when the Chrétien government was elected the following year, it cancelled the contract. Only a year after that, in its 1994 defence white paper, the government stated that the Sea Kings were "rapidly approaching the end of their operational life," and planning would start immediately to get a new aircraft in place by the end of the decade.<sup>80</sup> The acquisition process restarted again in 1995 as the Maritime Helicopter Project, and over the next five years, National Defence conducted options analyses. At a 2000 news conference, the minister of national defence announced that the government had given DND approval to proceed with the replacement process.<sup>81</sup> Originally, the project was divided into two competitions, one for airframe and one for mission systems, but this changed in 2002 when the government decided to hold a single competitive process for the entire aircraft. The number of aircraft was set at 28, two manufacturers were deemed compliant, and Sikorsky International Operations Inc. won the contract.

In late 2004, Ottawa signed a contract with Sikorsky specifying that the company would deliver one aircraft per month beginning in November 2008. But in early 2008, Sikorsky formally advised the government of a delay in the planned delivery date. The contract was amended, this time breaking the delivery into a tiered schedule of up to 19 interim aircraft, beginning November 2010, and 28 fully complaint aircraft starting in June 2012. In June 2010 there was a second contract amendment, this time allowing for delivery of six interim aircraft with a "preliminary version of the mission software."<sup>82</sup> The first interim helicopter arrived at CFB Shearwater in 2011, and three more in 2012. But the government would not take delivery of the aircraft until all requirements were met, something that proved elusive. In summer 2012, then-defence minister Peter MacKay declared the Cyclone to be the worst procurement in Canadian history.

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<sup>80</sup> 1994 Defence White Paper (Ottawa: Government of Canada, December 1994), 46-47.

<sup>81</sup> David J. Bercuson, Aaron P. Plamondon and Ray Szeto, *An Opaque Window: An Overview of Some Commitments Made by the Government of Canada Regarding the Department of National Defence and the Canadian Forces; 1 January 2000 – 31 December 2004* (Calgary: Canadian Defence and Foreign Affairs Institute, May 2006), 27.

<sup>82</sup> Department of National Defence, "Maritime Helicopter Project: Status," Fact Sheet, February 25, 2013.

In spring 2013, PWGSC commissioned an independent evaluation of whether it would ever be possible for Sikorsky to deliver a compliant aircraft. Meanwhile, for a brief period in summer/fall 2013, the government looked at alternative helicopters by rival aircraft makers. But in January 2014, Ottawa announced it would be sticking with the Cyclone, since the alternative would have been to lose over \$1 billion and set back the urgent replacement of the Sea Kings still many more years. The independent consultant report found that the program would be viable with a “different project structure and governance model,”<sup>83</sup> which amounted to Canada agreeing to accept helicopters that are not fully compliant while Sikorsky continues to work towards fully compliant aircraft. During this period, the Air Force was asked to revisit the program’s list of requirements, clearly indicating what was absolutely necessary and what was not essential.

Under an amended purchase agreement (the third one), reached between PWGSC and Sikorsky in spring 2014, interim helicopters are to be delivered in 2015 and will begin limited operational missions in 2016. The Cyclones will not be declared fully operational until 2018, once Sikorsky delivers a software package integrating all mission and warfighting capabilities.<sup>84</sup> No further payments will be issued to Sikorsky until fully compliant aircraft are delivered.

### **Explanation of variances**

The significant delays in this project are due to a combination of the contractor committing to more than was technologically possible to deliver and DND not being fully aware of the technological complexity of the helicopters it was asking for and the degree to which the technology was still in developmental status. The aircraft is the first military and naval variant of Sikorsky’s S-92 Cyclone civilian helicopter. At the time of contract award, it existed only on drawing boards and was expected to go from there to operational use within four years — an ambitious endeavor for “an aircraft that never existed before.”<sup>85</sup> A fall 2010 report by Canada’s auditor general found that National Defence did not adequately assess the developmental nature of the aircraft and the complexity of the required technical modifications.<sup>86</sup> An independent PWGSC evaluation in spring 2013 similarly determined that, while in 2004 the government thought it was buying an off-the-shelf product,<sup>87</sup> in fact what was being asked for was a state-of-the-art aircraft involving advanced technology. It therefore should have been treated as a developmental program.<sup>88</sup>

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<sup>83</sup> Government of Canada, “Government of Canada to continue with Maritime Helicopter Project and begin retiring Sea Kings in 2015,” News Release, January 3, 2014.

<sup>84</sup> Murray Brewster, “Ottawa Finalizes Revised Contract to Deliver Cyclones, Retire Sea Kings,” Canadian Press, June 18, 2014.

<sup>85</sup> Office of the Auditor General, *Report*, Fall 2010, 2.

<sup>86</sup> *ibid.*, para 6.33.

<sup>87</sup> A case can be made that the government did know the helicopter was developmental: Sikorsky’s primary competitor drew attention to it frequently. The competitor was a newer version of the same helicopter that had been cancelled by the Chrétien government in 1993. Although by 2004 there was a new Liberal government in place, some have argued the government may have “gone easy” on Sikorsky to avoid choosing the same helicopter the Liberals had previously cancelled at such great cost to the taxpayer. See Aaron Plamondon, *The Politics of Procurement: Military Acquisition in Canada and the Sea King Helicopter* (Vancouver: University of British Columbia Press, 2009).

<sup>88</sup> Kathleen Harris, “Cyclone Helicopter Contract Revisions Urged by Report,” CBC News, September 4, 2013.

## **Official commitments and testimony**

**2006–2007 DPR:** States that first delivery will be January 2009.

**2007 Senate Testimony:** The first Cyclone will arrive in early 2009 and the Sea King will be phased out two or three years after that.<sup>89</sup>

**2008–09 DPR:** States that first delivery will be November 2010.

**2009 Senate Testimony:** Confirms first delivery for November 2010.<sup>90</sup>

**2009–10 DPR:** States first delivery of interim maritime helicopter will be in 2010; first delivery of compliant maritime helicopter will be in 2012.

**2010–11 DPR:** States that project focus is shifting from design and engineering to operational testing and evaluation.

**2011–12 DPR:** States that first delivery of an aircraft is contractually required by 2012, but that “the delivery of fully capable helicopters is now expected to occur in 2013.”

**2012 Senate Testimony:** “I expect to see [the Cyclone] helicopters arriving in an interim capability this year [2012] and in 2013 and 2014.”<sup>91</sup>

**March 2013 Senate Testimony:** “We have four helicopters in Shearwater. I am being told it is still a matter of days or weeks until we will be able to use them for training. I am confident that this is coming.”<sup>92</sup>

**2013–14 RPP (p. 38):** States that Canada will continue to progress with the Maritime Helicopter Project.

**2014–15 RPP, Status Report on Major Crown Projects:** States that first delivery of interim maritime helicopter is to take place in 2015; first delivery of fully capable maritime helicopter to be in 2018; final delivery to be in 2020; and project close out to be in 2021.

## **Status as of Sept. 1, 2014**

As of Sept. 1, 2014 the Air Force has not taken delivery of any maritime helicopters. Under a June 2014 agreement, Sikorsky is to begin delivering interim helicopters in 2015 and fully operational aircraft in 2018. Final delivery of all fully compliant aircraft is anticipated for 2020.

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<sup>89</sup> Lucas, Testimony.

<sup>90</sup> Dan Ross, then-Assistant Deputy Minister (Materiel), Testimony Before the Standing Senate Committee on National Security and Defence, May 25, 2009.

<sup>91</sup> Maddison, Testimony, February 27, 2012.

<sup>92</sup> Blondin, Testimony.

### **13. MEDIUM-SUPPORT VEHICLE SYSTEM (MSVS) (TRUCKS)**

#### **Project details**

The Standard Military Pattern (SMP) portion of this project is meant to replace the Army's MLVW (Medium-Logistics Vehicle Wheeled) fleet. The 1,500 SMP vehicles are to be a minimum of 4.5 tons, capable of being armed and armoured, and transportable on board the C-130 Hercules aircraft.

#### **Project history and requirement overview**

Acquired in 1982, the service life of the MLVWs was supposed to be 15 years. Yet they continued to be used, at growing cost of repair, until 2008. A project to replace the MLVWs began in the late 1990s but had not progressed by the time the Conservatives came to power. In 2004, the Army had proposed a foreign military sale of U.S. trucks to Canada but the Liberal government turned down the proposal for lack of domestic industrial benefits.

In June 2006 the new government announced it would buy trucks, including 1,500 Standard Military Pattern (SMP) vehicles, and 800 (later 1,300) Militarized Commercial Off-the-Shelf (MilCOTS) vehicles. The plan at the time was for all deliveries to take place between 2008 and 2010. The MilCOTS portion of the program proceeded without significant delay: an RFP was released in late 2008, a contract was awarded in January 2009, and all vehicles were delivered by fall 2012. But an RFP for the SMP portion was not released until late 2011. Moreover, after six months the government abruptly cancelled the RFP. The cost had escalated as the military added more capabilities, but this increased cost — 40 per cent more than the allocated budget — had not been reflected in the RFP. In January 2013 the government conducted consultations with the industry on a new RFP, which was subsequently issued that summer. Bidders had until January 2014 to submit their proposals, and the contract award is now promised for fall 2015 with deliveries in 2017 and 2018.

#### **Explanation of variances**

The originally expected initial delivery date for the SMP vehicle (in 2006) has slipped from between 2008 and 2010 to 2017–18. One explanation for the original delay in issuing an RFP was a difference of views in the early years (2008–09) between the Army and civilian procurement staff on requirements — for example, on the level of armour protection against improvised explosive devices (IEDs). As a result, the requirements had to be rewritten. The Army was likely influenced in this regard by the ongoing mission in Afghanistan where, at this time, troops were being killed by IEDs on a regular basis. Increased armour, in turn, almost doubled the cost of the project, leading to further delays. The original RFP was cancelled, the shortfall had to be covered by transferring money from a future vehicle project to the MSVS project and a new RFP had to be issued.

## **Official commitments and testimony**

**2006–07 RPP (pp. 24, 44 and 45):** Notes that the MSVS project’s identification phase was approved in October 2000. The project has reached the end of its options-analysis phase and is entering the definition phase. Treasury Board approved the MSVS project in June 2006; approval for initial operational capability is anticipated by June 2009, with full operational capability by December 2011. In the 2008–2012 timeframe, the MSVS project will deliver up to 1,500 military-pattern vehicles.

**Budget Plan 2007 (p. 253):** “The procurement of major equipment has progressed with the approval and announcement of the acquisition of joint support ships, a medium-sized logistics truck fleet [and] medium-to heavy-lift helicopters.”

**2007–08 RPP (p. 38):** The MSVS project is in its definition phase. It is anticipated formal effective project approval will be sought in fiscal 2007–08.

**2008 CFDS (p. 4):** Restates that the government has announced plans to acquire 2,300 trucks.

**2008–09 RPP (p. 59):** “The project is currently in its definition phase and will be seeking approval for phased implementation commencing in 2008.”

**2009–10 RPP (p. 21):** “[T]he government...has announced *possible* plans to acquire...a fleet of medium-logistics trucks” (emphasis added).

**2009–10 DPR:** A draft RFP was posted on the project website for industry comment in 2009, and the final RFP for this project is planned for release in early 2011.

**2010–11 DPR:** The SMP contract will be awarded in early 2013, with first delivery in spring 2014.

**2011–12 DPR:** The SMP project is in definition phase; the RFP was released December 2011; contract award date is to be determined.

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Medium-Support Vehicle Systems Project.

**2013–14 RPP, Report on Major Crown Projects:** Anticipates contract award in 2014; first delivery in 2015.

**2014–15 RPP, Report on Major Crown Projects:** Anticipates contract award in 2015; first delivery 2017.

**June 2014 Defence Acquisition Guide:** The MSVS project does not appear in the June 2014 Defence Acquisition Guide.

## **Status as of Sept. 1, 2014**

In July 2013 the government issued an RFP to acquire a fleet of military trucks, but it is not clear what the status is of this RFP. Despite being released in March 2014, the 2014–15 RPP states “[the RFP] is slated to close in January 2014.” It also states that a contract will be awarded in 2015, but intriguingly, the Defence Acquisition Guide of June 2014 does not include the truck project. According to the most recent RPP the program is officially in definition stage.

## 14. MEDIUM-TO-HEAVY LIFT HELICOPTER (CHINOOK)

### Project details

This project is to deliver 15 Chinook CH-147F helicopters to support land-based domestic and international operations.

### Project history and overview

Troop-transport helicopters are critical for battlefield operations. Without such helicopters, which can normally carry about 40 troops or a combination of soldiers and equipment, an army is forced to get supplies and people from one point on the battlefield to another by vehicle convoy. This can be exceedingly dangerous, as was demonstrated in Afghanistan where Canada lost many soldiers in convoys to improvised explosive devices. During the Cold War, Canada had a fleet of Chinook transport helicopters, but the government sold them to the Dutch in the early 1990s as part of an overall program of defence cutbacks.

The 2005 budget was the first to highlight the need for a new troop-carrying aircraft. At the time, DND anticipated moving quickly through the project-definition phase, with contract award in 2006 and first deliveries in 2008.<sup>93</sup> After the Harper government came to power in 2006, and as circumstances grew more dangerous for Canadian troops in Afghanistan that same year, there was a further commitment to replace the Chinook capability. In June 2006 the government announced Canada would purchase 16 new military transport helicopters, with plans for contract award in 2007 and deliveries to start in 2010. Within two months the military had determined that only Boeing's Chinook could meet Canada's requirements, but over the following year the Air Force asked for changes that ultimately pushed back timelines. Requested design upgrades included better armour and weapons to enable casualty evacuation, and greater endurance to enable longer flying distances in the Arctic. In March 2008 the government issued an RFP to Boeing for 16 F-model Chinooks, yet a contract award — now for 15 aircraft — did not come until summer 2009. In July 2013 Canada took delivery of the first new Chinook, and the last was delivered in July 2014.

### Explanation of variances

Delivery of the first new Chinook took place five years after the originally anticipated date of 2008, and the last was delivered some three years after Canada's combat mission in Afghanistan — the original driving force behind the acquisition — came to an end. The delay can be largely explained by the upgraded design requirements. Although originally characterized as being “off the shelf,” in fact the aircraft contained significant modifications. The impact was a postponed delivery schedule and an increase in cost such that the number of helicopters purchased had to be reduced by one. Delivery of these F-model Chinook aircraft may also have been delayed by the need to negotiate an “emergency” purchase and deployment of six D-model Chinooks to Afghanistan by early 2009, a requirement in response to the 2008 report from the Independent Panel on Canada's Future Role in Afghanistan. These aircraft have now been sold.

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<sup>93</sup> Office of the Auditor General, *Report*, Fall 2010, 21.



## **Official commitments and testimony**

**2006–07 RPP (p. 24):** Notes that Treasury Board approved the Medium-to-Heavy Lift Helicopter project on June 22, 2006. “High priority will be given to...Medium to Heavy Lift Helicopters.”

**Budget Plan 2007 (p. 253):** “The procurement of major equipment has progressed with the approval and announcement of the acquisition of joint support ships, a medium-sized logistics truck fleet [and] medium-to heavy-lift helicopters.”

**2008–09 RPP (p. 58):** “Delivery of up to 16 helicopters is scheduled to begin in 2011.”

2008 CFDS (p. 4): Restates that the government has announced plans to acquire 16 CH-47F Chinook Helicopters.

**2009–10 RPP (p. 21):** “[T]he government...has announced *possible* plans to acquire a Medium-to Heavy-Lift Helicopter capability” (emphasis added).

**2009–10 DPR Estimates (p. 21):** Notes that the Medium-to Heavy-Lift Helicopter contract was awarded to Boeing on June 30, 2009.

**2010–11 DPR and 2011–12 DPR:** First fully mission-ready aircraft will be delivered in 2013.

**2013–14 RPP (p. 38):** States that Defence will continue to progress with the Medium-to-Heavy-Lift Helicopter.

**2014–15 RPP, Status Report on Major Crown Projects:** States major milestones of initial operational capability in June 2014; full operational capability in June 2017; and project close-out in June 2018.

### **Status as of Sept. 1, 2014**

Canada took delivery of its first new Chinook in July 2013 and its fifteenth in July 2014. Full operational capability is anticipated for 2017 and project close-out in 2018.

## **15. NANISIVIK NAVAL FACILITY**

### **Project history and requirement overview**

Despite its vast Arctic territory, coasts and waters, Canada has no deepwater port in the region. By contrast, Russia has several major ports above the Arctic Circle. With the warming Arctic, melting ice, and increased traffic through the region — actual, as well as that projected for the future — there is a growing need for a northern Canadian port. As part of his party’s election platform in late 2005, party leader Stephen Harper promised that a Conservative government would build a new military/civilian deep-water docking facility.<sup>94</sup> After the election, DND began analyzing sites for the port, based on ice, tide, and strategic location. In August 2007, Harper announced a deepwater port would be built in Nanisivik, on the northern end of Baffin Island, in a sound just off the Northwest Passage.

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<sup>94</sup> Conservative Party of Canada, “Harper Stands.”



The Nanisivik decision was tied to a concurrent announcement that Canada would build between six and eight Arctic/Offshore Patrol Ships that could dock and refuel at the Nanisivik facility. The deepwater port, combined with ships designed to operate in the Arctic, would enable Canada to maintain a federal presence in the region throughout the navigable season. In a backgrounder press release, the prime minister's office stressed that the port would serve as a staging area for naval vessels on the high Arctic, enabling them to resupply, refuel, embark equipment and supplies, and transfer personnel. The project-definition phase would begin in summer 2007; additional technical and environmental studies would take place summer 2008; construction at the Nanisivik site would begin summer 2010; initial operating capability was planned for summer 2012; and full operational capability was expected for summer 2015.<sup>95</sup>

In November 2009 the government awarded the first of four design contracts for what was now being called the Nanisivik Naval Facility to WorsleyParsons Westmar Ltd., of North Vancouver. This initial phase involved establishing requirements for construction and carrying out preliminary design work, while subsequent design contracts were to undertake detailed plans, develop drawings, and prepare construction estimates.<sup>96</sup> Yet even as the first design contract was awarded, the project had already fallen two years behind schedule. Construction work was now expected to begin in 2011, with initial operating capability anticipated by 2014. Later, in a winter 2012 letter to a northern environmental regulator, DND officially scaled down the scope of what was originally envisaged. At Nanisivik there would be less fuel stored, no permanent communications facilities installed, no heated accommodations, and delays in improvements to the wharf. The target date for initial operating capability was set at 2016. In a summer 2012 speech, Harper stated the Nanisivik Naval Facility would be completed over the next five years<sup>97</sup> — but the content of “completed” was far less than that envisaged in 2007. The government made the same five-year commitment in its Economic Action Plan 2013, indicating the scaled-down deepwater facility will not be finished before 2018. In summer 2013, DND stated “The Facility is on track to be completed when the first AOPS enters service”<sup>98</sup> (now estimated at 2018), but the port is not mentioned in Economic Action Plan 2014.

### **Explanation of variances**

A key factor behind this project's delayed implementation, and its reduced scope, is the unanticipated cost of constructing and operating a facility in the North. Because Nanisivik is an abandoned zinc-mining village with a pre-existing berthing facility, startup costs were projected to be relatively low. But as DND started to look at the details of the port expansion at so remote a location, projected costs ballooned to double the original allocation. Determined to stick to the budgetary envelope, the government has reduced the scope of the project and the functionality of the site. DND was also held up by the need for an environmental screening

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<sup>95</sup> Office of the Prime Minister, “Backgrounder — Expanding Canadian Forces Operations in the Arctic,” August 10, 2007.

<sup>96</sup> Government of Canada, “Canada's Government Awards Contract for Arctic Infrastructure Project,” Marketwire, November 26, 2009.

<sup>97</sup> States News Service, “Statement by the Prime Minister of Canada in Churchill, Manitoba,” August 24, 2012.

<sup>98</sup> Scott Stevenson, “Naval Plan on Course,” *Regina Leader-Post*, August 29, 2013.

process. The company that operated the now closed mine was to conduct an environmental clean up of the fuel-tank farm but had not done so, frustrating military progress even as the Department of Fisheries and Oceans — which currently administers this Crown land — had sent legal notification to the company to clean up the property.<sup>99</sup> In fall 2013, the Nunavut Impact Review Board ruled that the project could go ahead without a full environmental review.

#### **Status as of Sept. 1, 2014**

An SOIQ was issued in summer 2013; four companies qualified to compete for the contract; and an RFP was later released. A contract was awarded in summer 2014 to Almiq Contracting to rebuild the docks, build a new fuel-tank farm, and install the infrastructure from the fuel-tank farm to the docks, among other things. Initial operating capability is anticipated for 2017–18.

## **16. PROTECTED MILITARY SATELLITE COMMUNICATIONS (PMSC)**

### **Project details**

The project will deliver to the Canadian Forces a near-worldwide, assured, secure, and survivable satellite-based military communications system. The system of six satellites is to operate in the Extremely High Frequency (EHF) bandwidth, making such communications both reliable and robust, even in the event of nuclear war.

### **Project history and requirement overview**

The Canadian Forces requires dedicated, secure military satellite communications for the conduct of its operations around the world. To date, the CAF has never had such a capability — it is dependent on American and other allied military satellites systems, as well as on civilian systems. As far back as 1988, under the Mulroney government, DND began to conduct research with the United States on satellite communications in the (EHF) band. The Canadian Military Satellite Communications (CANMILSATCOM) project, begun by the Chrétien government, was a follow on to the original EHF initiative. In 1999, Treasury Board granted preliminary approval for the project, now known as Protected Military Satellite Communications (PMSC), to proceed. DND signed a memorandum of understanding with the United States guaranteeing, for the price of \$250 million, Canadian participation in America's Advanced EHF (AEHF) program. The PMSC involves two phases: first, satellite procurement; and second, procuring, installing and testing ground- and sea-based terminals. In 2003, Treasury Board granted approval for the second phase, bringing the combined cost to just over \$550 million.

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<sup>99</sup> Murray Brewster, "Harper's Vaunted Arctic Naval Refuelling Station Delayed Over Slow-Moving Environmental Clean Up," *National Post*, September 1, 2013.

Once the AEHF satellite system is fully operational — defined as four satellites having completed on-orbit testing — Canada will have access for a 12-year period. When the MOU was originally signed, it was anticipated the first satellite launch would take place in 2004 and that the system would be fully operational a few years later. But the projected launch date slipped from 2006 to 2008 and then to 2010. The first satellite in the system was finally launched in 2010, the second in 2012, and the third in 2013. The first two have completed on-orbit testing. It is expected the fourth satellite will be launched in 2017 and that the system will be fully operational by the end of 2020. The eventual fifth and sixth satellites in the system will add to operational capacity. In spring 2013, Canada became the first of three international partners (along with the United States) to communicate using the AEHF system, while the Netherlands and the United Kingdom connected some months later.

### **Explanation of variances**

Competing demands on defence in the United States over the course of a decade, combined with various technical difficulties experienced by the contractor, Lockheed Martin, progressively pushed back the launch of the AEHF satellites. Since America's AEHF satellite system is the heart of Canada's PMSC, Canada had no choice but to accept setbacks in the original PMSC schedule. Phase Two of the project, over which Canada had control, progressed as fast as was necessary. On a few occasions, the projected delivery date of the terminals actually moved up rather than back. That said, there were some delays in Phase Two as a result of the naval fleet plan refit schedule, specifically upgrades to the Victoria-class submarines that included installation of the AEHF terminals.

### **Official commitments and testimony**

**2007–08 DPR:** Initial satellite delivery in 2010; full operational capability in 2014; initial terminal delivery in 2009.

**2008–09 DPR:** Initial satellite delivery in 2012; full operational capability in 2017; initial terminal delivery in 2011.

**2009–10 DPR:** Initial satellite delivery in 2012; full operational capability in 2017; initial terminal delivery in 2010.

**2010–11 DPR:** Initial satellite delivery 2012–13; full operational capability in 2019–20; initial terminal delivery 2012.

**2011–12 DPR:** Initial satellite availability 2012–13; full operational capability in 2020; initial terminal delivery 2011.

**2012–13 RPP, Status Report on Major Crown Projects:** Initial satellite availability 2012–13; full operational capability in 2019–2020.

**2013–14 RPP, Status Report on Major Crown Projects:** Initial satellite availability 2013; full operational capability in December 2020.

**2014–15 RPP, Status Report on Major Crown Projects:** Full operational capability in December 2020.

**Status as of Sept. 1, 2014**

Three satellites in the AEHF system have been launched and two have completed on-orbit testing. It is expected that a fourth satellite will be launched in 2017. Once all four have completed on-orbit testing, anticipated by the end of 2020, the system will be considered fully operational. Two more satellites will eventually be launched as part of the system.

## LIST OF ACRONYMS

<b>AEHF</b>	Advanced EHF
<b>AIMP</b>	Aurora Incremental Modernization Project
<b>ALSC</b>	Afloat Logistics Sealift Capability
<b>AOPS</b>	Arctic Offshore Patrol Ships
<b>ASTOR</b>	Airborne Stand-Off Reconnaissance
<b>CAF</b>	Canadian Armed Forces
<b>CANMILSATCOM</b>	Canadian Military Satellite Communications
<b>CCV</b>	Close-Combat Vehicle
<b>CFDS</b>	Canada First Defence Strategy
<b>CMA</b>	Canadian Multi-mission Aircraft
<b>CSC</b>	Canadian Surface Combatant
<b>DAG</b>	Defence Acquisition Guide
<b>DND</b>	Department of National Defence
<b>DPR</b>	Departmental Performance Report
<b>DPS</b>	Defence Procurement Strategy
<b>EEZ</b>	Exclusive Economic Zone
<b>EHF</b>	Extremely High Frequency
<b>EPA</b>	Effective Project Approval
<b>FWSAR</b>	Fixed-Wing Search and Rescue
<b>IEDs</b>	Improvised Explosive Devices
<b>ITBs</b>	Industrial and Technological Benefits
<b>ISSP</b>	Integrated Soldier-System Project
<b>JSF</b>	Joint Strike Fighter
<b>JSS</b>	Joint Support Ship
<b>JUSTAS</b>	Joint Unmanned Surveillance Target-Acquisition System
<b>KICS</b>	Key Industrial Capabilities
<b>LAV</b>	Light Armoured Vehicle
<b>LVCTS</b>	Land Vehicle Crew-Training System
<b>MHP</b>	Maritime Helicopter Project
<b>MilCOTS</b>	Militarized Commercial Off-the-Shelf
<b>MSVS</b>	Medium-Support Vehicle System
<b>NORAD</b>	North American Aerospace Defense Command
<b>NSPS</b>	National Shipbuilding Procurement Strategy
<b>OAG</b>	Office of the Auditor General
<b>PMSC</b>	Protected Military Satellite Communications

<b>PPA</b>	Preliminary Project Approval
<b>PWGSC</b>	Public Works and Government Services Canada
<b>ROM</b>	Rough Order of Magnitude
<b>RCAF</b>	Royal Canadian Air Force
<b>RFP</b>	Request for Proposals
<b>RPP</b>	Report on Plans and Priorities
<b>SMP</b>	Standard Military Pattern
<b>SOIQ</b>	Statement of Interest and Qualification
<b>SOR</b>	Statement of Requirement
<b>SSN</b>	Space Surveillance Network
<b>SSOC</b>	Sensor System Operations Center
<b>UAV</b>	Unmanned Aerial Vehicle
<b>UCAV</b>	Unmanned Combat Aerial Vehicles

### **About the Author**

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