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HMCS *Algonquin*, HMCS *St. Johns*, and HMCS *Protecteur* sail in formation in the Gulf of Oman as part of the Canadian contribution to Operation Apollo.

## CHOOSING THE RIGHT FLEET MIX: LESSONS FROM THE CANADIAN PATROL FRIGATE SELECTION PROCESS<sup>1</sup>

by Peter Haydon

### Introduction

Naval shipbuilding programs are expensive, frequently controversial, and very political. Even the mere hint of a new shipbuilding program will draw a flurry of public criticism, varying from informed counter-proposals for the design to emotional challenges, to the actual need for the new ships. Unfortunately, the public debate usually focuses upon concepts and policy, rather than on their implementation or the work the new ships will have to do. The impact of shipbuilding programs on the national economy is seldom considered. As the details of the program emerge, the intensity of criticism spikes, and then rumbles on with less enthusiasm as the design is chosen and construction begins. Only occasionally will criticism persist through construction and sea trials, as it did with the Canadian Patrol Frigate (CPF) in the mid 1990s. Seldom, it seems, is a new naval shipbuilding program universally accepted, with the obvious exception of during wartime.

Since the 1970s, Canadian surface warship and submarine acquisition plans have run the gauntlet of public criticism, with some concepts, such as the abandoned 1987 nuclear submarine program, becoming more contentious than others. Conversely, programs like the present Joint Support Ship (JSS) are widely seen as necessary, with only a marginal public debate occurring over details such as the number of vehicles that should be carried. Now, as the navy moves

ahead towards the next step in replacing over-age ships, beginning with the *Iroquois*-class destroyers, concerns are being raised over the cost of replacement, and calls are being made to look at alternative designs as well as to review the rationale for the fleet as a whole. In many ways, the criticism is a reflection of a more widespread skepticism, of prevailing concepts of naval strategy.<sup>2</sup> Coupled with this criticism are concerns that the cost of replacing warships has escalated to the point where alternative fleet structures are necessary. Predictably, perhaps, smaller warships are being championed as a solution to this call for a new naval transformation.<sup>3</sup> At the same time, there is a counter-trend away from small warships, to larger, more flexible vessels under the broad categorization of frigates and corvettes.

This is not the first time such issues have been raised and it is not likely to be the last. The lengthy process that led to the building of the 12 *Halifax*-class frigates was the basis for a modest public debate on Canadian warship design options and therefore fleet rationale. That debate and the related internal naval studies on design options hold several useful lessons for today's concerns about the affordability and capability of the next generation of Canadian warships.

Peter Haydon is a Senior Research Fellow with Dalhousie University's Centre for Foreign Policy Studies specializing in naval and maritime security issues. He is a former career officer in the Canadian Navy.

## Design Choice Factors<sup>4</sup>

Contrary to popular belief, admirals get only the warships their political masters buy for them. Even then, the admirals seldom get that for which they ask. As one would expect, the process by which ship designs are proposed to government is bureaucratically complex and politically charged, with the end result – the design selected – invariably being a compromise. However, there are some important determining factors that influence the decision. For the most part, these consist of a series of fundamental physical and fiscal relationships that determine the design of a warship.

First, there is an obvious and important relationship between ship size and operational effectiveness that draws in such performance factors as:

- combat capability (including self-defence);
- the ability to withstand damage;
- sustainability as a function of not only logistic self-sufficiency but also endurance; and
- mobility, the latter incorporating speed and sea-keeping capability.

This relationship determines the inherent flexibility of the ship and its ability to operate effectively in an appropriate range of weather conditions. Obviously, there are trade-offs between size and capability. For instance, the US Navy's *Spruance*-class destroyers that displaced about 8000 tons carried 1400 tons of fuel, giving them an operating range (endurance) of 6000 nautical miles at 20 knots. A greater operating range would have required more fuel, leading, in turn, to a larger displacement and higher fuel consumption. There are also trade-offs in weapons and other systems, based upon 1980s data:

- a helicopter equates to about 400 tons displacement, and adds as much as \$20 million to the sail-away cost of the ship; and
- a large, hull-mounted sonar, such as the SQS 53, equates to about 500 tons and over \$60 million in total cost.<sup>5</sup>

In other words, there is a direct relationship between operational effectiveness and flexibility, and displacement tonnage. But effectiveness and flexibility always come at a price: the more you want a ship to be able to do, the larger it has to be.

Second, there is an equally important, but non-linear relationship between ship size and cost. In terms of *cost per ton of displacement*, a fast patrol boat is considerably more

expensive than a 1000-ton corvette, which, in turn, is more expensive than a 3000-ton frigate. This relationship obviously creates room for trade-offs. For instance, under a set budget, more small warships can be acquired than, say, frigates. But with such a force structure, the navy's ability to conduct sustained operations would be a function of fuel availability. The drawback is that this oversimplified trade-off model makes little provision for operational effectiveness or flexibility.

The third relationship, that existing between operational effectiveness and life expectancy, is probably the most complex. Unlike weapons systems of warships built 50 to 60 years ago where the life-spans of hull and propulsion systems and weapons were all roughly the same, modern 'fighting' systems (detection, data management, control, counter-measures, and weapons) become obsolete well before propulsion and hull systems. Also, because of the time it takes to produce a modern warship, it is almost impossible to build one incorporating all the latest technology. Instead, a cut-off date is established that defines the technological generation of the ship. Ships built to the same design at different times, i.e., in batches, can thus be different technologically. To remain fully effective, all ships now need a technological upgrade at some stage. As the life expectancy of hull and propulsion systems gets longer, and new technologies become available more frequently, it will be possible to do more than one technological upgrade in a ship's normal lifespan. The so-called *mid-life modernization* likely will become a misnomer. And at some point, the life expectancies of all systems converge, and it becomes time to replace the entire ship. Hence, life expectancy and the rate of technological development become essential design considerations.

With these and various other operational and industrial factors in mind, the politicians must decide on the quantity and type of new vessels. One consideration is the national capacity to build a new ship and to integrate new technologies, and this determines the extent of the off-shore industrial involvement. In some cases, it may be necessary to buy the complete warship from a foreign source. The political intent is to optimize operational effectiveness, and thus national security, at the lowest realistic price while maximizing domestic political benefits. The overall acquisition process can be summarized as follows:

Ultimately, the mix of ships in a navy must be established through trade-off between the types and numbers of ships that best provide the required operational capabilities and the total investment that a country is willing to make in its navy.<sup>6</sup>

**“One statement in the White Paper became the catalyst for both a public debate and a series of Department of National Defence (DND) studies with respect to the future fleet mix.”**



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### The Public Force Structure Debate of the 1970s

The 1971 Defence White Paper, *Defence in the 70s*, changed Canadian defence priorities to put national security, and thus territorial sovereignty,<sup>7</sup> firmly in first place. To many, this was the embodiment of Prime Minister Trudeau's 12 April 1969 declaration that he intended to do things differently, and that he intended to 'put Canada first.' In the eyes of many, it made perfect sense to re-think the naval force structure, and to make sure it was appropriate for the new priorities.

One statement in the White Paper became the catalyst for both a public debate and a series of Department of National Defence (DND) studies with respect to the future fleet mix.

The Government believes Canada's maritime forces must be reoriented with the long term objective of providing a more versatile general purpose capability. Versatility is required because it is not possible to be certain precisely which maritime activities will be required and which will not in the years ahead. It is therefore sensible to design a general purpose capability for Canada's maritime forces.<sup>8</sup>

The DND studies began with a very broad look at Canada's maritime interests and related defence requirements, which were presented to the Minister in May 1972.<sup>9</sup> The recommendations were simple: replace the over-aged and obsolete *Argus* maritime patrol aircraft without delay, because that capability had huge impact on national security and the maintenance of sovereignty, and, second, undertake

technical studies to determine the most cost-effective fleet mix. Even though the DND studies were not made public, a small cadre of serving and retired naval officers began publishing their views on the ideal force mix for the future, using, in some cases, concepts from those studies. The *Canadian Defence Quarterly* became the medium for a series of naval articles.<sup>10</sup>

The first article, published in the spring of 1972, began with a comprehensive analysis of political and operational requirements for Canadian naval capabilities, and then went on to discuss the best way of meeting those requirements. Here, the author of that article made an apt observation:

In a small navy one is forced to make a choice between a high-cost, multi-purpose ship with a complex weapons system and one of reasonable price with low or medium performance weapons and more modest capabilities.<sup>11</sup>

The proposed solution to the force structure problem was a compromise between 'high cost' and 'economical,' through a mix of relatively inexpensive frigates, based upon the Royal Navy's *Type-21* frigate<sup>12</sup> (HMS *Amazon*), for ASW and "blue water" operations – essentially the NATO commitment – and fast patrol boats, based upon the Vosper Thornycroft *Tenacity* design, for coastal defence and sovereignty operations.

This was followed by a proposal for an even smaller and cheaper fleet model that advocated a return to the philosophy of the Second World War of building corvettes and frigates using hull designs normally found in commercial fishing

vessels.<sup>13</sup> The underlying rationale was that if the Canadian Navy could do it during the Second World War, they could do it again today. As in the first suggestion for using small warships for constabulary tasks, little attention was paid to endurance, not just in terms of operating range but also with respect to the ship's ability to remain useful in high sea states – those conditions being a fact of life in Canadian waters.

The apparent love affair with light warships continued, with a third proposal based upon the *Yarrow* 1100-ton corvette.<sup>14</sup> Although much of the impetus was a perceived need for 'small and economical' solutions, much of the rationale was a function of picking a suitable off-shore design and building it quickly, so that the new ships could replace the aging *St. Laurent*-class destroyers before they ceased being useful. Predictably, the option of buying off shore was soon countered by the naval engineering community.

In a well-reasoned rebuttal to the operational logic of buying new ships off-shore, the economic benefits of designing and building at home were explained clearly.<sup>15</sup> One of the technical problems highlighted was that, "...if a design is purchased from overseas, it follows that the design is already out of date."<sup>16</sup> The article also brought out the gulf existing between the operational and the technical communities in their respective approaches to ship design. The operators tended to look to proven designs that met their immediate needs, whereas the engineers and naval architects were, arguably, more concerned with respect to actual construction and matching new designs to future operational requirements.

Some may argue that this was not a significant public input to the decision-making process, but this view overlooks the fact that for the first time in many years, the naval community had actually said something publicly. The traditional image of the navy as the 'silent service' was beginning to fade, but, as time would tell, it was only fading at the margins. We do not know to what extent those publicly offered suggestions were taken seriously by the operational naval staff or by the defence bureaucracy. However, what we do know is that some of those ideas were reflected in the formal technical studies carried out within DND.

### The DND Design Studies

In September 1973, the naval technical staff in the National Defence Headquarters (NDHQ) started a series of feasibility studies on design options for new warships. This included evaluating existing off-shore designs against such factors as the likely operating environment and geography, as well as the ability of

Canadian industry to build those ships. The first study, completed in late January 1974,<sup>17</sup> looked at various configurations of four theoretical hull types:

- a 10,000-ton surveillance control ship with up to nine helicopters embarked;<sup>18</sup>
- a 2500-ton destroyer employed in both general-purpose and anti-submarine warfare (ASW) roles;
- a 1500-ton corvette/frigate, also employed in general-purpose and ASW roles; and
- a 400-ton hydrofoil.

The purpose of the study was to lay out *options* rather than lead *decisions*. However, several key points emerged that would influence the final decision. The following table summarizes the cost factors that provided the decision-makers the necessary financial framework (shown in 1973 dollars and percentages of total (sail-away) costs).<sup>19</sup>

Another significant factor was that ice-strengthening the ship to Lloyds Class III standard (for ships operating in light ice conditions) would add between six and ten percent to the displacement of the ships (except the hydrofoil, of course), with corresponding increases in the sail-away cost.<sup>20</sup>

A follow-on study done in February and March 1974 looked at the feasibility of undertaking a major capability upgrade on the *Mackenzie*-class destroyers, and also at the options for acquiring four more submarines.<sup>21</sup> Again, the study made no firm recommendations, and merely provided some observations with respect to the degree of difficulty and cost-effectiveness of those concepts. For instance, modernization costs for ships with 15 or so years of remaining useful life would be around \$24 million per ship, and the work would have to begin quickly or there would be very little return on the investment. Although the industrial capacity to build submarines existed in Canada, it was believed that 'building Canadian' carried a high degree of risk, and would require considerable start-up funding. As a result, the option of buying submarines off-shore at that time became the only practical solution. The study also pointed out that because of the age of the *Oberons*, and the fact that they would likely be past their "safe-to-dive" date by the time any new submarines came into service, time was of the essence.

Ship Type/ Functional Area	Surveillance Control Ship	Destroyer	Light Frigate/ Corvette	Hydrofoil
Sail-away cost	\$ 145 million	\$ 76 million	\$ 56 million	\$30 million
Hull System	23%	9 - 11%	9 - 11%	42 - 52%
Machinery	30%	35 - 39%	35 -39%	28%
Payload	41%	45 - 49%	45 - 49%	42 - 52%
Cost per ton (C\$ millions)	0.0145	0.0304	0.0373	0.075



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HMCS *Ojibwa*, the first of the *Oberon* Class submarines acquired for the Royal Canadian Navy in 1965.

the mid 1970s when interest rates rose to perilously high levels and all capital spending was put on hold. Managing the defence budget during that period was a nightmare, and it resulted in a separate series of studies, the *Defence Structure Review* process, to find a way of meeting the various commitments on a fixed budget.<sup>23</sup> As a result, no progress was made with respect to routine fleet modernization and replacement, and some of the options already on the table, such as up-grading the *Mackenzies*, became impractical.

After two years of drafting, the submission to Cabinet for the replacement ships for the six remaining *St. Laurent*-class was presented as a formal Memorandum to Cabinet, on 3 November 1977.<sup>24</sup> In a very comprehensive annex,

the earlier Cabinet direction to “take into account the possible advantages of smaller ships more suitable and economical for use as back up for fisheries enforcement”<sup>25</sup> was carefully addressed. In doing this, the basic requirements for the next generation of warship, irrespective of whether tasked for sovereignty protection or the defence of Canada, were established as:

- good sea keeping qualities;
- high maximum speed;
- surface and sub surface surveillance, identification, and tracking capability;
- ability to operate helicopters in any weather;
- adequate command and control capacity;
- adequate weaponry for defensive operations and for self-protection; and
- an ability to operate in brash ice.<sup>26</sup>

The conclusion took full account of both domestic and NATO/Canada-United States defence commitments:

The restrictions of sea keeping qualities and speed preclude the employment of small patrol vessels in the open ocean to meet the full requirement of the protection of sovereignty. While lightly armed patrol vessels can perform in peace the tasks associated with protection of sovereignty and enforcement of regulations, the provisions of ships would be in addition to the requirement for 24 combat capable ships and would not provide a cost effective option.<sup>27</sup>

**“And the requirement to look at smaller, more cost-effective options would be imposed again.”**

The third study,<sup>22</sup> done during August and September 1974, responded to a request from the naval planning staff to examine three specific design options that had been refined from the earlier studies during a series of departmental meetings and workshops. Through this process it became obvious that only a traditional destroyer-type vessel (renamed a frigate to reflect US Navy categorization of warships smaller than the 5000-to-7000-ton displacement destroyers) met Canadian requirements. The three options were:

- a Canadian-built US Navy FFG-7 patrol frigate;
- a Canadian-built variant of the FFG-7; and
- a Canadian-designed and built patrol frigate based on the FFG-7 operational characteristics and capabilities.

The technical staff also included figures for a repeat *Iroquois*-class destroyer (DDH-280) for comparison. Although no specific recommendations were made, the results led to some logical conclusions. For instance, at a sail-away cost of roughly \$78 million (in 1973 dollars) there were few real savings in repeating the DDH-280 design, rather than designing and building a new patrol frigate. Predictably, perhaps, the three options were quickly narrowed to one of designing a new general-purpose ship. The final design and the location of the shipbuilding would, of course, demand a political decision. Not for the first time and certainly not for the last, the political reality of linking shipyard work to electoral ridings became a factor.

Getting the necessary political decision took a long time. Although some of the delay was due to the convoluted bureaucratic process associated with major spending programs, Canada also faced a financial crisis in

Program	Ship Classes to be Replaced	Start Planning	Contract Definition Starts	Contract Let	Delivery Date
CPF	<i>St. Laurent</i> (6)	1976	1979-80	1981-82	1985-86
SRP II	<i>Restigouche</i> (3) and <i>Mackenzie</i> (4)	1980	1983	1985	1989-90
SRP III	Improved <i>Restigouche</i> (4) <i>Annapolis</i> (2) and <i>St. Laurent</i> (1)	1983	1986	1988	1992-96
OSS	<i>Provider</i> and <i>Preserver</i> (2)	1989	1992	1994	1998-02
SRP IV	<i>Iroquois</i> (4)	1993	1996	1998	2002-04

When Cabinet approved the proposal on 22 December 1977, agreeing to a basic fleet size of 24 destroyer-type ships and approving the replacement of the six *St. Laurent*-class, the formal record noted that, "...Warships can fulfill all aspects of sovereignty as in present Canadian practice but armed patrol vessels cannot nor can they fulfill the collective defence role."<sup>28</sup> Simply, the government decided that a 4000-ton general-purpose, frigate-type ship best met Canada's maritime security requirements. *General-purpose* seemed to have triumphed over *small and cost-effective*, but it was not a complete victory. Approval was given for only six such ships, and the next problem facing the naval staff was to obtain approval to replace the remaining 14 destroyers and the rest of the fleet in due course. And the requirement to look at smaller, more cost-effective options would be imposed again.

### Fleet Rationalization in the 1980s

The surprising fall of the Trudeau government in early 1979 and the equally surprising election of a Progressive Conservative (PC) minority government led by Joe Clark that May resulted in a predictable shift in attitude to defence policy. One of the things the new Minister of National Defence (MND) Allan McKinnon initiated was a complete review of the CPF program, and a re-evaluation of the feasibility of getting 'smaller and less costly' ships for the second part of the destroyer-replacement program. The subsequent DND study,<sup>29</sup> which was not delivered until after the return of the Trudeau government in February 1980, examined a "bundle" of new hull forms and propulsion technologies against known and projected naval tasks. The framework for the study was a phased, complete replacement of the naval fleet over the succeeding 30 years, beginning with the six frigates approved in December 1977.<sup>30</sup>

**"An increase in the DND budget was not considered. In short, the 1980 study was seen within DND to be redundant."**

The study assumed that the Destroyer Life Extension Program (DELEX), the *Restigouche*-class update, and the *Iroquois*-class modernization (later called TRUMP) would all be implemented to maintain an adequate residual operational capability during the turmoil of the replacement program.

Regardless of whether operating in 'home' or 'away' waters, Canadian warships were viewed as having three interrelated tasks within an overall mission of *sea control*: surveillance, the maintenance of a naval presence, and combat operations. In turn, these tasks required ships with the following common characteristics:

- good sea-keeping capability, specifically the ability to remain effective in rough weather (stated as being above Sea State 5 with waves of more than 3.5 metres) and to be able to operate helicopters safely in those conditions;
- high mobility, in being able to proceed at 25 knots in Sea State 5, and, by implication, having sufficient endurance to remain effective for prolonged periods; and
- operational flexibility in being able to conduct more than one task without returning to port for reconfiguration.

The findings of the study were that those criteria could only be met by a destroyer-type warship in the 3000-to-5000-ton displacement range. In arriving at this conclusion, a key factor was an uncertainty over the proven capability of some prototype hull forms. While acknowledging that small hydrofoils, air cushion vessels, and surface effect ships had been developed, the larger sizes needed to carry the envisaged weapons and sensors (payload) had not progressed further than the drawing board.<sup>31</sup> This obviously imposed limits on the types of hull available for

SRP II. The conclusions forwarded to the Minister distilled down to two major points:

- Limiting hull size was counter-productive because small ships did not possess the mobility, flexibility, and sea-keeping qualities needed to be effective in all Canadian waters.
- Small warships designed primarily for “regulatory duties” could not survive in combat situations, and since, under the prevailing strategic concept, all Canadian warships were required to be combat capable, it was not cost-effective to build small warships.

Curiously, that study seems to have faded into oblivion, despite the thoroughness with which the issue was examined. This is probably a reflection of two factors: first, the naval staff, inasmuch as it existed at the time, had already convinced their ‘political masters’ that CPF Batch II would have to be “destroyer-type” vessels and that it made sense to repeat the design rather than waste even more time by embarking upon another lengthy design competition process. The other factor was the Senate’s comprehensive 18-month enquiry into Canada’s Maritime Defence, which had begun in late-1981.<sup>32</sup> DND was an active participant in that process and provided the Senate committee with an ‘ideal force structure’ to meet domestic and international defence and security requirements. That fleet concept reflected the political direction provided in December 1977, and it made no provision for additional capabilities. With 24 destroyers/frigates, three submarines, three support ships, 36 patrol aircraft, and 45 helicopters, the navy believed it could meet the current missions and tasks within the established long-range funding ceiling.<sup>33</sup> An increase in the defence budget was not considered. In short, the 1980 study was seen within DND to be redundant.

In distinct contrast to the rather conservative DND-recommended fleet structure, the Senate was offered a much more expansive vision of the future by Rear-Admiral Timbrell, a former Commander Maritime Command. Timbrell’s ideal fleet was larger than DND’s by about one-third, but it would cost almost double the projected government funding. It was essentially a multi-purpose fleet comprising destroyer task groups, submarines, and patrol aircraft, with a new mine warfare support force intended to meet all likely tasks at home and abroad. There were no specialized ships for domestic tasking because Timbrell continued the assumption that domestic tasks could be done using fleet spare capacity during peacetime.<sup>34</sup> In the end, Timbrell’s force structure became one of the ‘bookends’ for the Senate’s model fleet that sought to establish what it saw as a necessary balance between domestic and international missions and tasks:

- surface task groups drawn from an inventory of 16 destroyers/frigates and four support ships;

- 20 modern diesel-electric submarines for surveillance and sea control tasks;
- a 13-ship mine countermeasures force to address the growth in Soviet mine-laying capability;
- 12 missile-armed fast patrol boats for domestic use to be manned by a mix of coast guard, reserve and regular force personnel;
- three ‘escort merchantships’ to provide emergency support to the fleet;
- 36 long-range maritime patrol aircraft;
- 18 medium-range patrol aircraft;
- 45 maritime helicopters; and
- 84 shore-based attack aircraft available for maritime tasking.<sup>35</sup>

DND’s formal response to the Senate study was politely dismissive. The study was seen to be unrealistic in its call for new capabilities. The Department’s program, it was explained, included plans to replace all existing 24 destroyers rather than the Senate’s 16 specified hulls, with the option of replacing some ships with submarines. The need for a mine countermeasures capability was supported, and the Senate was advised that this was already being addressed within the Department. Fast patrol boats were not supported, despite pressure from the Naval Reserve for their acquisition as training vessels.<sup>36</sup>

From that point onward, the Department locked itself into a largely status quo fleet structure, which, as the 1984 version of the *Capabilities Planning Guide* (CPG) established, would be:

- 24 fully combat-capable surface warships;
- four submarines;
- 12 mine clearance vessels;
- three operational support ships;
- 18 long-range maritime patrol aircraft;
- 18 medium-range patrol aircraft; and
- an unspecified number of maritime helicopters.

The CPG also emphasized the need to concentrate upon improving the air defence capability of the fleet, establishing a better balance of ships between the east and west coasts, and the formation of national



HMCS *Terra Nova* en route to the Persian Gulf to participate in *Operation Friction* in 1991. This *Restigouche*-Class destroyer escort was paid off in 1997.

For the non-naval audience, it was a point that needed reinforcing. Geography, technology, and money collectively influence ship design more than some people realize.

But that was not the end of the public side of the debate. With a new government – the Conservatives lead by Brian Mulroney won the September 1984 federal election with a majority – the expectations of the naval community ran high that defence policy would be reviewed and a more aggressive approach would be taken to national security. In early 1985, the Canadian Institute of Strategic Studies held a conference on Canadian naval strategy. Vice-Admiral Fulton, a former Commander Maritime Command, offered his views of future fleet requirements, and he did not hold back. To the DND ‘status quo’ fleet, he added:

task groups, as proposed by SACLANT through NATO Force Goals.<sup>37</sup>

In the summer of 1984, *Canadian Defence Quarterly* published an article that re-examined whole nature of the future fleet mix, and it discussed, albeit briefly, the pros and cons of various hull forms.<sup>38</sup> The author seems to have had access to some of the earlier technical studies as well as the 1980 study done on the change of government, as the drawings of ship hull forms are identical. One of the conclusions, which to some will appear as a ‘motherhood’ statement for naval force planning, made the following point:

Projecting Canada’s surface ship requirements into the future requires an understanding of present realities – the increasingly important national maritime interests, the threats to those interests and the available options for combat capable ships, including technologically advanced vehicles to protect those interests. The dilemma facing those charged with planning and developing these future forces is how to relate present realities and assumptions to tomorrow’s capability requirements.<sup>39</sup>

**“That was the end of destroyer/ frigate shipbuilding programs in Canada for a decade.”**

- four nuclear-powered submarines;
- three helicopter carriers;
- eight patrol boats;
- four polar icebreakers; and
- many more patrol aircraft and helicopters.<sup>40</sup>

His concern was that, during a long period of ‘excessive NATO’ focus, Canada had overlooked its northern ocean and had allowed itself to become vulnerable domestically. Thus, he called for a far greater naval presence in all home waters. He was forthright in stating that the size of the navy would have to increase to around 25,000 personnel, and that much more funding would have to be made available. It later turned out that both the government and Admiral Fulton had shared concerns, but sought different solutions.

**The Impact of the 1987 Defence White Paper**

The long-awaited new defence White Paper appeared in 1987 complete with a proposal to acquire 10 to 12 nuclear-powered submarines to protect Canadian sovereignty. Had the submarines been built,

they would have been SRP Batch III – the option had always been there to substitute submarines for destroyers – but this did not happen. The demise of the SSN program in April 1989 was not a complete surprise. It had become difficult politically, far more expensive than originally expected, and had some very complicated industrial implications. In the end, the 1987 *Defence White Paper* essentially reduced the size of the navy by eight vessels. The bold and magnificent dream to ensure Canadian sovereignty with the help of a fleet of nuclear-powered submarines was soon forgotten, but no real effort was made to reinstate the plan to replace the eight remaining destroyers. Those ships were soon retired and disposed of in various ways as the Cold War ended with a flourish of disarmament fever. SRP Batch III planning never really got going again; it appeared that the future fleet had suddenly become eight ships smaller. It also looked as if the Senate's 1983 fleet plan for 16 destroyers or frigates and three support ships was becoming a reality.

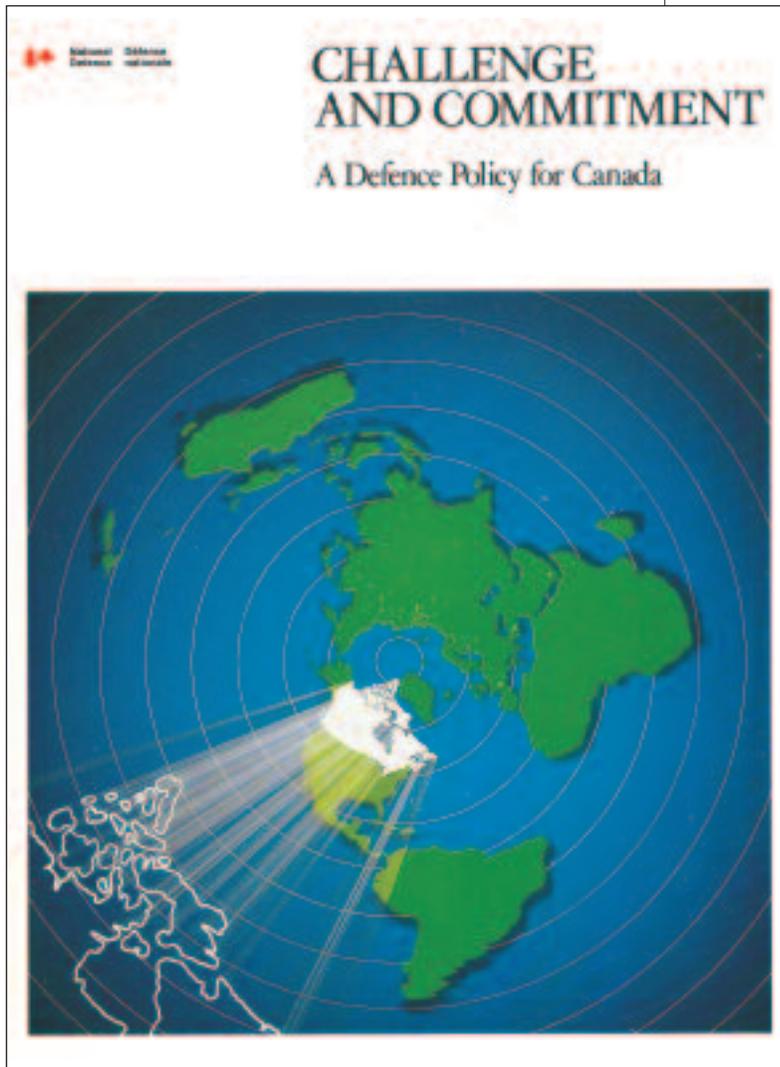
The second batch of CPFs (SRP II) was announced in late 1987, and the entire program was completed in August 1996, with the commissioning of HMCS *Ottawa*. That was the end of destroyer/frigate shipbuilding programs in Canada for a decade. Twelve Maritime Coast Defence Vessels, manned by the Naval Reserve, were built in Halifax between the end of 1994 and the summer of 1999, and they constitute the most recent warships built in Canada. There was a quick flurry of activity in September 1990 when a Defence Policy Statement contained the statement that four-to-six 'fast patrol corvettes' were planned conceptually, without giving much indication of their intended function. A commentary at the time stated:

There is reason to be sceptical of the concept for a new corvette. On the basis of the rationale presented so far, it would seem that such a vessel is not necessary. Destroyers and frigates can do almost everything the corvette might do except Arctic patrol. Also, traditional warships have a flexibility which is not normally inherent in a corvette. It also seems that as the integrity of the surface task groups diminishes, present plans call for ships of lesser capability and lesser capacity to represent Canada on the world's oceans.<sup>41</sup>

The corvette concept soon died, and thus SRP III was effectively 'dead.' A few additional public comments and suggestions with respect to 'ideal' fleet mixes were published, but without a new naval shipbuilding program on the horizon, there was little incentive to take inputs seriously.<sup>42</sup>

### Conclusion

Today, the navy is essentially attempting to activate a plan to take over where the comprehensive fleet replacement plan left off in 1989. No longer called SRP IV, the new plan, albeit without political or departmental blessing as yet, will replace the three remaining *Iroquois*-class destroyers with four new vessels. The requirement is to replace the area air defence and command and control capabilities of the *Iroquois*-class, which are essential components of the Task Group concept. The intention is that the acquisition plan for new destroyer-type ships will go to Cabinet in early 2008, fifteen years after the originally-scheduled replacement process was set to begin. Predictably, the plan is being challenged, and calls are once again being made to look at 'small



and cost-effective' solutions rather than automatically replacing the ships on a "one-for-one" basis.

With the government's new emphasis upon the Arctic, and the statement that new Arctic patrol vessels will be built to increase government presence in the northern ocean, one cannot help but wonder if SRP IV, for that is what it really is, will emerge as those new patrol vessels, rather than the four new destroyer-type ships, and if it will also be frittered away in a flurry of misplaced enthusiasm, such as that which occurred with SRP III. One thing is certain. There will be another call to look at the feasibility of getting 'smaller and less costly' ships

for the last phase of destroyer-replacement program, and we should expect that call to be accompanied by a requirement to consider Arctic operations. One other thing is fairly certain. The admirals will resolutely defend the task group concept in the same way that they have defended a destroyer force for the past 60 years. Some will argue that the time for change has come.

The next naval debate has already started, and it promises to be interesting.



DND photo IS2005-1326a

HMCS *Montreal* sails in the sunrise off the Atlantic seaboard.

## NOTES

1. I would like to thank friends and colleagues who read early drafts of this paper and gave me many useful suggestions, especially Dr. Dan Middlemiss and Commodore Eric Lerhe of Dalhousie University, and Dr. Richard Gimblett of Ottawa.
2. For instance, Paul Kennedy, "The rise and fall of navies," in *International Herald Tribune*, 5 April 2007; Vice-Admiral Jeremy J. Blackham and Gwyn Prins, "The Royal Navy at the Brink," in *RUSI Journal*, Vol. 152, No. 2, pp.10-16; and Commander Ken Hansen, "Starting Over: The Canadian Navy and Expeditionary Warfare," in *Canadian Naval Review*, Vol. 1, No. 1 (Spring 2005), pp. 20-24.
3. See, *inter alia*, Jon W. Glass, "Navy faces battle of the bulge in shipbuilding costs," in *The Virginian-Pilot*, 11 November 2007; Norman Friedman, "The Corvettes and Frigates New Wave," in *Armada International*, 2/2003, pp. 58-66, E.R. Hooton, "The Move towards Corvettes and Frigates," in *Armada International*, 6/2004, pp. 16-20; E.R. Hooton, "Corvettes Steaming Ahead," in *Armada International*, 6/2005; E.R. Hooton, "Corvettes to Sail Smartly," in *Armada International*, 1/2007, pp. 32-36; and Commander Ken Hansen, "The Superior-Simple Ship Fleet Construct," in *Canadian Naval Review*, Vol. 3, No. 2 (Summer 2007), pp. 4-7.
4. In making this cautious venture into naval architecture, I was influenced by two sources: Philip Pugh, *The Cost of Seapower: The Influence of Money on Naval Affairs from 1815 to the Present Day* (London: Conway Maritime Press, 1986), and Captain James W. Kehoe US Navy (ret'd) and Kenneth S. Brower, "Small combatants – the operators' choices," in *International Defence Review Small Warships Supplement 5/1987*, pp. 9-16. I know there are many further sources.
5. Current figures are not available. These estimates come from Appendix "C" to an April 1981 Congressional Budget Office paper, "Naval Surface Combatants in the 1990s: Prospects and Possibilities", available at <<http://www.cbo.gov/ftpdoc.cfm?index=5175&type=0>>

6. Kehoe and Brower, p. 11.
7. Political sovereignty has been an objective of Canadian defence policy since the First World War. The ideal being that whenever possible, Canadian forces will fight or conduct operations under Canadian command.
8. Canada, Minister of National Defence, *Defence in the 70s* (Ottawa: Information Canada, August 1971), p. 28.
9. Department of National Defence, *Maritime Policy Review*, dated May 16, 1972 (File No. D 1150-110/M21). Obtained through Access to Information.
10. The naval and related defence policy articles are available at <<http://centreforforeignpolicystudies.dal.ca/cdq/>>
11. Lieutenant-Commander R.H. Thomas, "Ships for the 80s," *Canadian Defence Quarterly*, Spring 1972, pp. 15-21.
12. The definitions of warships are not standardized between or even within navies. For instance, by its physical dimensions, the Canadian Patrol Frigate would have been rated as a cruiser in the early part of the 20<sup>th</sup> Century, yet with respect to its armament, it would be correctly designated as a frigate. Definitions can change in mid-design, often for political purposes as in the case of the Royal Navy's light carriers, *Illustrious*, *Invincible*, and *Ark Royal*, which were 'sold' to Parliament as 'through-deck cruisers.' In contemporary terms, the tasks fulfilled by destroyers and frigates are much the same, however, with destroyers usually being more closely associated with command roles.
13. Commander J.M. Reid, "On the right kind of surface ship for the Canadian Maritime Forces," in *Canadian Defence Quarterly*, Winter 1973, pp. 56-57.
14. Lieutenant-Commander S.T. Jessen, "Surface Vessels for the 1980s: Smaller, Cheaper, All-Purpose," in *Canadian Defence Quarterly*, Winter 1975, pp. 24-30.
15. W.H. German, "How to go about Modernizing the Canadian Maritime Forces," in *Canadian Defence Quarterly*, Spring 1976, pp. 30-33.
16. *Ibid.*, p. 31.
17. DGMEM, *Report on Surface Warship Study*, [3120-280/C3-3 (DMEM-5)], dated 25 January 1974. Obtained through Access to Information.
18. By direction from the operational staff, the engineers also looked at the concept of converting HMCS *Provider*, the first of the fleet support ships, into a surveillance control ship. It was prohibitively expensive.
19. The sail-away cost estimate is in millions of 1973 Canadian dollars per vessel, and it excludes design and project management costs, as well as training costs. All other figures are rough percentages of that cost, and "payload" is a short-form for all the ships' weapons, sensors, and other operational fittings, excluding helicopters and ammunition.
20. Several forms of ice-strengthening categorization exist; the primary ones are the Lloyd's standard and the Polar Class standard. The latter are explained by Doug Thomas in "Warship Developments: Arctic/Offshore Patrol Ships," in *Canadian Naval Review*, Vol. 3, No. 3 (Fall 2007), pp. 36-37. An interesting discussion on ice-strengthening can be found at <[http://www.arcop.fi/workshops/ws5day1\\_bridges.pdf](http://www.arcop.fi/workshops/ws5day1_bridges.pdf)>
21. DGMEM, *Report on Surface Warship Follow On Study*, [3120-280/C3-3 (DMEM-5)], dated 29 March 1974. Obtained through Access to Information.
22. DGMEM, *Report on Surface Warship Study Destroyer/Helicopter Options*, (3120-280/C3-3 (DMEM-2)), dated 12 September 1974. Obtained through Access to Information.
23. See Peter Haydon and Dan Middlemiss, "The 1975 Defence Structure Review: The Naval Dimension," in Yves Tremblay (ed.), *Canadian Military History Since the 17<sup>th</sup> Century* (Ottawa: DND, Directorate of History and Heritage, 2001), pp. 347-358.
24. Memorandum to Cabinet, *Maritime Surface Ship Requirements* (Discussion Paper DND 8-77P) Serial 545-77MC, dated 3 November 1977. Obtained through Access to Information.
25. Cabinet direction of 18 September 1975, quoted in Annex B to *Maritime Surface Ship Requirements*, p. 91.
26. This is a simplification of the full and rationalized list of desired capabilities on pages 32 and 33 of *Maritime Surface Ship Requirements*.
27. *Ibid.*, p. 37.
28. Cabinet Minutes for 22 December 1977, p. 39.
29. Department of National Defence, *Future Ship Study – Follow-on Options to the Canadian Patrol Frigate*, (no file number) dated 6 June 1980, with covering memo from DM (DND) and CDS to MND, dated 17 July 1980. Obtained through Access to Information. Also see Proceeding of the Parliamentary Committee on External Affairs and National Defence for 19 March 1981.
30. *Future Ship Study – Follow-on Options to the Canadian Patrol Frigate*, Annex D to Part II, p. D-20.
31. *Ibid.*, p. D-24.
32. Report of the Sub-committee on National Defence of the Standing Senate Committee on Foreign Affairs, *Canada's Maritime Defence*, May 1983.
33. This concept was almost certainly discussed and explained in the *Future Surface Ship Study* of September 1982, and it is shown in summary form on page 59 of the Senate Sub-committee report, *Canada's Maritime Defence*.
34. The details can also be found on page 59 of the foregoing Senate Sub-committee report. Timbrell's concept was published in the *Canadian Defence Quarterly* several years earlier – Rear-Admiral R.W. Timbrell, "On Canada's Maritime Defence Requirements," in *Canadian Defence Quarterly*, Spring 1977, pp. 47-49.
35. See Chapter V of the Senate Sub-committee report, pp. 41-61.
36. DND Review of Report of the Sub-committee on National Defence of the Standing Senate Committee on Foreign Affairs, *Canada's Maritime Defence*, May 1983, dated 17 April 1984. The author was a member of the naval planning staff in the early 1980s when the Naval Reserve proposal first surfaced. It had some roots in the Second World War, but was also a reflection of the intense dislike for the naval staff's views that the reserve should take over the mine countermeasures role in the same manner as their British counterparts.
37. Capabilities Planning Guidance Part II 1984, as summarized in CMDO Discussion Paper Fleet Mix Alternatives Study, File 11900-1 (CMDO) of May 1989. Obtained through Access to Information. The story of how the Canadian naval task group came into being can be found in Peter T. Haydon, "The Evolution of the Canadian Naval Task Group," Ann L. Griffiths, Peter T. Haydon, and Richard H. Gimblett (eds.), *Canadian Gunboat Diplomacy: The Canadian Navy and Foreign Policy* (Halifax: Centre for Foreign Policy Studies, 1998), pp. 95-130.
38. Lieutenant (N) D.B. Bindernagel, "Planning for Future Ship Requirements," in *Canadian Defence Quarterly*, Summer, 1984, pp. 22-27.
39. *Ibid.*, pp. 26-27.
40. Vice-Admiral J.A. Fulton, "What Model Fleet for Canada?" in Brian MacDonald (ed.), *High Tech and the High Seas* (Toronto: Canadian Institute of Strategic Studies, Spring 1985). As a parting shot on retirement, John Gelner, the editor of the *Canadian Defence Quarterly*, made another plea for the government to examine the merits of building corvettes rather than destroyer-type ships. Arguing unconvincingly that the RCN had used corvettes effectively during the Second World War, and that the Soviets were now using modern corvettes, Gelner stated his belief that Canada did not need big warships. His argument failed because he did not consider Canadian weather and geography. (Editorial, *Canadian Defence Quarterly*, Autumn 1986, p. 6.)
41. Peter Haydon, "What's Wrong with Corvettes?" in *Canada's Navy Annual 1991-92*, pp. 13-14.
42. For instance, Michael C. Eames, "The Impact of Future Surface Ships and Aircraft on Anti-Submarine Warfare," in *Canadian Defence Quarterly*, December 1989, pp. 7-16; Michael Eames, "Foreseen Technology and Its Impact on Naval Capabilities," in *Canadian Defence Quarterly*, December 1991, pp. 13-18; and Sub-Lieutenant Peter Dalton, "Patrolling Canada's Coastline: The Hydrofoil Reconsidered," in *Canadian Defence Quarterly*, May 1993, pp. 29-35.