

Canada's National Shipbuilding Procurement Strategy and the CSC Project – Dec 2014

**Canadian Surface Combatant Project – Recapitalization of the RCN
Recycling, Capabilities, and New Options for the Navy's CSC Project**

An *In Detail* series by Steve Daly, CD

The Danish *Iver Huitfeldt* class frigate as a model for the Canadian Surface Combatant (CSC)



Part 1: Charting Complexity and Capabilities – the Canadian Surface Combatant Project

The Canadian Surface Combatant (CSC) is the upcoming replacement for the Royal Canadian Navy's three *Iroquois* class destroyers and twelve *Halifax* class frigates. The Department of National Defence's CSC Project represents the single largest Defence project in the country's history. Canadian Surface Combatant acquisition costs alone are in the realm of \$26B for the construction and outfitting of 15 new warships.

Requirements for the integration of sensors, combat management systems, and weapons systems has already raised tremendous interest among potential suppliers, prompting aggressive marketing and diplomatic campaigns as US and European defence firms vie for a slice of this lucrative project. [1] The Canadian Surface Combatant project will have diplomatic and military effects for at least the next four decades.

The primary reason for a 'Single Class,' with variants to fulfil the two roles of destroyer and frigate, is simple ... cost. There is a direct correlation between the number of ships produced in a series, and the cost of those ships. [2] Producing 15 hulls of a common type will allow the Canadian shipyard to gain experience in building new hulls that will see costs decrease across the class as these ships are built. Nor will the savings stop during construction; each refit brings with it the same practical learning curve and the same potential for cost savings.

The complexity of a project like the Canadian Surface Combatant falls far outside the realm of easy understanding for most Canadian citizens. Even when the Canadian Armed Forces tries to explain its requirement, there are simple linguistic disconnects between what our military says and what the average citizen will hear. For example, 'capability replacement' may lead an uninitiated listener to ask why we don't simply build exact duplicates of our worn-out ships.

The simple answer is growth – in weapons, sensors, habitability for crews, and the myriad other features of a modern warship. During World War Two, the largest class of destroyer in Royal Canadian Navy (RCN) service were the *Tribals*, [3] with a displacement of 2,500 tons. At 5,100 loaded tons, 1970s-era *Iroquois* class destroyers displaced twice that of their WWII ancestors. New Canadian Surface Combatants will likely displace in the range of 7,000 tons.

The growth in destroyer displacement has brought with it an expansion of the engagement ranges for warship weapons. A WWII *Tribal* class destroyer was limited to the approximate 16 km reach of her main guns. [4] The 1970s *Iroquois* class reach out as far as 170 km using its Standard SM-2 missiles. A CSC, depending on weapons chosen, may be able to reach out more than 475 km. The increasing costs of building and equipping modern warships has led to dwindling sizes of naval fleets (for all the world's navies). And that means each ship must have the ability to engage targets – or defend against threats – across a much broader area.

Canadian Surface Combatant [CSC] Project – Evolution, Flexibility, and the value of 'Recycling'

In this series, we will try to illustrate the possible naval capabilities that Canada can buy for its \$26B CSC budget. To better illustrate the potential capabilities for this still - hypothetical warship, we have chosen a standardized platform for CSC – in this case, based on Denmark's Iver Huitfeldt class frigate. [5] The Iver Huitfeldt class has been chosen as a model because of its radar fit and its **use of the Danish Standard Flex containerized weapon/sensor system.**

The Iver Huitfeldt class has an 'integrated mast' incorporating its fixed **Thales APAR (Active Phased Array Radar)** antennae. APAR is considered a multi-functional radar set but APAR has been adopted for a number of European designs for new 'Air Defence Frigates'. [6] Initially, the Government of Canada was a development partner in the Thales APAR radar system. So, it must be assumed that the APAR is in a position of advantage to be chosen for the new Canadian CSC air defence destroyer.



The **Royal Danish Navy's Standard Flex concept** is for a quick- change, modular, mission payload system. In simple terms, Stan Flex means that weapons and sensor modules can be 'plugged in' to appropriate slots – with **module changes taking as little as an hour** to perform at dockside (a crane normally pulling the 'old' module for storage, then dropping the new module into the now- empty 'slot'. In practice, that means that sensors and armament – whether guns or missiles (and their launchers) – can be swapped out to suit the vessel's assigned tasks or availability of weapons.

Iver Huitfeldt class frigates were designed from the outset for the Standard Flex system and its advantages are immediately obvious. [7] StanFlex allows the fitting of new capabilities to warships without the usual recourse to lengthy and expensive dockyard refits. However, the **StanFlex system does come with a cost** – StanFlex **modules add weight and complexity** not incurred in a role-specific design. That said, the advantages of the flexibility provided by the Standard Flex system is one Canada will have to examine closely, regardless of hull chosen.

In this series, we will also examine the potential for re-using existing RCN weapons systems on the new Canadian Surface Combatant vessels. Taking advantage of their Standard Flexsystem, the Royal Danish Navy has used such 'recycling' successfully as it brought the Iver Huitfeldt class and the related Absalon class support frigate into service. [8] Such 'recycling' reduces costs – both in weapons acquisition and in training requirements since the crews are already familiar with the in-service weapons. It will serve here also to facilitate a direct class-by-class comparison between the capabilities of the Royal Canadian Navy's current Halifax and Iroquois classes and those of the Canadian Surface Combatant vessels to replace them.

In Canadian Surface Combatant Part 2 , we will examine the CSC destroyer in more detail.

[1] Doubtless the subject of the Canadian Surface Combatant Project (and France's DCNS FREMM) was raised during French President François Hollande's recent visit to Canada.

[2] The RAND Corporation produced a study for the US Navy on cost inflation in warship production. RAND's data indicates that the "learning curve" needed to maximize efficiency in ship production, and lower construction costs, is approximately 9 hulls of the same class.

[3] The WWII Tribal class consisted of eight similar hulls. There were 14 RCN River class destroyers but this so-called 'class' actually comprised six different British destroyer types.

[4] Bereft of a missile armament, WWII destroyers' gun armaments were very heavy compared with modern warships. The Tribal class was armed with a total of 12 4.7 inch (120 mm) guns.

[5] There is some international confusion over the use of the terms 'frigate' and 'destroyer'. 'Area Air Defence' was assigned to Iroquois class destroyers – hence Canada's 'Destroyer Replacement Program'. Still, most allied nations classify such ships as 'Air Defence Frigates'.

[6] These include German F124 Sachsen and Netherlands' LCF De Zeven Provinciën classes.

[7] The design sub-contractor for the CSC Project, Odense Maritime Technology (OMT), is already well-versed in Standard Flex design – both Absalon and Iver Huitfeldt classes of frigate having been built by the Odense Staalskibsværft (Odense Steel Shipyard, aka Lindø).

[8] By way of example, ships of the Iver Huitfeldt class are currently fitted with OTO Melara 76/62s in both forward gun positions. The chosen weapon for the 'A' position is actually the pricey BAE Systems 127 mm Mk 45 gun but the Danes had stocks of 76 mm guns in storage.