

DND photo HS030590m01 by Sergeant Giancarlo Luca

HMCS *Corner Brook* at sea.

## A RATIONAL CHOICE REVISITED – SUBMARINE CAPABILITY IN A TRANSFORMATIONAL ERA

by Commander Michael Craven

### Introduction

The origins of a modern Canadian submarine force can be traced to studies undertaken in the post-Second World War era. These were concerned with anti-submarine warfare (ASW) effectiveness in a Canadian navy rapidly expanding to meet North Atlantic Treaty Organization (NATO) demands, at a time when all three service elements were undergoing the greatest peacetime expansion in Canadian military history. Without dwelling on the particulars of the studies or of the period, on 2 April 1958 the 56<sup>th</sup> Meeting of the Naval Board concurred the requirement for submarines as effective ASW units and vital to an overall program of ASW training for the Royal Canadian Navy (RCN) and the Royal Canadian Air Force (RCAF). The establishment of a national submarine service was decided for practical purposes, although it was not yet a foregone conclusion. Almost exactly 40 years later, on 6 April 1998, the Chrétien Liberal government announced the acquisition, via a novel ‘lease-with-the-option-to-buy’ arrangement, of four United Kingdom *Upholder* Class diesel-electric submarines, surplus to the requirements of the Royal

Navy and now made available to Canada.<sup>1</sup> The acquisition of the *Victoria* Class, as the submarines were collectively named, seemingly secured the future of the submarine service well into the future, allowing in the process Canada to dispose of her remaining *Oberon* Class submarines and to introduce a modern undersea capability.<sup>2</sup> In April 2006, the Chief of Maritime Staff declared the *Victoria* Class to be at Initial Operational Capability.

This article, which draws upon material contained in archived and filed documents, as well as the personal recollections of former and serving Canadian Forces (CF) officers, contributes to an ongoing dialogue about the role of submarines in a transformed Canadian Forces. It begins by exploring the fundamental nature of the submarine; the reasons nations acquire them, and the requirement in the Canadian context. After a short historical review, including evolution of the process to replace the *Oberon* Class, and, ultimately, the 1998

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decision to acquire the *Victoria* Class fleet, the article will examine the current submarine Concept of Operations. It will then review the contribution that submarines have made in the past and are likely to achieve in future relative to Canada's national defence and security, and discuss the current situation with respect to the Submarine Capability Life Extension Project and *Victoria* Class status, including challenges to the achievement of Full Operational Capability. Finally, it will offer a conclusion relevant to the retention of submarine capability within a transforming and transformed Canadian Forces. During this process, three myths that continue to circulate with respect to submarines, both in the press and internal to the DND/CF, will be examined.

### The Nature of Submarines and the National Requirement

Nuclear and non-nuclear propelled submarines alike exhibit characteristics of stealth, endurance, flexibility, lethality, and relative invulnerability.<sup>3</sup> Accordingly, in general terms, both are platforms of profound power and influence. The nuclear submarine, with almost unlimited range, endurance, mobility, and offensive power, represents the apex of the technology. Of course, such capability requires extensive specialist infrastructure, and it is enormously expensive. These two factors effectively have restricted nuclear submarine ownership to a handful of navies, where they are incorporated as the pre-eminent capital ships of the fleet, charged with missions of strategic deterrence, sea control, power projection, and surveillance of the blue water and littoral environments.

Most nations with limited budgets and appreciable maritime interests strive to maintain a credible non-nuclear submarine capability.

Generally characterized as 'vehicles of position' (as opposed to nuclear submarines, which are 'vehicles of manoeuvre') the attraction of the non-nuclear submarine as an instrument of power and influence can be deduced by the composition of the maritime forces of major and middle powers, as well as those of smaller nations with regional interests in offshore and littoral waters. With the exception of most sub-Saharan African states, almost all these nations strive to maintain a viable submarine capability. Although the number of submarines in service globally has dropped dramatically from almost 900 at the peak of the Cold War, today some 40 nations operate about 400 submarines.<sup>4</sup> Every one of these nations understands that the submarine, with its superior combat power and freedom of action, is a fundamental component of the sea power paradigm. Each of these nations implicitly understands that possession of a submarine capability confers an influence out of proportion to initial investment and 'year-over-year' operating and maintenance expenses.

Elaborating on the theme of cost, the expense of acquiring and maintaining a non-nuclear submarine capability compares favourably with that of a modern frigate. However, surface warships require significantly larger crews, and they are more expensive to deploy, requiring the support of dedicated logistics assets in order to achieve similar levels of endurance. Even with the need for supporting infrastructure and the demanding maintenance routines associated with an unforgiving operating environment, non-nuclear submarines represent an affordable and credible front-line maritime capability. By way of example, the steady-state cost of ownership of the four-boat *Victoria* fleet is estimated at about \$C250 million per year, with an 'all up' personnel requirement, including support staff ashore, of less than 500 people. Comparatively, a non-nuclear submarine costs some 30 percent less than a frigate or destroyer to keep at sea on a daily basis, in part the consequence of smaller crew and greater fuel economy.

As noted earlier, about 40 nations operate submarines, of which three (France, China, and Russia) operate a mix of nuclear and non-nuclear boats, and two (the United States



A German Navy *Type 214* Class U-boat heads out to sea.

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and United Kingdom) focus exclusively on nuclear submarine operations. Among the states operating submarines, there are some not predisposed to western values and interests, including Algeria, Iran, and North Korea. Other submarine-operating nations, whose interests are not always synonymous with each other or the west, include China, Pakistan, and India. Together, these six states possess almost one quarter of the world's submarines. Each of China, India, and Pakistan has commenced an ambitious submarine modernization agenda, with China having an aggressive building program intended to replace its entire undersea fleet.<sup>5</sup> While sceptics argue that ASW is a thing of the past, it must be pointed out that conventional submarine production continues apace, including in Russia with the export-oriented *Amur* Class, in France with the *Scorpenes* Class, and in Germany with the *Type 212/214* Class.<sup>6</sup> Each features an option *for* or is equipped *with* an integrated air-independent propulsion system.<sup>7</sup> Extensive orders for units of the *Scorpenes* and *Type 212/214* Classes have been placed, with Chile recently having taken delivery of the first of two French *Scorpenes*, and India having signed an order earlier this year for six, with a follow-on option for six more. Proliferation of such capable platforms around the world is both a security concern and a military planning problem.

**“Most nations with limited budgets and appreciable maritime interests strive to maintain a credible non-nuclear submarine capability.”**

Submarines are internationally recognized as a maritime core capability able to perform a variety of roles that support national security and defence objectives. In the period leading up to an announcement of the *Submarine Capability Life Extension Project M2549* in 1998, the initiative by Canada to replace her vintage *Oberon* submarine fleet was the subject of extensive and intensive professional and public introspection that stretched back several years. Particularly sharp in domestic media and academic circles, this energetic debate inevitably attracted the interest of Canada's continental defence partner, the United States. Notably, two successive US Secretaries of Defense (William Perry and William Cohen) wrote directly to the Canadian Minister of National Defence, strongly supporting the possibility of a modernized submarine service. The topic of whether Canada should invest in a revitalized submarine capability was raised at the Permanent Joint Board on Defence, and it was directly and positively addressed by the Canadian ambassador to Washington (Raymond Chrétien) and the Canadian High Commissioner to London (Roy MacLaren). Secretary Cohen exhibited no hesitation in stating that a modernized Canadian submarine capability would contribute directly to the defence of North America and the transatlantic region, a point of view discerned as sufficiently emphatic to merit re-emphasis by both Canadian officials.<sup>8</sup>

The eventual decision to sustain a submarine capability was buttressed by logic continually refined since 1980, when Canada first seriously considered the option of modernizing her submarine service. Much as the arguments underpinning the broad roles of the CF have remained relatively constant since the end of the Second World War, the speaking points central to retention of submarine capability remained constant throughout the 1990s. Expressed in current terms, the rationale justifying acquisition of submarines was centred on their ability to achieve domestic and deployed effects through four enabling features: strategic impact, balance, sovereignty/surveillance, and non-combat capability. Each feature will be addressed in turn.

**Strategic impact.** As a consequence of their stealthy nature, submarines afford the option of *selective disclosure*, defined as the discretion available to decision-makers to keep secret, announce, or deny the presence of forces in the context of a developing situation. Simultaneously, submarines serve as a credible deterrent to the activities of almost all maritime adversaries. The suspected presence of even a single boat can exert diplomatic, political, or military influence in the furtherance of national goals and interests. Examples in the Canadian context include the temporary establishment of a submarine Notice of Intention (a formally communicated mechanism to announce reservation of an ocean area for submarine operations) during the spring 1995 fisheries confrontation with Spain, as well as generation of national *angst* when foreign submarines were discovered to have been operating in Arctic waters in proximity to Canada's northern archipelago. An important corollary exists in this regard; submarines – should the government choose to employ them in such capacity – are capable of projecting offensive power with strategic

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effect in the littorals and choke points of other nations, even when allied forces are unable to exert presence in the face of enemy domination of the battlespace. Finally, possession of submarines admits Canada to that exclusive group of states participating in regulated and highly classified submarine waterspace management and intelligence-sharing schemes. The intention to re-establish a Pacific submarine presence led to the immediate cooperation of the United States in development of a west coast Waterspace Management Agreement with Canada, whereas none existed previously. Likewise, Arctic transits and deployments by allied submarines are generally first signalled when Canada's Atlantic Submarine Operating Authority is advised of foreign submarine movement across 70 degrees North latitude. Taken together, these various factors result in a capability of strategic importance in so much as it exponentially expands the range of coercive options available to decision-makers.





HMCS *Windsor*, a *Victoria* Class submarine, sails beside HMCS *Montreal* at sunrise along the Atlantic seaboard.

situation unobtrusively, and, if the situation requires, immediately transition to a more coercive posture with the intention of achieving political, diplomatic, and military advantage. Submarines are able to respond covertly to real or perceived threats to the maritime sovereignty of Canada and to the North America continent.<sup>9</sup> Through the conduct of sovereignty and surveillance patrols, they secure the maritime approaches of the nation and continent against a range of illegal activities, assist in the protection of the national fishery industry, and can even provide a degree of support to environmental surveillance activities. These latter activities lead inevitably to:

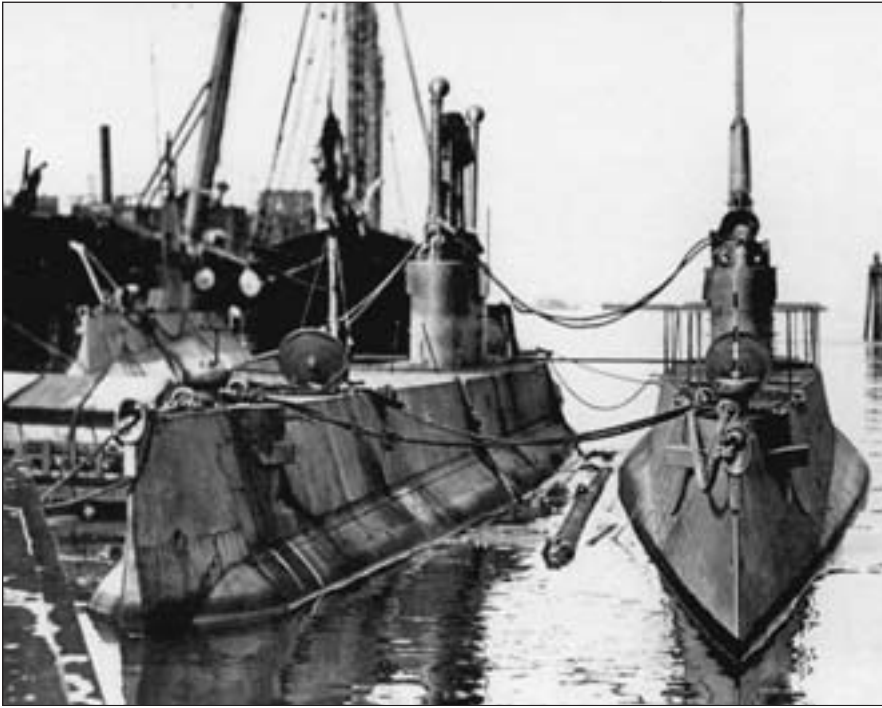
**Balance.** Submarines permit a graduated and determined response to military developments at sea, in both domestic and international spheres. In this regard, they act as an unparalleled ‘force multiplier’ for the operating nation, and a significant planning and resource allocation challenge for a potential enemy – in short, a very real deterrent at the strategic, operational, and tactical levels. Their versatility, while not as extensive as surface platforms, is considerable, and, in contrast to a surface force, they are able to operate for several weeks without logistics support and with relative impunity in an area controlled by opposing surface and air forces. They offer advanced training opportunities for forces charged with the ASW mission, and their possession requires staff experienced in the command and control of submarine operations. This gives other nations the confidence to assign control of their submarines, including nuclear submarines, to Canada for operations. Loss of confidence in this regard would seriously compromise Canadian ability to command complex multi-national fleets at sea. In the broadest sense, the balance resulting from the inclusion of submarines in the Canadian Forces Order of Battle affords Canada simultaneous vertical coverage of the water column, and horizontal coverage of the maritime warfare continuum. Only fleets that include the right mix of assets – that is, balanced fleets – are able to achieve this.

**Sovereignty/Surveillance.** As a consequence of their submerged operating mode, exceptional on-station endurance, and diverse sensor outfit, submarines provide a unique and highly effective covert surveillance capability. When melded with the ability to exercise selective disclosure, this capability confers a capacity to monitor a developing

**Non-combat capability.** Submarines have a proven ability to respond effectively in support of the needs of Other Government Departments (OGDs), and have provided unique services, particularly in fisheries and counter-drug operations. Greater elaboration will be provided upon this theme downstream.

Each of these four points featured prominently in the pre-September 2001 geo-strategic environment, and each remains extant today. However, submarines also have a contribution to make in deterring and countering the asymmetric threats that now preoccupy Canadian/US (CANUS) planners. This is centered upon Intelligence-gathering, Surveillance, and Reconnaissance (ISR) activities, and the covert delivery and recovery of Special Operations Forces (SOF) charged with the anti-terrorist and other unique missions. Special operations from submarines have long been recognized as a core capability by many of Canada’s NATO allies, as well as by Russia, Australia, Israel, Brazil, Argentina, and Chile, amongst other nations. At a basic level, *Victoria* Class submarines already possess the ability to support these types of activities, and, with additional affordable upgrades and training, they could make an even more significant contribution, either in the domestic littoral or when deployed abroad. Is it beyond the realm of practical consideration to wonder how Canada might respond if a vital off-shore hydrocarbon production platform were seized by a terrorist or other force, equipped with personal firearms and man-portable anti-aircraft weapons, threatening political or environmental blackmail?

**“Against this background the Canadian Oberons one by one advanced beyond their 25-year design lifespan.”**



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Humble beginnings. The British Columbia navy, CC1 (left) and CC2, seen here probably after their arrival on the east coast in late 1917.

### Historical Background<sup>10</sup>

Canada's post-Second World War association with submarine operations has centred on diesel-electric vessels stationed at naval dockyards in Halifax and Esquimalt. This first involved, throughout the 1950s and early 1960s, submarine services provided by the United Kingdom (Royal Navy Sixth Submarine Squadron, with up to three submarines in Halifax) to facilitate operational training of RCN/RCAF ASW forces. With the impetus of the April 1958 endorsement at the 56<sup>th</sup> Meeting of the Naval Board, the RCN and the CF operated five submarines between 1961 and 2000, comprising two ex-USN boats of Second World War vintage (SS71 *Grilse*, 1961-68, and SS75 *Rainbow*, 1968-74), loaned to Canada and based at Esquimalt, and three new-construction *Oberon* Class submarines (SS72 *Ojibwa*, SS73 *Onondaga*, and SS74 *Okanagan*), purchased by Canada from the United Kingdom, and based at Halifax during the period 1965-2000.

In 1978, four years after a tired HMCS *Rainbow* was paid off, *Project M1642 West Coast Submarine Acquisition* was initiated to procure a replacement submarine for Maritime Forces Pacific (MARPAF).<sup>11</sup> In 1980, this initiative was rolled into a broader replacement strategy for the entire CF *Oberon* fleet, designated *Project M1837 Canadian Submarine Replacement Project* and seeking to acquire a minimum of six modern platforms for introduction into service by the end of that decade. In 1985, at the instigation of the Mulroney Conservative government, this was re-designated the *Canadian Submarine Acquisition Project* and re-scoped to investigate the option of acquiring nuclear submarines. In 1987,

the government announced, in its "*Challenge and Commitment*" *Defence White Paper*, procurement of 12 nuclear submarines. In response, the submarine replacement initiative was again revamped and placed under the leadership of the Chief of Submarine Acquisition. Then, in 1989, the entire project was cancelled. With the navy still needing to replace the aging *Oberons*, *Project M2549 Canadian Patrol Submarine Project* was stood up in 1990, but in 1992, it was deferred two years until 1994, at which time, a Liberal government-instituted *Defence White Paper* stated that the government intended to "explore [the] option" of "acquiring three to six modern diesel-electric submarines on a...demonstrably cost-effective [basis]."<sup>12</sup> This deferral entailed yet another change in nomenclature, to *Project M2549 Submarine Capability Life Extension*. Against this background the Canadian *Oberons* one by one advanced beyond their 25-year design lifespan.

From 1994 until the summer of 1997, significant departmental effort was expended educating Cabinet and Canadians as to the rationale for replacement submarines. A series of documents drafted for government consideration stressed common themes: the overall relevance of submarines to national security and the 1994 defence policy; their contribution to the exercise of national sovereignty; their role in the defence of Canada and collective defence of North America; and their support to international security and a stable global framework through the assignment of multi-purpose, combat-capable maritime forces to NATO and other bilateral, multilateral and UN initiatives. In summarizing the operational requirement, a classified June 1997 analysis submitted to government noted the need to conduct cost-effective surveillance operations; to maintain continued Canadian capability and credibility in undersea warfare in support of alliance and international contingency operations; to provide training, experience and expertise in undersea warfare for all Canadian maritime forces; and to secure leverage with allies for intelligence and information sharing.

**"These latter patrols were frequently undertaken in cooperation with *Argus* and *Aurora* long-range patrol aircraft..."**

On 6 April 1998, after an extended period of intensive negotiations with the United Kingdom, the government formally announced the *Submarine Capability Life Extension Project* initiative to acquire four reactivated



The consolation prize in the nuclear submarine sweepstakes. HMCS *Ojibwa*, the first of three O Class submarines acquired for the RCN, at sea during May 1965.

*Upholder* Class submarines, complete with basic safety training, shore trainer facilities, a technical data package, and initial equipment conversion, consisting of a six-month so-called Canadianization Work Period undertaken in Canada. Original projections called for submarines to be accepted by Canada from the United Kingdom at six-month intervals, commencing in April 2000. It was anticipated that all four would be available for operational activity early in 2004, and that the Project Office would stand down by 2006-07. The project was initially approved at a total cost of \$C750 million. In 2003, Treasury Board approved a revised expenditure authority authorizing additional funding to \$C896 million. Against this cost, the Office of the Auditor General and National Defence Headquarters (NDHQ) Chief of Review Services would conclude, in a 2003 report, that the value of the assets to Canada was conservatively estimated at \$C3 billion.

The new submarines were, at the time of project announcement and in keeping with the precedent established for *Halifax* Class frigates and *Kingston* Class coastal defence vessels, named after Canadian communities, the SSK876 *Victoria*, SSK877 *Windsor*, SSK878 *Corner Brook*, and SSK879 *Chicoutimi*. Management of the acquisition was achieved via the mechanism of an Assistant Deputy Minister Material Project Office and a Maritime Staff Program Directorate. The management structure was unique in that it was significantly leaner than utilized in the past to supervise a major Crown acquisition.

### Concept of Operations

Even before the announcement of the *Victoria* acquisition, the navy began development of an updated submarine Concept of Operations, based upon experience gained with the *Oberon* Class in the post-Cold War period. Intrinsic to this development was the realization that, while submarines remain essential components of a balanced maritime force, *Victoria* Class operations were likely to include other important tasks beyond traditional core activities. In 1998, an interim *Victoria* Class Concept of Employment was promulgated, and then complemented in 2001 with a comprehensive Submarine Operating Instruction containing a detailed Concept of Operations, a document that has continued to evolve. Today's operational concept describes submarine missions and employment, and it specifically articulates the requirement for *Victoria* Class submarines to be available for domestic, continental, or expeditionary deployment in support of national defence and security tasks.<sup>13</sup>

Achievement of capability relevant to such missions and tasks demands the preservation of traditional core submarine capabilities (anti-submarine and anti-surface warfare), as well as the development of additional skills known to be in demand today – primarily ISR and support to SOF. Recognizing the security challenges occasioned by emergent asymmetric threats, effort is being directed toward the integration of submarines into the expanded special warfare and anti-terrorist capability that the department is acquiring. The intention



is, once the steady-state operations cycle is achieved in 2011, that one submarine will always be at a state of readiness to commit, at relatively short notice, to a domestic or international contingency operation for up to six months, with the expectation that the readiness level of a second platform could be advanced such that it could relieve the first vessel and provide sustained coverage for a second consecutive six-month period. In terms of under-ice/Arctic operating capability, the Concept of Operations notes that, while retrofit of an air independent propulsion capability is possible, pursuit of an under-ice capability – which involves major investment in other areas in addition to expensive propulsion enhancements – is not currently being pursued. Nevertheless, with incorporation of a limited number of planned improvements already being actively considered, the ability of the *Victoria* Class to operate in near-ice edge open-water northern areas of interest to Canada will be measurably improved.

### Generating Effects

Beginning in the late 1960s, CF *Oberon* submarines deployed regularly to the United Kingdom as part of a formal submarine exchange program. Operations undertaken by Canadian submarines in this context included intelligence-gathering missions – colloquially known as ‘mysteries’ or ‘sneakies’ – which gave the submarine service its first taste of Cold War operations. In the Pacific, the availability of a single submarine, heavily subscribed for ASW training, limited the

opportunities for operational deployments. Nevertheless, some operational activities were undertaken, and a great amount of training with direct application to special operations was conducted.<sup>14</sup> On the Canadian side of the Atlantic, conduct of an annual surveillance patrol became the norm in the 1970s, and, in 1980, it was formalized with the production of a standing patrol Operation Order. This facilitated a series of operations against surface and sub-surface units of the Soviet Navy in the Western Atlantic over the next 10 years, including the monitoring of Soviet intelligence-gathering and space event support vessels, intelligence-gathering missions on new-construction Soviet warships, and patrols to detect and track Soviet ballistic missile carrying submarines transiting to their assigned operation areas in the western Atlantic. These latter patrols were frequently undertaken in cooperation with *Argus* and *Aurora* long-range patrol aircraft operating from CFB Greenwood and CFB Summerside, as well as United States Navy P3 *Orion* aircraft flying from east coast US naval air stations. The implementation of the *Submarine Operational Update Programme* and acquisition of MK48 heavyweight torpedoes in the mid-1980s resulted in an even more relevant and effective patrol capability. This was significant inasmuch as the provision of truly operational submarines was recognized by NATO as a credible contribution in lieu of other types of maritime platforms. Similarly, it spoke to Canada finally achieving a balanced maritime capability to exert presence throughout the water column: above, on, and beneath the ocean surface.



HMCS *Victoria* in Halifax Harbour.

Far from signalling an end to operational patrols, the termination of the Cold War resulted in submarines being re-tasked in support of emerging priorities. Between 1991 and 1994 four major patrols were undertaken: *Operations Ambuscade* and *Grouse* in support of the Department of Fisheries and Oceans, and *Operations Jaggy* and *Bluebird* in support of the Office of the Solicitor General. Three of these achieved meaningful results, including: sufficiently robust surveillance of the Georges Bank fishery in 1993, to reduce the level of fisheries violations by the New England fishing fleet; submarine observation in the same year of a large quantity of illegal drugs being dumped, which were later recovered by navy divers to serve as evidence in a law enforcement action; and surveillance of the Portuguese

and Spanish fishing fleets on the Grand Banks in 1994.<sup>15</sup> Other surveillance patrols were conducted, but without observers from OGDs, a pattern of activity that has been re-initiated with two *Victoria* Class consolidation patrols off Canada's east coast. In this regard, it is important to note that, even though Full Operational Capability has not yet been declared, a submarine is available today to participate in domestic and continental operations off Canada's Atlantic coast. With a two-boat capability expected as of 2009, availability will expand to include the Atlantic and Pacific coasts of North America.

Delays related to re-activation, and other issues – the October 2004 fire aboard HMCS *Chicoutimi* significant amongst them – have, in the past, and continue to impact submarine introduction and achievement of operational capability. These, in turn, adversely affect the navy's ability to demonstrate submarine-specific effects easily understood by laypersons. Notwithstanding, a Canadian submarine presence has been re-established in the Pacific with attendant positive implications for Canadian sovereignty and naval flexibility. Initial Operational Capability has been declared, and a submarine capability is available to contribute to national sovereignty and collective homeland defence. Regeneration of a capacity

to support SOF is underway, as is support to a Standing Contingency Task Force proof-of-concept exercise that was scheduled for the autumn of 2006. This speaks to the core of CF transformation, and, while the option of expeditionary submarine deployments will not occur for some years, in the event of an arising domestic or collective defence contingency, the federal government has at its disposal a powerful and dissuasive capability. A significant investment has been made that embodies the spirit and intent of a transformed CF while preserving a capacity to confront more traditional threats, such as the proliferation of highly capable submarines throughout the world.

### Getting to Steady State

**V**ictoria Class Initial Operational Capability was announced on 26 April 2006 in *Maritime General Order 023/06 – Victoria Class Submarine Update*. While this was an important milestone, much remains to be done to achieve a sustainable two-platform operational capability by 2009, such that a submarine is available for expeditionary deployment in support of any security requirement in 2010. Efforts to regenerate sufficient numbers of submarine-qualified personnel remain an



HMCS *Windsor*, with Army Pathfinders and a CBC news crew on top, following the completion of Exercise *Joint Express 2*.

DND Photo HS2006-0428-06 by Corporal Jodie Cavicchi, Formation Imaging Services Halifax



ongoing challenge, and they are subject to close attention by maritime personnel planners and naval trainers. Achievement of a full heavyweight torpedo firing capability across the class is a high priority. Implementation of a revised operating cycle, and the award of an 'end-to-end' in-service support contract are essential, as is development of a complete appreciation of the Logistics Cost of Ownership and fully understanding the implications of parent-navy responsibility.<sup>16</sup> Management of obsolescence issues looms, an activity that must preserve the stealthy tactical advantage of the class, the viability of its combat system and sensors, and the interoperability of its communications suite. The heavyweight torpedo is approaching the end of its supportable life, and its upgrade or replacement must be initiated. Achievement of Full Operational Capability is, as always, predicated upon the assumption that technical schedules can be achieved, as well as essential crew generation and training.

### Capability Investment or Divestment?

As part of ongoing efforts to mitigate the undercapitalization of the *Defence Service Programme* (most recently estimated at \$C60 billion over 20 years, or in simplistic terms, \$C3 billion per annum) divestment of submarine capability is sometimes suggested. From a purely fiscal perspective, this would achieve an annual saving in the order of \$C200-250 million per year, or slightly less than 7 percent of the total annual shortfall. The savings achieved would not likely result in the freeing up of additional real funds for reinvestment elsewhere, but would more probably represent a contribution to the 'squaring of the circle' of the perennial problem of DND funding shortfalls. In considering whether Canada should consider investing in the sustainment of submarine capability, or divesting itself of the capability altogether, a single fundamental question must again be considered and answered beyond reasonable doubt: Why were the submarines purchased? Distinct subsets of this question include: Why is it vital that Canada have submarines? What do they do for the country? Can they achieve a strategic effect? And finally: What is the return on investment?

This article earlier reviewed the rationale and justification of the *Victoria* Class acquisition as understood in the mid-1990s, leading up to the 1998 announcement to modernize the national submarine capability. To ensure the point is understood fully, the question is best answered again in concise terms tailored to today's geo-political and strategic environment. In this first decade of the 21<sup>st</sup> Century, the imperative for a Canadian submarine capability can still be summarized in terms of three enduring elements: strategic impact, balance, and sovereignty.

**"Submarines, even non-nuclear submarines, impart balance..."**

Non-nuclear submarines like the *Victoria* Class are assets of *strategic impact* in the domestic and expeditionary realms. Under certain circumstances, they have the capacity, alone, to influence the political, diplomatic, and military decision-making of an adversary. This capacity is imparted by characteristics of stealth, endurance, mobility, lethality, and flexibility, combined with the option for selective disclosure and the ability to conduct offensive or defensive operations. There are few, if any, CF capabilities that exert this degree of influence and leverage, either with neighbours, allies, or potential adversaries, in such a consistent and affordable manner. In answer to the question: "Can they achieve strategic effect?" the answer is not just yes, but emphatically: "Yes, they have in the past, and they continue to do so today." Submarines confer options out of all proportion to the initial and steady-state capital and personnel investment, and for this reason alone, they are vital.

Submarines, even non-nuclear submarines, impart *balance*, not just to the navy, but also to the entire Canadian Forces. Their flexibility and inherent traits result in their simultaneous characterization as a force multiplier and an element and enabler of transformation. Accordingly, they facilitate the intersection of vertical presence in the battlespace continuum (above, on, and under, wherever it might be), and horizontal participation across a spectrum of warfare disciplines. The elimination of submarines would upset balance and produce disequilibrium difficult to overcome, not just within the maritime component of the CF, but for the national government. At a minimum, and ignoring the consequences for sovereignty, within half a generation all corporate knowledge with respect to submarine warfare and special operations, and much knowledge of ASW, would be lost.

Submarine capability is one of several crucial ingredients in the exercise of national *sovereignty*. Such capability allows covert and overt surveillance missions to be undertaken for extended periods at minimal cost in Atlantic and Pacific areas of Canadian maritime jurisdiction, as well as in the ice-free open-water northern sea areas. Divestment of this capability would not only eliminate the option for such operations, but would exclude Canada from important waterspace management and intelligence-sharing arrangements. Finally, it would send a clear – even if unintended – signal to other nations that Canada was not entirely serious about exercising sovereign jurisdiction in its adjacent ocean areas.

**"The *Victoria* Class are, like all submarines, robustly constructed and rigorously maintained."**

Three myths persist relative to the maintenance of a national submarine capability; myths that are regularly presented, either individually or in combination, by those who seek to advance an agenda of rationalization that includes the elimination of submarines from the CF inventory. They are:

Myth #1 – The ASW component of underwater warfare is dead and will not be an issue for the future, at least for the next decade. Accordingly, there is no need for Canada's navy to remain engaged with the ASW problem, and no requirement

for submarines, either as ASW platforms or training targets. In the enthusiastically-delivered analogy offered by various uninformed commentators, submarines, like tanks, are relics of the Cold War, and in the Canadian context, no longer pose a threat or serve any useful purpose;

Myth #2 – *Victoria* Class submarines, in particular, have not proven to be good value; they have and continue to be plagued with problems. Even if militarily relevant, they are years away from demonstrating a practical contribution to Canada's national defence and security, and they already require extensive and expensive refitting to overcome obsolescence of essential systems. With respect to this latter allegation, they are 'orphans,' and Canada is unable to share the development of solutions and defray costs with other nations.

Myth #3 – The navy of the United States, Canada's closest ally and continental defence partner, has the most advanced and capable submarine force in the world. As well, the USN, with its potent mix of aircraft carriers, cruisers, destroyers, submarines, amphibious ships, sea-going logistics platforms, and heavy-lift transport capability, has achieved utter dominance of the world's oceans. When measured in these terms, it does not make sense for Canada to waste money on a tiny and ineffective fleet of submarines. Indeed, Denmark has already disbanded its submarine service, and there are continuing indications that sustenance of a submarine capability by the Dutch government is in doubt.



DND photo HS035621d44

HMCS *Victoria* transiting the Panama Canal, in a setting not unlike those envisioned for expeditionary operations – except that the submarine would not be visible.

These three myths are, at best, reflective of fuzzy thinking and false analogy. At worst, they are simply nonsensical. The continued proliferation of extremely capable non-nuclear submarines, as well as the keen desire on the part of at least two states to join the nuclear submarine club, proves that interest in such a formidable capability has not diminished in the least.<sup>17</sup> History teaches that those who argued the inconsequential nature of the submarine as a threat, either as a result of the perfection of ASDIC (sonar) after the Great War, or the perfection of the ASW aircraft in and immediately after the Second World War, lived to rue their opinions.<sup>18</sup> Today, it is fair enough to argue that the dominance of the USN speaks against the recurring likelihood of the types of global undersea campaigns witnessed in the 20<sup>th</sup> Century, but the threat in the littoral remains, and as long as it remains, the ways and means of achieving its neutralization must be considered. ASW most assuredly is not dead, and without the ability to move freely on the oceans, including in those waters adjacent to states in turmoil, all other military options are seriously proscribed. The only analogy between submarines and tanks is that both were introduced to combat during the Great War, were perfected in the Second World War, formed critical components of the Cold War Order of Battle, and remain in widespread service today. While relatively inexpensive and effective methods of killing tanks have been developed, the same is not true of submarines. Regardless, speculation as to the imminent demise of either is both premature and unwise.

As to the value of the *Victoria* Class, little needs to be said, apart from that which is already well known. If measured in a purely financial sense, the margin of value of the acquisition remains favourable.

Of course, a series of technical and other challenges, compounded by a tragic fire aboard the *Chicoutimi*, delayed the introduction of capability in accordance with the first and several subsequent iterations of the submarine program schedule. But such delays are not unusual in the introduction of a complex platform when, in peacetime, safety must absolutely and always assume the highest priority. Success has subsequently been amply demonstrated in several areas related to operations and maintenance, success which, in turn, serves as a foundation for further advances, as issues related to inevitable obsolescence of critical systems are addressed. Submarines are not alone in this latter regard, and, like all military hardware, they require a carefully managed program of enhancements to ensure their utility is preserved to the end of their service lives. The *Victoria* Class are, like all submarines, robustly constructed and rigorously maintained. There is absolutely no reason to expect that they do not have at least two and potentially three decades of safe and effective operational service ahead. In achieving this potential, the expertise of Canada's closest allies, including Australia, the United Kingdom, and the United States, will undoubtedly provide inspiration and assistance in defraying technical risk.

The sustainment by the United States of the most capable submarine fleet in the world belies that nation's interest in Canada continuing to preserve a complementary non-nuclear submarine force. Individually, Canada's submarine fleet is small, and it would only be able to achieve limited results within a purely national context. However, when considered together with the submarine forces of Australia, various NATO and Scandinavian nations, Russia, Japan, and other Asian and South American states, the perspective becomes far clearer. It is apparent that a range of diverse yet capable assets are available for the mutual benefit of like-minded nations. Canada may well applaud the Danish government's action to divest its navy of submarines, inasmuch as that decision presents Canada with a clear and comforting option in the event any Arctic dispute between the two NATO allies loses its civilized edge and migrates to less amiable ground. While the possibility is unlikely – some would even insist inconceivable – it is true that, in the event of a nasty upset, Canada has at its disposal a capability that is simultaneously coercive and dissuasive.



DND Photo

HMCS *Windsor* and HMCS *Corner Brook* returning to home port after conducting an underwater rendezvous in Exercise *Marlant Opareas*, the first Canadian diesel boat SSX (sub-on-sub exercise) in a decade.



## Conclusion

Submarines confer strategic impact and balance, not just within the purely maritime dimension, but also as part of Canada's overall security and defence policy. They provide powerful options to government, and they are a fundamental tool in directly securing national sovereignty in two dimensions, on and beneath the sea. They establish a strategic linkage with the United States relative to information-sharing and collective defence, a linkage that, in some cases, allows this country to leverage the CANUS relationship. Possession of submarines by Canada is significant to the US for another reason. The Americans remain seized of the submarine threat posed to their interests throughout the world, and view Canada's submarine force as an important part of a collective underwater warfare effort involving themselves, Australia, various NATO nations and Japan. Finally, the impact of submarines is out of proportion to the initial

investment, annual operating cost, and personnel demand. If lost, it would be extremely difficult to re-generate as a consequence of its highly-specialist nature, and impossible to generate at short notice and within the current and foreseen fiscal climate. The retention of submarine capability is essential if Canada proposes to remain engaged as an international player on the world scene, to exercise and leverage influence with the United States, to transform the Canadian Forces, and to assert sovereign jurisdiction in its own house.

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## NOTES

1. The eventual decision by the Royal Navy to discontinue diesel-electric submarine operations in favour of an all-nuclear submarine force was reached only after an intense and protracted debate internal to that service, but precipitated by broader budgetary pressures facing the UK Ministry of Defence and armed services. Apart from Canada, other nations that expressed interest in the *Upholders* were Chile, Portugal, and South Africa.
2. For a more profound analysis of the events leading to establishment of the modern Canadian submarine service in 1961, see James A. Boutillier (ed.), *RCN in Retrospect, 1910-1968* (Vancouver and London: The UBC Press, 1982), Chapter 18, "An Engineers Outline of RCN History: Part II", by J.H.W. Knox; Michael L. Hadley, Rob Huebert, and Fred W. Crickhard (eds.), *A Nation's Navy. In Quest of a Canadian Naval Identity* (Montreal and Kingston: McGill-Queens University Press, 1996), Chapter 8, "Fleet Replacement and the Crisis of Identity" by Michael A. Hennessy; and Marc Milner, *Canada's Navy: The First Century* (Toronto: University of Toronto Press, 1999), Chapter 12, "Uncharted Waters 1958-64."
3. For the purpose of this paper, a 'nuclear submarine' refers to any submarine that derives its propulsion energy from a nuclear reactor. A 'non-nuclear submarine' refers to all other types of submarines propelled by energy derived from other means. When used in the purely Canadian context, the term 'submarine' on its own refers to the latter type of craft.
4. The actual numbers vary as an inevitable result of ongoing building and replacement programs. While the number of platforms has declined by more than half since the end of the Cold War, the number of operators has remained relatively constant and the quality of submarines today is dramatically higher. Of the 400 in service, approximately 100 are either at sea or are more or less immediately available for deployment.
5. China is building *Type 093* SSNs, a *Type 094* SSBN, and *Yuan* Class SSKs (indigenously manufactured variants of the Russian *Kilo* Class). Eight more improved *Kilos* are being purchased to complement four models of an earlier *Kilo* variant. The older *Song* and *Ming* Classes are reportedly being retired.
6. Of the three Classes, the *Amur* and *Type 212/214* simultaneously are being built for the domestic as well as the export market. In Russian service the *Amur* is known as the *Lada* Class. The German *Type 212* is exported as the *Type 214*.
7. Air independent propulsion (AIP) technology has long promised to revolutionize submarine operations, permitting enhancements to submerged endurance without the expense of nuclear propulsion.
8. All correspondence from the original files of MCP 3 Submarine Programme Office, now retained by DMPOR 4 Submarines.
9. Classified files dating from the early 1990s document no fewer than 19 reports, based upon reliable visual sightings, of possible incursions by submarines in Canadian waters, or waters over which Canada exercised responsibility on behalf of SACLANT, and for which no waterspace management collaboration could be achieved. Since the end of the Cold War additional sightings have been reported, almost exclusively in the Arctic and off the Labrador coast. Investigation of each Cold War event routinely led to the conclusion that almost all were 'friendly,' i.e., non-Soviet incursions.
10. In addition to material cited earlier dealing with the immediate post-war period, Julie H. Ferguson has produced two books documenting the larger history of Canada's submarine service. See *Through a Canadian Periscope-The Story of the Canadian Submarine Service* (Toronto: Dundurn Press, 1995), and *Deeply Canadian, New Submarines for a New Millennium* (Port Moody, British Columbia: Beacon Publishing, 2000).
11. Both *Grilse* (ex-Burrfish) and *Rainbow* (ex-Argonaut) were combat-experienced veterans of the USN submarine campaign against Japan during the Second World War. It was hoped that *Rainbow* could be replaced with an *Oberon* submarine surplus to Royal Navy requirements.
12. *1994 Defence White Paper*, Chapter 7 "Implementing Defence Policy," p. 46.
13. *Victoria* Class CONOP Version 1.3, dated 6 April 2006 – posted at CMS Composite Submarine Website (available to DND users only): <<http://navy.dwan.dnd.ca/english/dgmfd/dmmcp/sip/orgchart/CONOPS%201.3.doc>>
14. In particular, training USN and US Marine Corps SOF for operations in an Asian theatre.
15. For a more complete discussion of CF submarines in fisheries enforcement trials, see Captain (N) Laurence M. Hickey, "The Submarine as a Tool of Maritime Enforcement," in *International Coastal Zone Management Magazine*, No.1 (Spring 2000).
16. Parent-navy responsibility denotes the requirement by Canada, for the first time, to support a class of submarine without extensive support from another nation. The numerous submarines of the *Oberon* Class were operated by a variety of navies in addition to the parent Royal Navy. Likewise, *Grilse* and *Rainbow* were members of one of the numerically largest classes of submarines ever built by the USN. This greatly simplified Canada's efforts to maintain the platforms over their lifespan.
17. The nations are Brazil and India.
18. ASDIC, commonly thought to stand for the Anti-Submarine Detection and Investigation Committee convened by the British during the First World War. Interestingly, at least one historian specializing in the development of ASW technology has cast doubt on whether such a committee ever existed. See Willem Dirk Hackmann, *Seek and Strike: Sonars, Anti-submarine Warfare and the Royal Navy 1914-54* (London: H.M.S.O., 1984).