

Blank Cheque

National Shipbuilding Procurement
Strategy Puts Canadians at Risk

Michael Byers and Stewart Webb





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ABBREVIATIONS

A/OPS Arctic/Offshore Patrol Ship

BIW Bath Iron Works

CCG Canadian Coast Guard

CPF Canadian Patrol Frigate

CRS Chief Review Services

CSC Canadian Surface Combatant

DND Department of National Defence

FELEX Frigate Life Extension

GCS Global Combat Ship

IMC International Marine Consultants Ltd.

IRB Industrial Regional Benefits

JSS Joint Support Ship

MWC Marine Warfare Centre

NGSB-GC Northrop Grumman Shipbuilding-Gulf Coast

NSPS National Shipbuilding Procurement Strategy

OMT Odense Maritime Technology

RCN Royal Canadian Navy

RV Research Vessel

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National Shipbuilding Procurement Strategy Puts Canadians at Risk

Introduction

In June 2010, the Harper government announced the National Shipbuilding Procurement Strategy (NSPS), a long-term plan to renew the Royal Canadian Navy (RCN) and Canadian Coast Guard (CCG) fleets.¹ It projected a cost of \$35 billion for replacement vessels, plus refit-and-repair work amounting to an additional \$500 million annually.²

The Harper government set in place a competitive and apparently objective process to select two shipyards where the larger vessels would be built.³ In October 2011, Irving Shipbuilding Inc. (Irving) was chosen to build 6–8 Arctic/Offshore Patrol Ships (A/OPS) and 15 Canadian Surface Combatants (CSC) for the RCN, at a projected combined cost of \$25 billion.⁴ Seaspan's Vancouver Shipyards (Seaspan) was chosen to build 2–3 Joint Support Ships (JSS) for the RCN as well as one polar icebreaker, one offshore oceanographic vessel and three offshore fisheries science vessels for the CCG, at a projected combined cost of \$8 billion.⁵ These acquisition-cost estimates were later altered to \$29.3 billion for the combat vessel package and \$7.3 billion for the non-combat package.⁶

In November 2013, the Auditor General of Canada reported that the full cost of the NSPS would be approximately \$105 billion.⁷ This higher figure

included 30 years of life-cycle costs, such as salaries, fuel, and ammunition. Life-cycle costs are necessarily approximate since the price of fuel and other commodities can fluctuate, and unexpected technological advances can require updates to communication, sensor and weapon systems.⁸ The Auditor General did *not* examine the accuracy of the Harper government's projected acquisition costs.

One of the stated aims of the NSPS is to provide long-term certainty for Canada's shipbuilding industry.⁹ This might well occur, but only at a much greater cost than is necessary. For the Harper government made a serious mistake by confining the only truly competitive portion of the NSPS to the choice of shipyards, which are both, effectively, also in the position of "prime contractors" now. Indeed, Seaspan has already been formally designated as the prime contractor for the JSS project.¹⁰

As prime contractors, Irving and Seaspan will be free to select the "system integrators" which coordinate various aspects of the procurement, including the selection and acquisition of communication, sensor, and weapon systems. Despite not having been formally named the prime contractor for the A/OPS project, Irving has already selected Lockheed Martin as the 'command and surveillance' systems integrator, without any competitive process involving the government.¹¹

The shipyards, together with their appointed system integrators, will also select the various sub-contractors who design and equip the vessels. The only restriction on these selections will be that the designs and equipment must meet the requirements of the RCN and CCG — requirements that in most cases have yet to be set. The selection of a sub-contractor need not be made on the basis of best value, but may instead be determined by other factors such as the shipyard's "familiarity" with a particular company.¹² And those decisions, made by the shipyard, will have significant impacts on the ultimate cost of the ships. In essence, this means that the Harper government has issued blank cheques to Irving and Seaspan.

This approach to shipbuilding is unusual. In most NATO countries, a naval procurement begins with the definition of requirements, followed by the setting of a budget, and only then by the competitive selection of a prime contractor (which, by this point, generally has a consortium of system integrators and suppliers in place). As a result of that approach not being followed in the NSPS, and the largely uncompetitive and unsupervised process of sub-contracting by the shipyards, the NSPS is already showing signs of mismanagement and overspending that may well lead to lower quality, less capable, and perhaps fewer vessels.

Canada's Traditional Approach to Shipbuilding

Initially, the Harper government won praise for departing from the prior approach to shipbuilding in Canada, which had been marked by “personal favouritism and political influence.”¹³ As Jeffrey Simpson wrote, shipbuilding in Canada had previously been “50 percent engineering and 50 percent politics.”¹⁴

That said, Canada has a proud history of shipbuilding dating back to the ‘golden age of sail’ between 1840 and 1880, when its merchant fleet was the fourth largest in the world,¹⁵ after Britain, the United States, and Norway. At the end of the Second World War, Canada’s navy ranked fourth largest in the world,¹⁶ after the United States, Britain, and the Soviet Union.

However, in the decades following the Second World War, Canada’s shipbuilding industry entered a boom-and-bust cycle.¹⁷ In the 1950s, financial incentives were provided that enabled Canadian shipyards to continue building vessels — and maintain more than ten thousand jobs.¹⁸ In the 1960s, the incentives were withdrawn, the government cancelled several major projects, the RCN’s independent design and production planning capabilities were reduced,¹⁹ and shipbuilding contracts were issued on a short-term project-to-project basis.²⁰ As a result of the decline in Canada’s shipbuilding industry, not a single vessel was built for export between 1962 and 1972.²¹

The 1970s: Iroquois-Class Destroyers

The early 1970s saw the launch of four *Iroquois*-class (also known as *Tribal*-class) destroyers that were designed and built in Canada for the RCN.²² The *Iroquois*-class was the culmination of a long procurement process that began with an early 1960s plan to build eight General Purpose Frigates; a plan that was subsequently cancelled by the Pearson government after cost estimates for the project rose from \$275 million to between \$450 and \$500 million.²³ Pierre Trudeau was prime minister before the procurement was revived and the four *Iroquois*-class vessels were delivered. HMCS *Iroquois* and HMCS *Huron* were built in Sorel, Quebec by Marine Industries Ltd.,²⁴ while HMCS *Athabaskan* and HMCS *Algonquin* were built in Lauzon, Quebec by Davie Shipyard.²⁵

The final acquisition cost of the *Iroquois*-class totalled \$252 million, nearly twice the original estimate of \$142 million.²⁶ This significant overrun can be attributed to wider failings in Canadian defence procurement at the

time, including “weak project management, risk assessment, accountability and an overall lack of policy outlined by the Management Review group.”²⁷

The 1980s: Halifax-Class Frigates

The 1980s were dominated by the Mulroney government’s procurement of 12 *Halifax*-class vessels under the Canadian Patrol Frigate (CPF) project. Nine of the frigates were built in New Brunswick, and three in Quebec.²⁸

The CPF project got off to a shaky start, due in part to the gap in warship construction that followed the completion of the *Iroquois*-class destroyers.²⁹ Provisional delivery of the first frigate was delayed from 1989 to 1991.³⁰ Cost overruns were also a problem until 1994, when the contract “was converted to a fixed-price and the method of payments was changed from one based primarily on bi-weekly progress claims, to one based on the delivery of products and milestones.”³¹

The 1990s: Kingston-Class Mid-Coast Defence Vessels

Born out of the 1987 White Paper on Defence, the *Kingston*-class Mid-Coast Defence Vessels (MCDVs) were launched between 1995 and 1998.³² The original plan called for 18 MCDVs as well as six “patrol corvettes”,³³ but for cost-saving reasons the planned corvettes were abandoned and the capability of the MCDVs significantly scaled back.³⁴ As one example of the reduction in capability, the ships were built from “mild” rather than military-grade steel, which reduced their displacement, rendered them top-heavy and unstable, and made them unsuitable for open-ocean and overseas deployments. As the Senate Standing Committee on National Security and Defence reported in 2007: “Crews become seasick when these vessels are stationed off the Grand Banks for more than a few hours.”³⁵

As a result of the scaling back of the original plan, the MCDVs provided only four years of construction work for Halifax Shipyards Ltd.³⁶ In 2006, the Harper government cancelled a planned mid-life refit that would have created more work.³⁷ The MCDVs, which were originally intended to last until 2055, will now likely be decommissioned by 2020.³⁸

Naval Procurement in Other NATO Countries

Several other NATO countries are undertaking major naval fleet constructions. The United Kingdom is embarking on two fleet renewal projects, the Type 26 Global Combat Ship (GCS) and the *Queen Elizabeth*-class aircraft carrier. The United States is building *Arleigh Burke*-class destroyers, to bring the total number of those advanced warships up to 75, as well as three even more advanced (and almost prohibitively expensive) *Zumwalt*-class destroyers. But different approaches are being taken to constructing these different vessels: from a traditional single prime contractor approach, to an approach involving multiple prime contractors — and placing more risk on government.

The Harper government has adopted the single prime contractor approach — with the unfortunate twist (explained above) that two shipyards were selected and allowed to become *de facto* prime contractors, before the requirements had been defined and a specific budget set. Normally, the single prime contractor approach begins with the setting of requirements, followed by the budget, and only then by a tendering process involving prospective prime contractors backed by consortia of system integrators and suppliers.

In the United States and in France, the traditional approach has been modified in a different manner — by using modular construction, a process where units are built at different locations by different companies, before being assembled at a single site. This share-build approach is being used by Northrop Grumman Shipbuilding-Gulf Coast (NGSB-GC), the prime contractor for the U.S. *San Antonio*-class amphibious transport dock. NGSB-GC has divided the work, not only among its own shipyards, but with Bath Iron Works and General Dynamics Electric Boat as well.³⁹ NGSB-GC tracks the progress through weekly reports and performs inspections “to validate the constructed units.”⁴⁰

The prime contractor for the French *Mistral*-class frigates, DCNS, has subcontracted the construction of some modular units to other companies with shipyards in Saint-Nazaire, France, and Gdansk, Poland.⁴¹ A modular share-build approach is well suited to the complexity of 21st century naval warships, with work being divided between different companies based on their strengths and specialities.

A different, markedly less successful approach has been taken with the *Zumwalt*-class destroyers. The U.S. Navy identified not one but four prime contractors: Bath Iron Works, Northrop Grumman Shipbuilding, Raytheon and BAE,⁴² each of which delivers its modules to the U.S. Navy, which in turn delivers them to a central shipyard for assembly. Under this approach,

the Navy assumes the risk associated with any problems that occur during the integration process — and already, there have been many of these.⁴³

Another recurrent issue with military shipbuilding concerns delays. In the United States, and some European countries, shipbuilding contracts often provide substantial penalties for delays. So far, the Harper government has failed to include, or even signal any intent to include, penalty provisions within the NSPS. Penalty provisions could usefully incentivize Irving and Seaspan to keep to schedule and, if necessary, subcontract work to other shipyards such as Davie. The teaming arrangements that might result from the threat of penalties could help to create a more efficient Canadian shipbuilding industry.

NSPS: A Novel Approach

The National Shipbuilding Procurement Strategy was supposed to break the boom-and-bust cycle of Canada's shipbuilding industry through large-scale orders and subsequent in-service support contracts spread over decades.⁴⁴ While this goal is feasible, the Harper government's focus on this objective has resulted in a series of other problems.

The Harper government began by structuring the NSPS around two projects: one for combatant vessels, the other for non-combatant vessels. It then decided that just one shipyard would be used for each project, decided to select those shipyards from the outset, and delegated the selection to the civil service.⁴⁵

Three shipyards were involved in the competition: Seaspan's Vancouver Shipyards in British Columbia, Irving Shipbuilding Inc. in Nova Scotia, and Davie Shipbuilding in Quebec. This meant that one of the three shipyards would lose out.

A points system was implemented to assess each shipyard, with 60 of the available 100 points concerning the current state and capability of the facility. For the combatant project, Irving scored 82.8 points while Seaspan scored 74.9 points.⁴⁶ For the non-combatant project, Seaspan scored 76.8 points while Davie scored 63.2 points.⁴⁷

After Irving and Seaspan were chosen, Davie was informed that it would still be eligible to bid on further contracts to build smaller ships, estimated to be worth \$2 billion.⁴⁸ It was a small consolation, however, given that an approach focused on selecting prime contractors (rather than, or in addition to shipyards as parts of consortia) would have likely resulted in work

spread much more evenly among the three yards. This would, in turn, have also reduced the risk of logjams (when a delay in the construction of one ship causes delays to others, as has occurred with the JSS project) and consequent cost overruns.

It cannot be argued that Davie was unprepared to play a major role in the NSPS, especially considering that it will take Irving two years to improve its infrastructure before the construction of the A/OPS can begin. Five ships were constructed at the Davie shipyard this year, including the largest ship to have been built in Canada in decades — the 130 metre-long *Cecon Pride*, the first of three large offshore construction vessels that Davie is building for the Norwegian company Cecon.⁴⁹

In October 2013, the Harper government added up to ten Coast Guard vessels — five Medium Endurance Multi-Tasked Vessels and up to five Off-shore Patrol Vessels — to the Seaspan contract.⁵⁰ The vessels will cost an estimated additional \$3.3 billion.⁵¹ A timetable for the delivery of the vessels has yet to be determined. Remarkably, there is no indication that Davie, or any other shipyard, was considered for these additional builds.

Again, the Harper government made a serious mistake by confining the only truly competitive portion of the NSPS to the choice of two shipyards, both of which are now also in the *de facto* position of “prime contractor”. The absence of competition from this point onwards creates a significant risk that the shipyards will overcharge for design and construction. This risk is already apparent with respect to Irving’s handling of the design of the A/OPS.

A/OPS: Overly-Expensive Compromise Vessels

In 2013, Vancouver-based International Marine Consultants Ltd. (IMC) was commissioned to provide a third-party review of Irving’s proposal for the A/OPS “Contract Definition Phase”. As IMC explained:

The AOPS is not a complicated vessel. It has a relatively low ice class, a well tried AC-AC diesel electric propulsion system and fairly pedantic accommodation and on-board services and equipment. The hull form does not incorporate the parabolic hull form utilized in many of the Canadian Coast Guard ice-class vessels. It is not fitted with sophisticated weaponry and even its naval situation room outfitting is limited and not intended to be functional on a year round basis.⁵²



Arctic/Offshore Patrol Ship / Copyright Her Majesty the Queen in Right of Canada (2009)

The Harper government recently contracted to pay Irving Shipbuilding \$288 million to design the A/OPS.⁵³ According to a CBC investigation, a reasonable amount for the design would be \$10–20 million.⁵⁴

IMC also questioned how the contract amount for the design phase was determined. According to its report, the cost estimates were derived on the basis of “two ships recently built by Irving Shipyards Inc., and the most recent naval vessel built at Bath Iron Works.”⁵⁵ The last two ships built by Irving were a “Mid-Shore Patrol Vessel”⁵⁶ for Fisheries and Oceans Canada and an 80-metre UT 722L series Anchor-Handling Offshore Supply Vessel.⁵⁷ Bath Iron Works (BIW), located in Maine, had most recently built a very complex *Zumwalt*-class guided missile destroyer — the most advanced naval ship ever constructed.⁵⁸ The A/OPS will not resemble the *Zumwalt*-class in the slightest, and the use of the *Zumwalt*-class to estimate the cost of the A/OPS certainly resulted in a much higher estimate for the A/OPS — to Irving’s financial benefit.

IMC suggested that a better comparison for the A/OPS is the new Alaska Region Research Vessel (RV). Although the RV *Sikuliaq* is slightly smaller, it



Zumwalt-Class Guided-Missile Destroyer / Source: U.S. Navy photo courtesy of General Dynamics

has the same speed and ice-capabilities and “more outfitting and systems than the AOPS due to its research capabilities.”⁵⁹ The shipyard contract (including both design *and* build) for the RV *Sikuliaq* came to a total of US\$123 million — less than half the design contract for the A/OPS.⁶⁰

IMC also questioned the “Work Breakdown Structure” for the A/OPS. At the time the report was written, Irving had not broken down the work structure to the level of detail requested, which makes additional cost overruns foreseeable as the project moves forward.⁶¹ According to IMC, “In some cases, the costs have been extrapolated from ISI’s [Irving’s] recent commercial projects and BIW’s latest military newbuilding at a high level (level 3 or 4), rather than being developed by defining the work to be done and estimating the level of effort required for each element of the work. In a number of cases the resultant extrapolation may be overstated.”⁶²

IMC also found that the “Contract Definition” phase has been influenced by the time being taken to upgrade Irving’s facilities in Halifax.⁶³ In short, construction work on the A/OPS cannot begin until 2015 when the infrastructure is completed.⁶⁴ During that lengthy period of delay, some personnel will



Alaska Region Research Vessel RV Sikuliaq

be employed doing work that they would accomplish more quickly in other circumstances.⁶⁵ As a result, IMC explained, “the amount of effort being allowed for is considerably more than the work to be done should consume.”⁶⁶ And this, too, only served to increase the amount of the design contract.

Most strikingly, IMC delivered its report to the Harper government on 5 March 2013 — two days before the government signed the design contract with Irving.⁶⁷ This means the Harper government knew that the cost of the A/OPS had been inflated *before* it agreed to pay the \$288 million, which, again, is just for the design phase.

Missing Step

Again, naval procurements in most NATO countries begin with the definition of requirements, followed by the setting of a budget, and only then by the selection of a prime contractor (which, by this point, generally has a consortium of system integrators and suppliers in place). Even if it somehow

made sense to choose the shipyards first, the Harper government omitted a step when setting up the NSPS. As former Assistant Deputy Minister (Material) Alan Williams explains: “The government selected Irving Shipyards Inc. for combat vessels, and chose Seaspan for non-combat vessels. The next step would be to select the systems provider and integrator.”⁶⁸ By “systems provider”, Williams means a “prime contractor” other than the shipyard, one that is responsible for selecting and coordinating the installation of all the complex equipment that makes up a modern warship. The prime contractor will generally be supported by several “system integrators”, which are companies that specialize in sensors, communications, weapons, and other complex components of modern warships.

No company has yet been identified by Industry Canada as the prime contractor for the A/OPS or CSC projects, though Seaspan — significantly — has been designated as the prime contractor for the JSS project.⁶⁹ This suggests that Irving will likely be designated as the prime contractor for the A/OPS and CSC projects. Irving is already behaving in this manner with respect to the A/OPS design.

Having selected Irving as the shipyard for the A/OPS and CSC projects, and created an essentially uncompetitive and unaccountable process from that point onwards, the Harper government has only one option it can now responsibly pursue: run a fair and open competition to choose prime contractors for the two projects. In the absence of such intervention, it seems likely that the shipyard will instead act as the prime contractor, selecting system integrators and suppliers based on its own preferences, rather than the ability of different companies to provide the necessary expertise and equipment at the lowest price.⁷⁰

Essentially, Irving will act as the prime contractor for a fleet of high-tech 21st century warships, and be able to pass unnecessary expenses onto Canadian taxpayers. Communication, sensor and weapon systems are the most expensive, complicated and risk-prone components of any naval vessel, and particularly combat vessels. In the circumstances, it makes no sense — in terms of cost control, quality control and accountability — to leave the choice of system integrators and suppliers entirely in the hands of a shipyard selected as the location of the build.

Rather than selecting the two shipyards at the outset, a better approach to the NSPS would have been to competitively select prime contractors — on the basis of their ability to assemble a credible consortium of shipyards, system integrators and suppliers, and to commit to set systems requirements and a fixed budget.

Alternatively, the selection of shipyards, system integrators and suppliers could have been made by the government and the prime contractor together, through a series of additional public tenders. The Harper government did something similar to this when it established the Frigate Life Extension (FELEX) project in 2008.⁷¹ FELEX is taking place at Halifax Shipyards Inc. and Victoria Shipyards Company Ltd., which were awarded contracts of \$549 million and \$351 million respectively.⁷² Lockheed Martin was separately awarded \$2 billion as the “combat systems integrator” for the project.⁷³

Lack of Oversight

Concerns about a lack of oversight and accountability are exacerbated by the small number of civil servants tasked with implementing and overseeing the NSPS. The construction of modern combat vessels involves hundreds of suppliers and sub-contractors, and an innumerable number of decisions that will affect the quality, timeline, and final cost of the project. As David Pugliese reports, “in the 1980s there were 400 people working directly on the *Halifax*-class frigate program; another 1,000 personnel were also involved in secondary roles.”⁷⁴ Today, “there are less than three dozen personnel assigned to the Canadian Surface Combatant project, which is to acquire a replacement for the *Halifax*-class frigates and *Iroquois*-class destroyers. Even as the project matures it is expected that only 200 or so personnel will work on the program.”⁷⁵ By understaffing the NSPS, the Harper government is denying itself the capability of ensuring a high quality, timely, and cost-effective build.

The lack of oversight could, for instance, make it difficult for the government to ensure that Irving has the correct labour force for a high-tech military build. A report published by the RAND Corporation addressed the labour differences between commercial and military shipbuilding, stating “The ratio of foremen (blue-collar supervisors) to workers is about 1:20 at the commercial yards versus about 1:6 at the military yards. Apparently, the complexity of military ship construction requires more waterfront supervision.”⁷⁶ The difference in the labour force ratio stems from the fact that military projects require a specially trained workforce with skills related to advanced communication, sensor and weapon systems, along with knowledge of military standards.⁷⁷ It remains unclear whether Irving will be scaling up its foremen-worker ratio to the military standard, whether the Harp-

er government is expecting it to do so, and if so, how such an expectation might be enforced.

Selecting Ship Designs

The Harper government decided to hold a ship-design competition for the Joint Support Ship project, which was initiated well before the NSPS was conceived. In November 2006, the government announced that two companies, ThyssenKrupp and SNC-Lavalin, would each receive \$12.5 million to develop designs and assign the intellectual property rights to Canada.⁷⁸ In 2013, the decision was made to buy the *Berlin*-class design submitted by ThyssenKrupp, which has already been used by the German Navy.⁷⁹

From its beginnings in the 1992 Afloat Logistics Sealift Capability Project, the JSS project was intended to deliver three vessels to serve as both replenishment ships for the Navy and transport ships for the Army.⁸⁰ The project was finally approved in 2004, by the Martin government, and formally announced in 2006 by the Harper government.⁸¹ Two years later, the Harper government cancelled the project because the proposals by ThyssenKrupp and SNC-Lavalin did not comply with stated requirements.⁸²

In July 2010, the JSS project was re-launched. However, this time, just two ships would be constructed, and only a limited Army transport capability would be included in the design.⁸³ In 2010, the Department of National Defence (DND) estimated that the project would cost approximately \$2.6 billion.⁸⁴ In February 2013, the Parliamentary Budget Office estimated that it would cost approximately \$4.13 billion.⁸⁵

The A/OPS, in contrast, is based only loosely on a foreign design, namely the Norwegian ice-strengthened patrol ship KV *Svalbard*.⁸⁶ That design was dramatically altered for cost-reduction reasons, including by removing the planned “Azipods” — rotatable propeller units that enable many Arctic ships to sail in both directions, and thus be equipped with an efficient bow for high speed open-water sailing, and an ice-breaking stern. In addition to removing the Azipods, the initial planned displacement of 6940 tons was reduced to 5874 tons and the initial planned top speed of 20 knots reduced to 17 knots.⁸⁷

As mentioned above, the Harper government signed a \$288 million contract with Irving for the design phase of the A/OPS in March 2013.⁸⁸ Irving then subcontracted much of the design work to Odense Maritime Technol-

ogy (OMT), a Danish company.⁸⁹ According to a former Irving employee, Irving's own engineering team has since been reduced from 14 to 4 members.⁹⁰

Irving chose OMT on a non-competitive basis and without government involvement. Indeed, Irving has chosen all the system integrators and principal suppliers for the A/OPS project on a non-competitive basis, including: "Lockheed Martin Canada as Command and Surveillance Systems Integrator, GE Canada as Integrated Propulsion System Integrator, Lloyd's Register Group as Classification Society, OMT as Marine Engineering and Naval Architecture Provider, and Fleetway Inc. as Integrated Logistics Support Provider."⁹¹ A similar process can be expected for the Canadian Surface Combatants, which will likely also be based, at least initially, on a foreign hull design.

At first, one possible design for the CSC was the Type 26 Global Combat Ship (GCS) currently being developed for the British Royal Navy.⁹² In February 2011, British Parliamentary Secretary for Defence, Gerald Howarth, announced that Canada and the United Kingdom were in "close discussions" about the program.⁹³ But just one month later, the Harper government announced that the two countries would not be collaborating in the development of the CSC.⁹⁴ No explanation was provided for the change, which came only after the existence of discussions was revealed.

France's government-owned defence contractor DCNS is now pushing its FREMM design as an option for Canada. In April 2013, then Defence Minister Peter MacKay toured the French frigate *Aquitaine* while the ship was visiting Halifax.⁹⁵ After debarking, MacKay was quoted as saying "I have never seen...such an impressive vessel."⁹⁶ MacKay also said that touring foreign vessels enabled the government to "look at the capabilities of partners, serious navies like the French, to determine the best fit for Canada."⁹⁷

The prospect of buying a foreign-designed hull has caused concern in some quarters, with Janet Thorsteinson, the Vice President of the Canadian Association for Defence and Security Industries, writing that "buying or modifying foreign designs mean that ships may not be suitable for Canadian tasks, it also deprives Canadian businesses of work they are well qualified to perform, locks them out of future opportunities and it lessens their ability to undertake civilian work."⁹⁸ Thorsteinson's concerns are legitimate, since "it can take two years or more to design a military ship compared with six months for a commercial ship."⁹⁹ In fact, even the "predesign work on a frigate or submarine can amount to 10 times that needed for a tanker."¹⁰⁰ As with the A/OPS, using a foreign design for the CSC would mean that a

great deal of the work will be done outside of Canada — and will not contribute to developing expertise and capacity at home.

Inflation

The escalation of the JSS acquisition cost from \$2.6 billion to \$4.13 billion illustrates how the Harper government has failed to account properly for inflation.¹⁰¹ In an audit of the project, the DND's own Chief Review Services (CRS) found that inflation was improperly assessed at 2 percent per year instead of the 3.5 to 5 percent “acknowledged to be prevalent in the ship-building industry.”¹⁰²

Similar concerns about the CSC project would appear justified. Indeed, if inflation occurs at a similar rate as in the JSS project, cost overruns or compromises are almost inevitable. It is possible that the 15 CSCs could be reduced in number, as has occurred with the JSS project. Their capabilities might also be reduced, as has already occurred with the A/OPS, resulting in smaller, slower ships with less-advanced communication, sensor and weapon systems. Delays, inflation, and a flawed procurement process could even lead to the outright cancellation of the CSC project, which would require Canada to use the aging *Halifax*-class frigates — much like the ongoing use of half-century old Sea King maritime helicopters today.

Communication, Sensor and Weapon Systems

The costs of commercial vessels, such as tankers and cargo ships, are generally projected using weight-based models. It is difficult to imagine that this calculation model will be used for the Canadian Surface Combatants (CSCs), as “weight-based cost models cannot easily account for the cost of the *complexity* of a ship design.”¹⁰³ One tool the U.S. Navy uses to gauge the cost of ships is ‘density’, which “refers to the extent to which ships have equipment, piping, and other hardware tightly packed within the ship spaces.”¹⁰⁴

The most expensive components of modern naval vessels are their communication, sensor and weapon systems. And while the CSCs will be based on “a common hull design...the frigate and destroyer variants will be fitted with different weapons, communications, surveillance and other systems.”¹⁰⁵ Moreover, since these systems are generally not produced in Canada, Irving will have to rely on foreign suppliers such as Lockheed Martin, Raytheon and General Dynamics. It is doubtful whether the Harper government

appreciates the complexity and risk associated with the density of modern warships, since it has failed to build the necessary oversight and cost-control mechanisms into the NSPS.

Admittedly, civil servants will determine the requirements for the various systems. For instance, the Maritime Warfare Centre (MWC) at Canadian Forces Base Halifax will assess the needs and capabilities with regard to the weapons systems, without recommending a specific system.¹⁰⁶ Other branches of the RCN, such as the Naval Electronic Warfare Centre in Ottawa, will develop their own specifications concerning the communication and sensor systems. Based on the specifications, companies will advance their systems, which will then be assessed by those branches.¹⁰⁷ For example, a call for radar systems will be made to industry, companies will provide the relevant information concerning their systems, and the RCN will assess those systems and indicate which meet the specifications.

However, Irving will do the actual selection and contracting of the system, and not necessarily on a competitive basis. Irving has already chosen Lockheed Martin as the weapon systems integrator for the A/OPS. Former Assistant Deputy Minister (Materiel) Alan Williams has expressed doubts whether this arrangement is “in the best interest of the military, of the Canadian taxpayer or of the Canadian defence industry.”¹⁰⁸

Industrial Regional Benefits

As with all major defence procurements, companies awarded contracts are required to fulfill the conditions of the Industrial Regional Benefits (IRB) policy. The aim of the IRB policy is to provide a ‘dollar-for-dollar’ investment in the Canadian economy: for every dollar a company acquires as part of a procurement contract, it has to spend a dollar in Canada — either as part of the same procurement, or in the course of other business. According to Industry Canada: “There are currently over 60 procurements subject to the IRB policy with a value of over \$21 billion.”¹⁰⁹

As Irving has explained, “IRBs can occur inside and outside the shipbuilding sector, benefitting innovation, research and business development here in Nova Scotia and across Canada.”¹¹⁰ For this reason, it is foreseeable that the IRBs will be fulfilled by non-shipbuilding work done by other elements of the Irving conglomerate — work that might have been done anyway, without the industrial regional benefits requirement. At the moment, the IRB policy for the NSPS has not been fully defined.¹¹¹

Moreover, since Canada has little expertise in producing advanced naval communication, sensor and weapon systems, one can expect that the bulk of the money in the NSPS will flow to foreign companies — as has been the case with the design phase of the A/OPS. It is not yet clear whether the foreign companies engaged in that work will have to fulfill IRBs in Canada themselves, or whether the IRBs that would normally be required of them, will be instead be the responsibility of the shipyard/prime contractor.

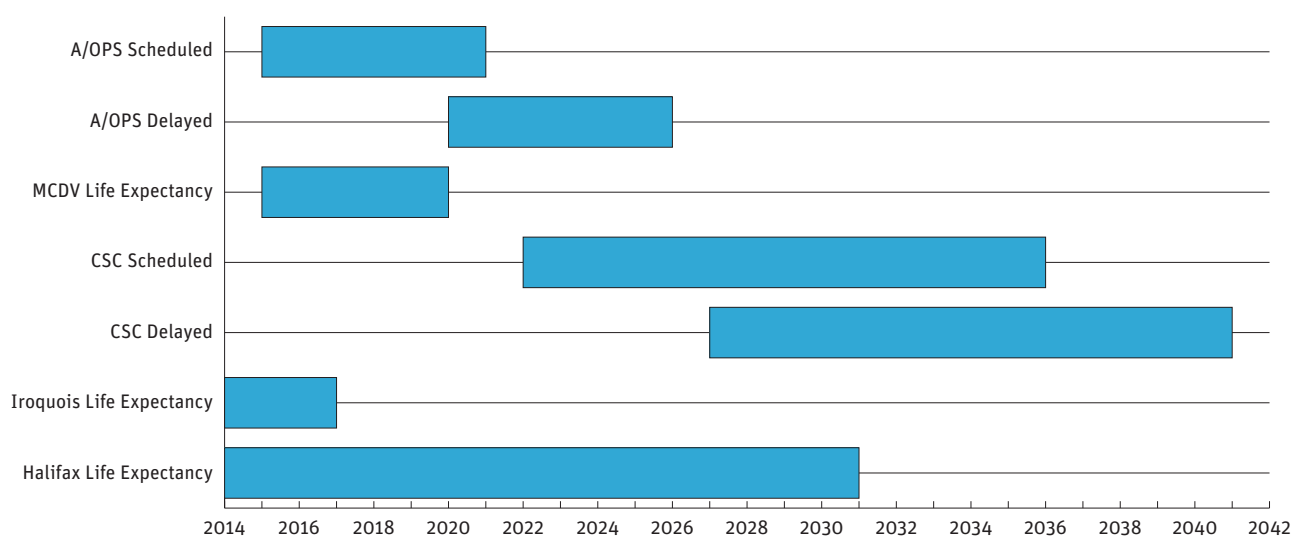
Again, “prime contractors will be required to undertake IRB business activities in Canada valued at 100 percent of the contract value, thereby ensuring a dollar-for-dollar investment into the Canadian economy.”¹¹² The prime contractor for the A/OPS and CSC projects will be Irving, not the foreign companies selected by Irving as system integrators and suppliers. This creates at least two serious risks: First, that work required by the IRBs to offset the money flowing offshore will be fulfilled through work that Irving would have engaged in anyway, either at its shipyard or elsewhere in its large conglomerate. Second, that Irving and its various system integrators and suppliers might potentially inflate the size of their non-competitive contracts to cross-subsidize work done in Canada, as IRBs, to offset the work overseas. In other words, the NSPS might deliver dollar-for-dollar investments, but the return to Canada from the IRBs might have come anyway, or come from Canadian taxpayers paying above-market rates for the systems installed in the CSCs. Either way, the NSPS — as currently structured — is an expensive and inefficient way of creating employment.

Delays

Canadian defence procurement projects are prone to substantial delays. The replacement of the Sea King maritime helicopters has dragged on for 23 years, the JSS project for fourteen years, and the A/OPS project for six years — in the latter case, without even a construction contract being signed.

A delay in one project can lead to delays in other projects — particularly in cases where more than one project is designated for a single shipyard. The delays in the JSS project have already resulted in a significant setback to the CCG’s *Polar*-class icebreaker project, which is supposed to be built by the same shipyard in Vancouver. The original plan for the JSS anticipated delivery of three vessels between 2012–16.¹¹³ Delivery of the *Polar*-class icebreaker was to follow in 2017.¹¹⁴ But when the JSS timeline slipped, a major scheduling conflict emerged. The Harper government chose to prioritize the

FIGURE 1 Construction Schedule for A/OPS & CSC and Life Expectancy of Replaced Vessels



construction of the JSS and push back the construction of the *Polar*-class icebreaker. Now, completion of the JSS is projected for 2019–20 (15–16 years after the procurement began), with the *Polar*-class icebreaker following in 2021 (13 years after the procurement began).¹¹⁵

There have been similar delays in the A/OPS project. Before construction on the A/OPS can commence in Halifax, Irving must first construct new infrastructure.¹¹⁶ The two years needed for this infrastructure development were not accurately calculated when Irving was selected for the project, and as a result, the timeline for the A/OPS project has slipped.¹¹⁷

Complicating things further, there is a significant risk that the FELEX project, also taking place mostly at Irving in Halifax, will be delayed, as the Chief Review Service (CSR) warned in 2011.¹¹⁸ This work on the *Halifax*-class frigates began in October 2010 and was slated for completion by 2016.¹¹⁹ If the frigates are still in the shipyard after that date, this will necessarily impede the construction of the A/OPS and later the CSCs.

The early, significant delays at both shipyards do not bode well for the future of the NSPS. Currently, 6–8 A/OPS are scheduled for completion by 2021 and the first deliveries of the 15 CSCs for 2021.¹²⁰ However, it is already being reported that deliveries of the CSCs will only begin in 2022.¹²¹ These delays will likely grow worse. Based on the current setbacks to the JSS and A/OPS projects, we predict that on average, each A/OPS will be delivered five years late, and each CSC will be delivered six years late.

Again, at least some of these delays could have been avoided if the Harper government had chosen prime contractors for each of the individual projects (JSS, A/OPS, CSC) through a competitive tendering process, rather than choosing the shipyards and allowing them to take on this role. The prime contractors then could have selected the most time- and cost-efficient combination of shipyards for the builds. Had such an approach been taken, it is likely that more than two Canadian shipyards would be building naval ships, thus spreading the jobs and other benefits more evenly across the country.

Umbrella Agreement

The Harper government's "umbrella agreement" with Irving to build 15 CSCs includes a clause that gives the government the power to alter the total amount of work allocated to the shipyard.¹²² This suggests that if the CSC project were to face cost overruns, the government could simply reduce the number of vessels to be built.

The umbrella agreement also gives the government the power to change the total amount of money available for the CSC project.¹²³ This could lead the government to increase the project budget to offset additional costs resulting from inflation, the lack of competition in the selection of system integrators and suppliers, or other aspects of bad planning and mismanagement. Or, it could lead in the other direction, namely to cutbacks or even outright cancellation. The umbrella agreement even stipulates that the government may take over Irving's workforce and facilities "in order that the work under the resulting contract can be completed and delivered pursuant to the terms of the licence."¹²⁴

These latter powers are blunt instruments that no responsible government would use unless the procurement was going drastically wrong. Unfortunately, the likelihood of something going drastically wrong has been greatly increased by the almost inexplicable lack of competition and oversight provided for in the NSPS, now that the two shipyards have been chosen.

Conclusions

It was envisioned that the National Shipbuilding Procurement Strategy (NSPS) would sustain the Canadian shipbuilding industry and maintain the operational capabilities of the Royal Canadian Navy (RCN) and Can-

adian Coast Guard (CCG) for decades to come. This might occur, but only at a greater cost than is necessary.

The Harper government made a serious mistake when it departed from the standard approach to naval procurement, which begins with the definition of requirements, followed by the setting of a budget, and only then by the selection of a prime contractor.

Already, problems with the Arctic/Offshore Patrol Ship (A/OPS) project, including delays and an inflated design contract, indicate that the Harper government has lost control over the management of the NSPS.

The two shipyards selected as the locations for the builds have become the *de facto* prime contractors for the projects, and are taking on the responsibility of choosing system integrators and suppliers — without much, if anything, in the way of competitive processes and government involvement. The current situation amounts to Irving and Seaspan being given blank cheques by the Harper government.

There is still time to set things right. By using the powers allocated under the umbrella agreement, the Harper government can reassert control and ensure that high quality ships are delivered on time and on budget. The government should organize a competitive tendering process to select prime contractors for the A/OPS and Canadian Surface Combatant (CSC) projects.

The prime contractor for each project should be engaged on a fixed-price basis, with a detailed statement of requirements for the ships and their systems spelled out in advance. Stringent financial penalties for delays or sub-standard work should be built into the contract, thus providing incentives for prompt delivery and quality control.

Although using a competitive process to select the shipyards made for great headlines, the failure to use a similarly competitive process to choose prime contractors has increased the likelihood of cost-escalations, delays, and compromises on the number and capability of vessels.

Having issued the equivalent of blank cheques to Irving and Seaspan, the Harper government needs to reassert control over the NSPS. Canadians deserve better protection than is currently being provided — both in terms of their tax dollars, and in terms of the long-term operational capabilities of the Royal Canadian Navy and Canadian Coast Guard.

Recommendations

- The Harper government should initiate a competitive process to select prime contractors for the Arctic/Offshore Patrol Ship and Canadian Surface Combatant projects. The powers allocated under the umbrella agreement with Irving Shipbuilding enable this change.
- The Harper government should engage the prime contractors for the Arctic/Offshore Patrol Ship and Canadian Surface Combatant projects on a fixed-price basis, with detailed statements of requirements for the ships and their systems spelled out in advance.
- The Harper government should build stringent penalties for delays or substandard work into the contracts.

Concluding Note

This report does *not* address the still-undefined requirements for the Canadian Surface Combatants. The necessary and appropriate capabilities for those vessels are worthy of a national debate — and will be addressed in a later publication.

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