CANADIAN NAVAL REVIEW

VOLUME 13, NUMBER 1 (2017)

The RCN's Forgotten War: The First World War

Why Canada Needs a Humanitarian Assistance and Disaster Relief Ship

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- provide a source for the public examination of Canadian naval and maritime history and for the development of lessons learned.

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Credit; Corporal Malcolm Byers, MARPAC Imaging Services, DND

*HMCS **Victoria** (SSK 876) performs hoisting drills with a Sea King helicopter from 443 Maritime Helicopter Squadron during sea trials, Constance Bank near Victoria, BC, 7 December 2011.*

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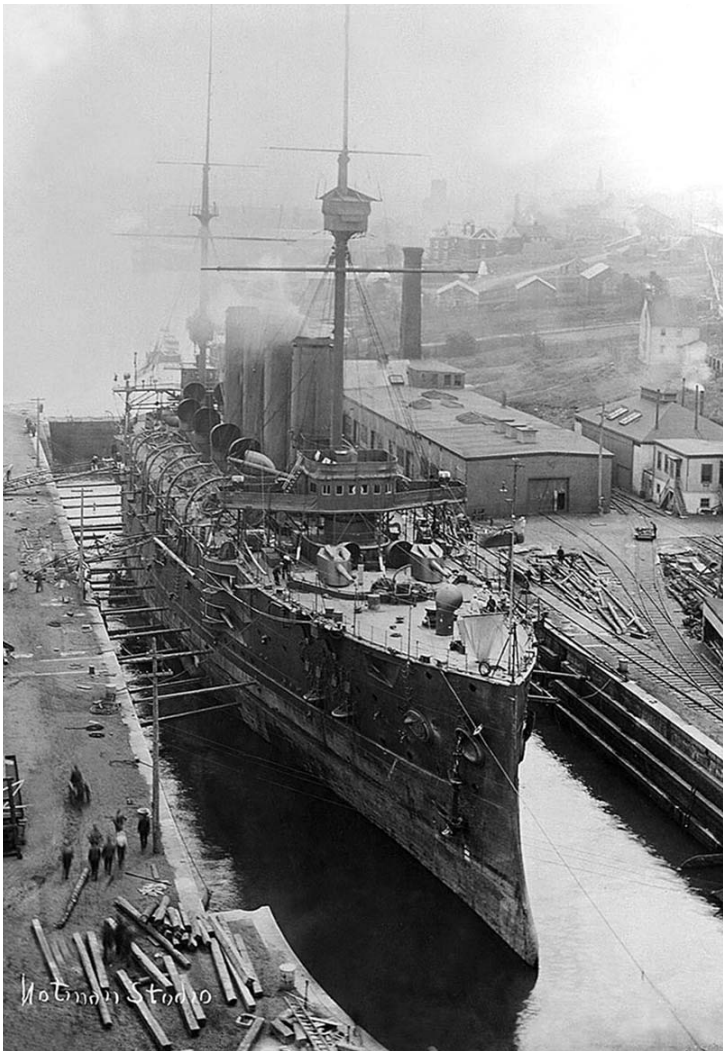
The RCN's Forgotten War: The First World War, 1914-18

As this journal goes to print in the Spring of 2017, a major commemoration is unfolding to mark the 100th anniversary of the Battle of Vimy Ridge, where on 9-12 April 1917 the Canadian Corps – fighting for the first time as a unified formation – fought a bloody battle to wrest those commanding heights from the occupying Imperial German Army. In the resulting victory mythically 'Canada was born as a nation.' In the past two years there has been a succession of ceremonies marking the progress of the Canadian Expeditionary Force across the battlefields of Flanders and northern France, and we should expect the procession to continue through the fall of 2018, rightfully culminating with the centenary of 'The Hundred Days.' It was during the period from August through 11 November 1918 that the Canadian Corps made its name as "the shock troops of the British Empire,"[1] the premier fighting force of the Western Allies that broke the Hindenburg Line and established a Canadian military reputation that lasts to this day.

You will not have noticed any similar commemorations for the Royal Canadian Navy (RCN). The received history is that the nascent RCN only started the war with two obsolete cruisers, HMC Ships *Niobe* and *Rainbow*. These were augmented by the surreptitious acquisition of a pair of coastal submarines (CC-1 and CC-2) by the British Columbia government, and then a motley variety of American yachts that were hastily armed for service, none of which ever engaged the enemy. Indeed, the one Canadian warship that did sight a German submarine (the armed yacht *Hochelaga*), on 25 August 1918 exercised deference to U-156's heavier armament and turned away to get assistance thus allowing the U-boat to escape, for which the captain was court-martialled.

Along the way, the RCN was saddled with much of the blame for the devastating Halifax Explosion of 6 December 1917. With nothing much else apparently worth recounting, Gilbert Tucker's original official history of the navy (published in 1952) dispenses with the First World War in fewer than a 100 pages (and somehow forgot to mention let alone examine either the explosion or the *Hochelaga* incident).[2] As even I have written elsewhere, "[w]ith the greater part of the national effort dedicated to the land battles of the European Western Front, the RCN is not remembered as having contributed materially to Canada's Great War effort."[3]

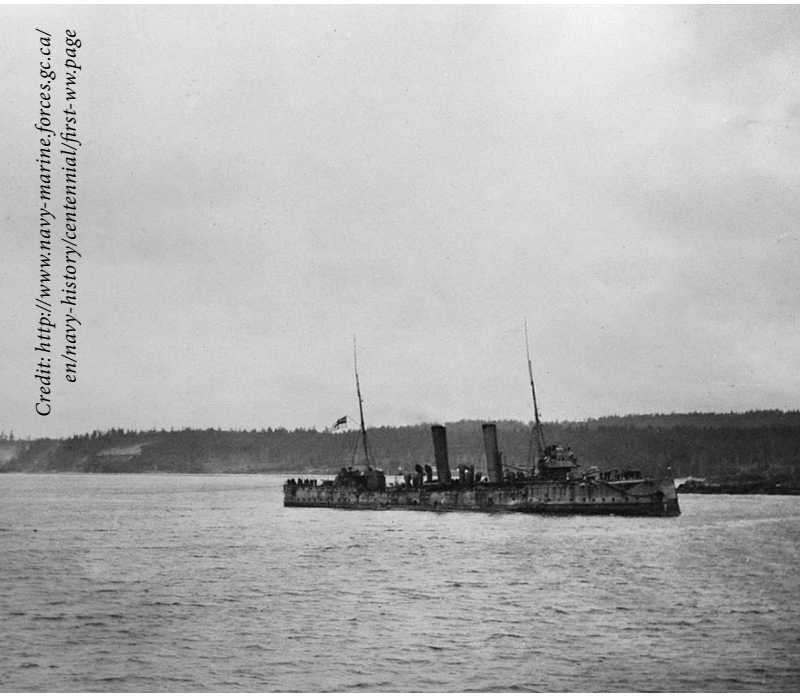
While not wrong, that assessment is an insufficient appreciation of Canada's naval effort during the First World War. There is much more to the activities of the RCN during the war, with many precedents set for the future of the institution. A better understanding of the expansion and administration of the service, as well as the acquisition and operations of the diverse ship types, let alone command interaction with British and American allies, could be expected to provide some interesting nuances to these issues as they arose again in the Second World War, and indeed feature to the present day.



Credit: http://www.navy-marine.forces.gc.ca/en/navy-history/centennial/first-ww.page

HMCS ***Niobe*** *in the Halifax drydock being readied for war, August 1914.*

Space here is limited but some examples are worth noting. To be sure, *Niobe* and *Rainbow* would not have warranted a place in the line of battle at Jutland, but the Royal Navy employed other ships of their respective classes to very good effect on dispersed stations throughout the war, and both Canadian ships performed yeoman contraband patrol service for a year or more on their corresponding



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*HMCS **Rainbow** returns to Esquimalt in May 1916.*

coasts. More than that, they assumed their patrol stations within days of the outbreak of war, establishing the RCN's reputation as Canada's first responder in time of crisis. Additionally, pre-war exercises and planning with the Department of Marine and Fisheries (forerunner of the Coast Guard) made for a seamless incorporation of those vessels for patrol and examination duties in wartime. The later taking up of the armed yachts was a natural extension of this activity, even if executed in a somewhat ad hoc fashion that would itself set a warning example for the Second World War. On the subject of command relationships, the evolving association with the Royal Navy was a series of missteps, ranging from conflicting Admiralty advice as to the composition and employment of Canadian naval forces, to petty struggles over operational authority that resulted in delays to the establishment of an efficient command organization for the East Coast patrols.

So if we – to borrow a phrase – 'don't know what we don't know' about the RCN in the First World War, how can we gain a better understanding of it? Happily, recent scholarship has risen to the challenge. The 'new' official history, *The Seabound Coast/Du littoral á mer, 1867-1939*, delivers a full exposition of the war years in a 600-plus page section by Directorate of History and Heritage historian William Johnston.[4] For those too busy to give that quantity of material a close read, the commemorative history I edited for the navy's centennial, *The Naval Service of Canada/Le Service naval du Canada*, presents a more digestible 15-page summary, and recently has been made available on the RCN History and Heritage website.[5]

But as often proves the case, the new material in turn draws a spotlight on remaining gaps in our knowledge, while pointing to possibilities for additional research and analytical methodologies. An opportunity to engage in that exploration comes this summer with the latest in the series of RCN (formerly MARCOM) historical conferences being held at the Naval Museum of Halifax in collaboration with the Canadian Nautical Research Society.[6] The timing and location are chosen specifically with regard to this year being the centenary of the Halifax Explosion, and the program promises a session of fresh looks at that defining moment in the history of the port and its relation with the RCN. As well there will be other sessions on themes such as the war as a catalyst for the re-emergence of Canadian shipbuilding, the place of Halifax in the establishment of the allied convoy system in 1917, and the creation of the Royal Canadian Naval Air Service (RCNAS) as Canada's first air force.

Another resource under development by the RCN's History and Heritage section is a project to digitize the ledger sheets and related papers from the personnel files of each of the 9,500 officers and sailors of the RCN and Royal Naval Canadian Volunteer Reserve (RNCVR), to be made available online in collaboration with Library and Archives Canada.[7] With the completion of a fully-searchable database, this promises to offer fascinating insights into the social composition of the Canadian fleet and the wartime operational experience of the individual sailor. A related project is being explored with The Rooms, the provincial archives of Newfoundland and Labrador, to digitize similar records of the 2,000-odd sailors of the Newfoundland Division of the Royal Naval Reserve (recall Newfoundland was then a separate Dominion).

The 'forgotten' war? Not if history can help it!

Richard Gimblett

Notes

1. See Shane Schreiber, *Shock Army of the British Empire: The Canadian Corps in the Last 100 Days of the Great War* (St. Catharines, ON: Vanwell, 2005).
2. Gilbert Norman Tucker, *The Naval Service of Canada: Its Official History* (Ottawa: King's Printer, 1952).
3. Richard Gimblett, "Royal Canadian Navy," *The Canadian Encyclopedia*, available at www.thecanadianencyclopedia.com/en/article/royal-canadian-navy/.
4. *The Seabound Coast/Du littoral á mer, 1867-1939* (Toronto, ON: Dundurn, 2010). This greatly expanded treatment of the navy led a wag to observe, "never has so much been written about so few ships."
5. Richard Gimblett, *The Naval Service of Canada/Le Service naval du Canada* (Toronto, ON: Dundurn 2009). The summary can be found at http://navy-marine.forces.gc.ca/en/navy-history/centennial/intro.page.
6. Details can be found on the Canadian Nautical Research Society website.
7. A prototype of the resource can be found at http://www.bac-lac.gc.ca/eng/discover/military-heritage/royal-canadian-navy-1910-1941-ledger-sheets/Pages/canadian-navy-ledger-sheets.aspx#b.

Why Canada Needs a Humanitarian Assistance and Disaster Relief Ship

Kevin McCoy and Tom Tulloch

In recent years there have been many natural and man-made disasters, particularly in coastal areas where 80% of the world's population resides (see Figure 1). Canada has responded to global catastrophes with billions of dollars in aid. The Canadian Armed Forces (CAF) have been sent to deliver assistance, alleviate suffering and rebuild infrastructure. This has involved deploying the Disaster Assistance Response Team (DART), airlifting food and stores, and employing naval vessels to sealift relief supplies and expertise. Nevertheless, Canada's response to disasters has been often small scale and ad hoc in nature. Canada has never possessed a large-scale capability to undertake humanitarian assistance and disaster relief (HA/DR) or to conduct large-scale evacuation operations. There are options, however, for a maritime capability to improve significantly Canada's ability to render assistance and evacuate citizens.

This article will examine the disaster relief challenge, review Canada's contributions, assess its capacity and examine some options. While Canada is unlikely to be able to afford the full amphibious capacity that can deliver large amounts of aid effectively, there are commercial options to provide HA/DR capacity but which are also broadly utilitarian.

Increasing Disasters and Canadian Response

Numerous reports have linked ongoing climate change to an increase in the frequency and severity of storms and other extreme climate events worldwide. Many reports have concluded that human activity has "influenced specific extreme weather and climate events ... including tropical cyclones in the central Pacific, heavy rainfall in Europe, drought in East Africa, and stifling heat waves in Australia, Asia, and South America."[1] The trend is steadily increasing.

Further complicating the situation is the growing urbanization of the world's population which creates massive metropolitan areas containing millions of people. Many of these megacities are located in regions where natural disasters are frequent, with most of them in coastal areas.

As noted, Canada has responded to numerous disasters worldwide with billions of dollars in aid and by physical response and on-scene assistance. The DART was deployed to Sri Lanka to assist in the aftermath of the 2004 Indian Ocean tsunami along with $700M in aid. The response to Hurricane Katrina in the United States in 2005 was a combined RCN and Coast Guard task force of four ships with helicopters, divers, Canadian Red Cross, and urban search and rescue teams. The response to the 2010 earthquake in Haiti was over $1.2B in aid and over 2,000 CAF personnel deployed, including a frigate and a destroyer, six Griffon helicopters, the DART, a field hospital, an infantry battalion and a combat engineer squadron along with airlift capability. Canada's response to Typhoon Haiyan in the Philippines in 2013 included $170M in aid, the DART, a Canadian Red Cross field hospital, airlift, helicopters and some 319 CAF personnel. Canada has also responded with CAF capabilities to numerous smaller scale HA/DR operations since 2000.[2]

Events in recent years have illustrated the need to be able to evacuate Canadians from conflict and disaster regions. Today, over 2.8 million Canadian citizens live abroad.[3] They all enjoy a right of return and will demand evacuation should disaster occur. Recently Canadians have required evacuation from troubled areas such as Haiti (2004), Côte d'Ivoire (2004), Lebanon (2006), Egypt (2011) and Libya (2011). These operations were accomplished by civilian and military airlift, and in the case of Lebanon by hastily contracted local sealift, with significant difficulty.[4]

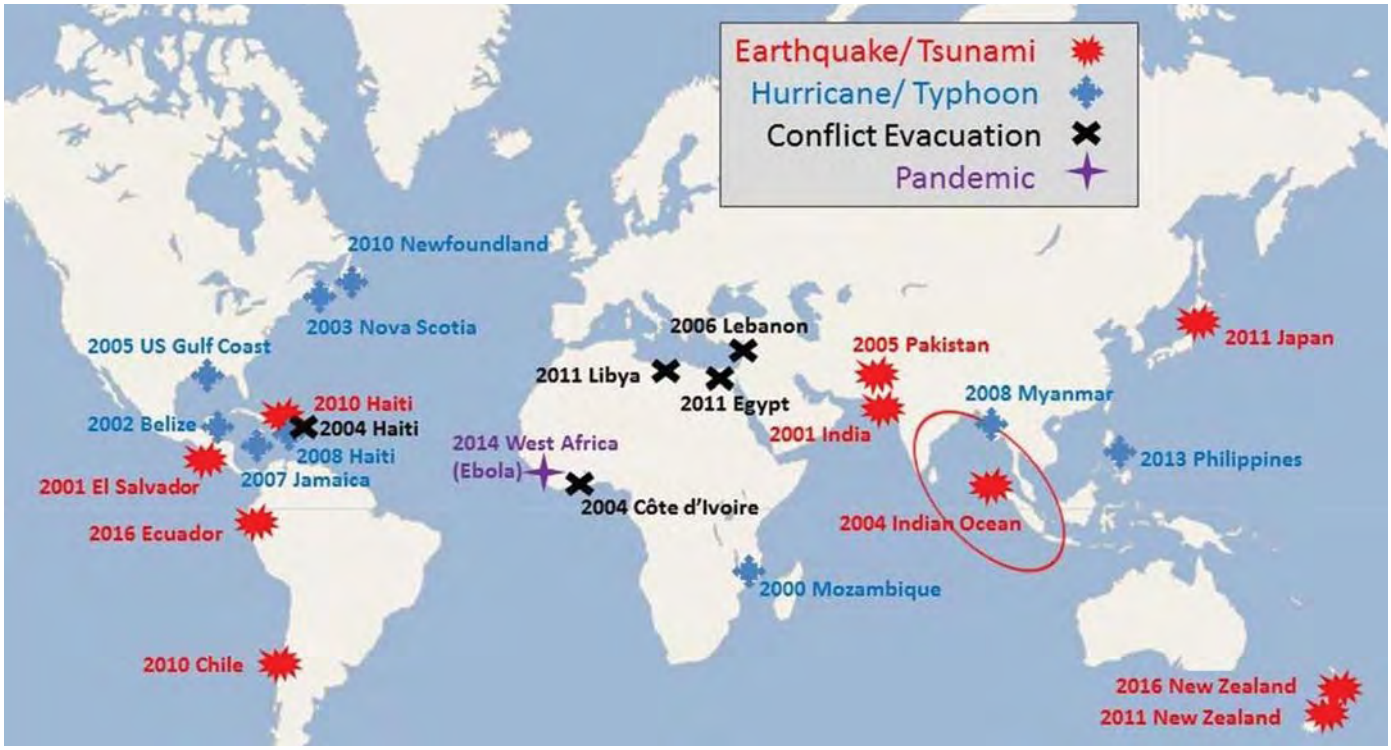
The 2016 Canadian Defence Policy Review Public Consultation Document notes that natural and man-made disasters have increased and that responding to these disasters is a priority for the government. It further poses the question "should more defence resources be devoted to disaster response capabilities?"[5] We believe that the answer is yes, but not at the expense of existing capabilities and requirements; rather in addition to them.

HA/DR Capacity in Canada and Allies

Canada's physical HA/DR response to date has taken many forms, however, each has its drawbacks. The DART is rapidly deployable and highly capable, but is lightly equipped and consists of just 200 personnel. Aircraft are useful for delivering relief supplies, and Canada possesses three primary strategic lift aircraft: the CC-177 Globemaster III; the CC-130 Hercules; and the CC-150 Polaris. Speed of response is such that they can be in theatre in a matter of hours of a disaster occurring. They are capable of reaching inland and can make many trips in a relatively short period of time.

There are, however, significant limitations in terms of the load capacity and costs when using aircraft for HA/DR missions. Even carrying 73 tonnes, a CC-177 Globemaster cannot compete with cargo ships capable of carrying

Figure 1: Global Disasters 2000-2016



Credit: Irving Shipbuilding

thousands of tonnes of supplies. Military aircraft are expensive to purchase and to operate – the RCAF's CC-177s, for example, cost over $30K CAD per flying hour to operate.[6] Further, with an RCAF fleet of just five CC-177s, it would be unlikely that more than two would be available at short notice for an HA/DR operation.

Additionally, the effective employment of aircraft for HA/DR depends on there being functioning airfields, and that they possess sufficient capacity to conduct loading, unloading and refueling. After the 2010 earthquake in Haiti, Port-au-Prince's airport was capable of handling just 120 to 140 flights per day, which resulted in a backlog of relief supplies and inflicted considerable wear on the airport's single runway. In many parts of the world the capacity of airports is already limited without taking additional damage into account.

If airlift is limited in its utility, what about supply ships? When the RCN's Auxiliary Oiler Replenishment (AOR) vessels (HMCS *Protecteur* and *Preserver*) were available they were Canada's go-to asset for large-scale humanitarian response. Despite being ill-suited to the task – with no roll-on/roll-off (Ro-Ro[7]) capability, and designed for at-sea replenishment rather than to transport cargo – they nevertheless performed admirably when called upon. From Hurricane Andrew relief in 1992 and Swissair 111 recovery operations in 1998, to East Timor security, reconstruction and sealift in 1999, the AORs were highly useful in this role. They were capable of carrying just over 1,000 tonnes of cargo, far more than could be moved by strategic airlift. They also provided a persistent presence and a skilled workforce.

Other states have approached maritime HA/DR differently. States with large militaries such as the USA, UK, France, China and Russia possess significant amphibious forces which are ideally suited for transporting relief equipment and supplies. Even mid-tier navies often have small numbers of amphibious ships that can readily perform HA/DR missions (see Table 1). In fact, other than Germany, Canada is the only G-8 state with no amphibious capability.

One of the most critical contributions from amphibious forces is their connectors – the landing craft and helicopters that allow them to move equipment onshore despite damaged infrastructure. The effectiveness of the response to the 2004 Indian Ocean tsunami was reduced by overloading the facilities at the region's small airports with unsolicited shipments delivered by fixed-wing aircraft, which prevented more urgently needed equipment from getting through. However, US Navy helicopters were able to reach the most devastated remote areas with supplies by bypassing the airfields. A similar situation occurred in Haiti in 2010 where earthquake damage had reduced the capacity of port facilities. Helicopters therefore proved vital in getting supplies ashore.

It is unlikely that Canada's defence budget will be increased to provide amphibious capability. In addition to the cost of purchase/construction, the personnel, operating and maintenance expenses of any major defence item are often twice the cost of the item itself.[8] Given that the RCN does not have additional sailors to crew these vessels, the point is moot.

Nevertheless, the evidence points to Canada needing a

Table 1. HA/DR Capable Vessels in Mid-Tier Navies

Nation	Vessel	Displacement	Cargo Capacity	Helicopters
Singapore	*Endurance* Landing platform dock	6,500 tonnes	20 trucks Bulk cargo	2 medium lift or 1 heavy lift helicopter
Australia	*Choules* Landing ship dock	16,190 tonnes	1,150 lane metres 150 light trucks or 700 troops	2 medium lift helicopters
Australia	*Canberra* Landing helicopter dock	27,500 tonnes	110 vehicles 1,040 troops	Hangar space for 18 helicopters
Italy	*San Giorgio* Amphibious transport dock	7,650 tonnes	350 troops with up to 36 vehicles	Up to 5 helicopters
Japan	*Osumi* Tank landing ship	8,900 tonnes	2 vehicle decks 300 troops	Up to 8 helicopters
Japan	*Izumo* Helicopter destroyer	27,000 tonnes	400 troops and 50 light trucks	Up to 28 aircraft
Korea	*Dokdo* Landing platform	18,800 tonnes	720 troops or up to 200 vehicles	Up to 10 helicopters

Credit: Irving Shipbuilding

dedicated *maritime* capability to provide HA/DR on a scale and with a level of effectiveness heretofore unavailable to Canada. Correctly selected, such a ship could incorporate containerized field hospitals, generators, water treatment and desalination plants, and waste treatment facilities. A field engineering squadron with an infantry force for security could be sent to restore order and transportation infrastructure. Landing craft and a Mexeflote-style landing raft or modular causeway system plus helicopters would permit loading/unloading to take place regardless of the availability of port facilities. As well, a large volume of fresh water could be delivered ashore by hose while standing off shore.

If fitted with modular on-board accommodations, galleys and command centres, a ship could support governmental partners, local authorities and international organizations. This would serve as a safe, central coordinating facility for Canadian relief efforts – an on-site floating base and a physical manifestation of the whole-of-government approach. The command function would enhance Canada's ability to take a leadership role internationally in HA/DR and cooperative civil-military operations.

In addition to helicopters, drones could be embarked to extend the assistance effort, and could be used to produce aerial imagery for crisis mapping. They could also conduct damage assessment and search and rescue, and assess the scale of displaced persons. Furthermore, they could serve as an emergency communications link.

Finally, the visible effect of sending a naval vessel (HMCS *Canada*?) as a symbol of a state's resolve should not be underestimated. Such a presence off the coast of a stricken country sends the message that Canada has the capability and resolve to help. It would also satisfy the government's pre-election promise to increase the RCN's ability "to operate as a true blue-water maritime force."[9]

The primary HA/DR capability of such a vessel would, of course, not be required 365 days per year. With a large internal space, significant cargo capacity and flexible features, such a ship could fulfil a variety of roles when not responding to humanitarian requirements. The following illustrates the possible roles:

- an adjunct to the Joint Support Ship (JSS), providing fuel and stores to support naval forces at sea;
- evacuation of Canadians or as an afloat refugee/migrant processing centre incorporating medical support;
- support to UN operations such as maritime interdiction operations and counter-piracy operations;
- a secure, mobile, afloat operating base when sovereignty or security conditions dictate a minimum footprint ashore;
- on-site medical care for deployed CAF personnel and allies, or medical care to the local population;
- a source of assistance to build local maritime capacity and cooperation, combat illegal fishing, human smuggling, drug trafficking, resource theft and piracy;
- sea-based logistics and operating support to allied operations, or a command facility for a joint commander;
- a floating base for law enforcement and intelligence agencies during high-profile events in Canada in maritime locations (e.g., Vancouver 2010 Olympics);
- support to northern operations such as supplying fuel and supporting Arctic and Offshore Patrol Ship (AOPS) deployments to the Arctic; and
- aerial surveillance to watch over Canada's maritime approaches, and sea-based surveillance of areas ashore, which could be used to counter migrant smuggling and counter-narcotics operations.[10]

Potential Canadian Solutions for Maritime-Based HA/DR

Some solutions to providing Canadian maritime-based HA/DR – such as buying new amphibious ships – could involve multibillion-dollar expenditures. The DND capital plan has over $55 billion in unmet demand and only $18 billion to invest.[11] Options that call for high capital expenditures are thus unrealistic. Furthermore the same tight financial conditions suggest one must beware of solutions that also bring high crewing or maintenance costs, as these cut directly into the funding for capital equipment.

There are a number of potential solutions to Canada achieving an HA/DR capability. The first potential solution is to build more Joint Support Ships (JSS). The two *Queenston*-class JSS, scheduled to replace the decommissioned AORs after 2020, are intended as naval at-sea replenishment vessels like their predecessors. They, therefore, suffer similar drawbacks. The JSS will have somewhat less cargo capacity than the AORS they will replace, they will lack Ro-Ro capability and, as they will be dedicated to sustaining the fleet at sea, their availability for HA/DR purposes will be limited. As well, each additional JSS purchase for HA/DR would likely be extremely expensive,[12] and would involve some 130 crew, which means additional personnel costs.

The second potential solution is to build more interim AORs. The interim AOR solution could be expanded to provide a further HA/DR ship, especially as its capital, personnel and maintenance costs are low because the vessel is leased and largely civilian. However, the interim AOR is based on a container ship which makes it ill-suited for effective HA/DR operations, as it has neither Ro-Ro capability to deploy emergency equipment, vehicles and supplies, nor a large reconfigurable internal volume that can be tailored to emergency needs. Furthermore, using the sole planned interim AOR for HA/DR missions would interrupt it from its primary purpose of supporting naval operations, the role that it was procured to fill.

The third potential solution is to purchase used amphibious ships. Other states have obtained such vessels with Ro-Ro, hospital and shore connector facilities (hangars, flight decks, well decks and landing craft) already in place. It is difficult, however, to identify many success stories as costs are high, and there have been some significant failures.

Britain's naval downsizing in 2011 appeared to offer just such a solution, if the Canadian aversion to buying another secondhand British naval vessel could have been surmounted. Australia, however, seized this opportunity and for about $100M AUD purchased HMS *Largs Bay*, a 16,000 ton

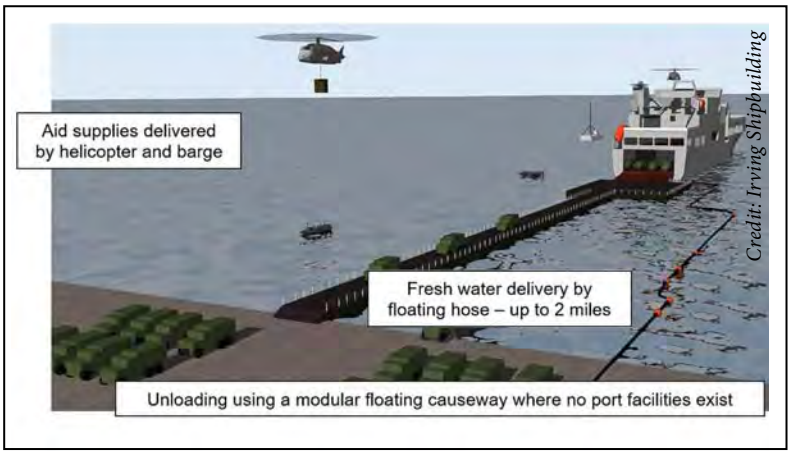


Diagram of Maritme Support Ship with helicopter and floating dock.

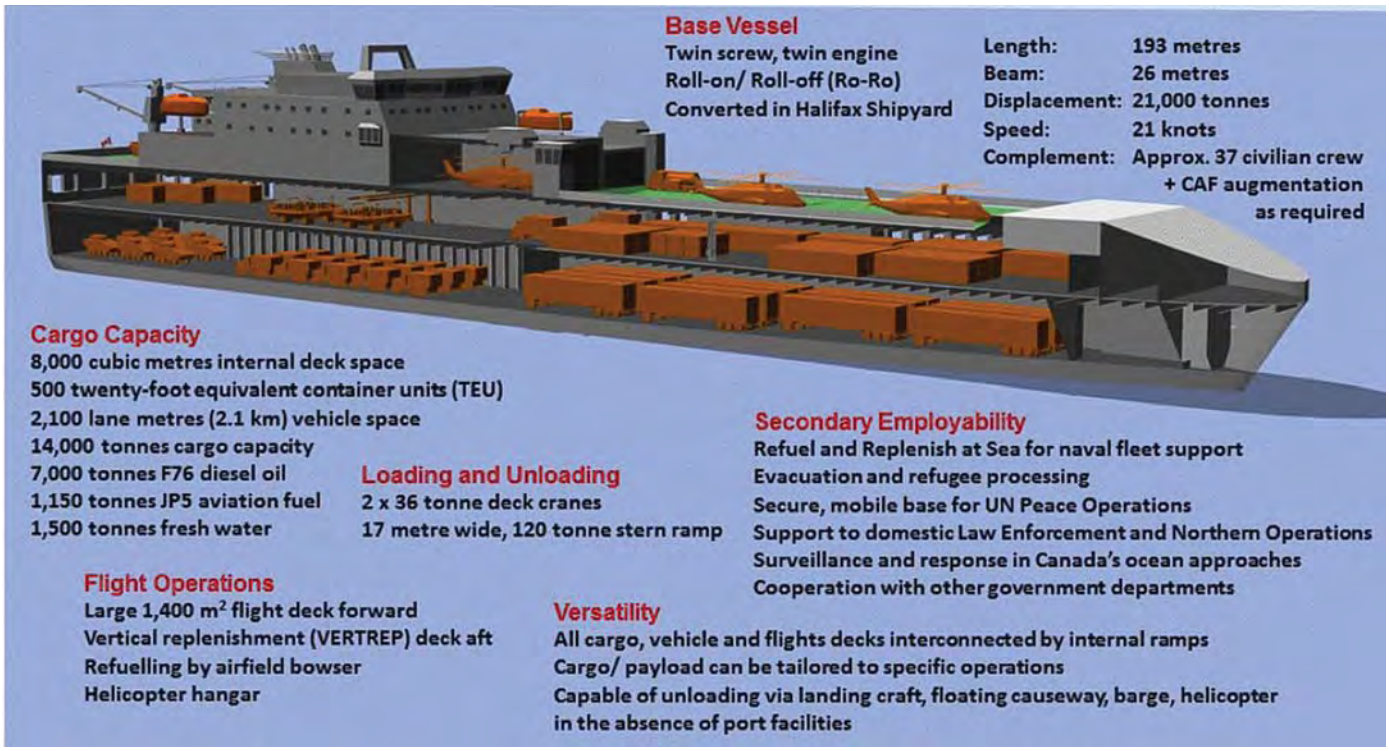
Landing Ship Dock capable of embarking up to 600 troops and 150 vehicles. Despite having a flight deck, however, it had no helicopter hangar and required modifications, including the replacement of both main propulsion electrical transformers.

Australia experienced other problems in an earlier purchase of two used *Newport*-class amphibious transport ships. HMAS *Manoora* and HMAS *Kanimbla* were acquired in 1994 for a total of $40M AUD from surplus US Navy assets. They required some $400M AUD in modifications and repairs. The upgrades proved inadequate and both vessels suffered hull corrosion and engine defects until finally paid off in 2011. Buying used, therefore, is not automatically economical in the long term and involves significant risk.

The fourth potential solution is to arrange time charter conversion.[13] This option involves taking a suitable civilian merchant vessel and configuring it to meet Canadian government, joint CAF and RCN requirements. A suitable vessel is key – unlike the interim AOR discussed earlier, inherent HA/DR capability already resides in existing Ro-Ro vessels with large internal volume. An arrangement could involve something similar to the model employed by the US Military Sealift Command, using a proven Ro-Ro vessel design requiring minimal modifications, and offering innovative financing and crewing options. This would significantly lower costs, reduce strain on RCN crewing and increase operational availability and effectiveness.

A workable concept for a dedicated HA/DR vessel – a Maritime Support Ship (MSS) – could involve the conversion of a recently built European twin-screw, twin-engine Ro-Ro vessel of 21,000 tonnes displacement, 193 metres length, 26 metres beam and 7 metres draft.

The vessel's design (as essentially a strong open box) means that conversion would require minimal changes and no major structural alteration. The conversion would maximize the vessel's already impressive logistical support capability which includes: 8,000 cubic metres of internal deck space; 500 twenty-foot equivalent container



Credit: Irving Shipbuilding

Irving proposal for a Maritime Support Ship.

units (TEUs[14]); 2,100 lane-metres (2.1 km) of vehicle space[15]; 14,000 tonnes of cargo capacity; and 1,500 tonnes of fresh water. Added fuel tanks would extend the range of the vessel, enhancing its ability to operate independent of external support and in austere conditions worldwide.

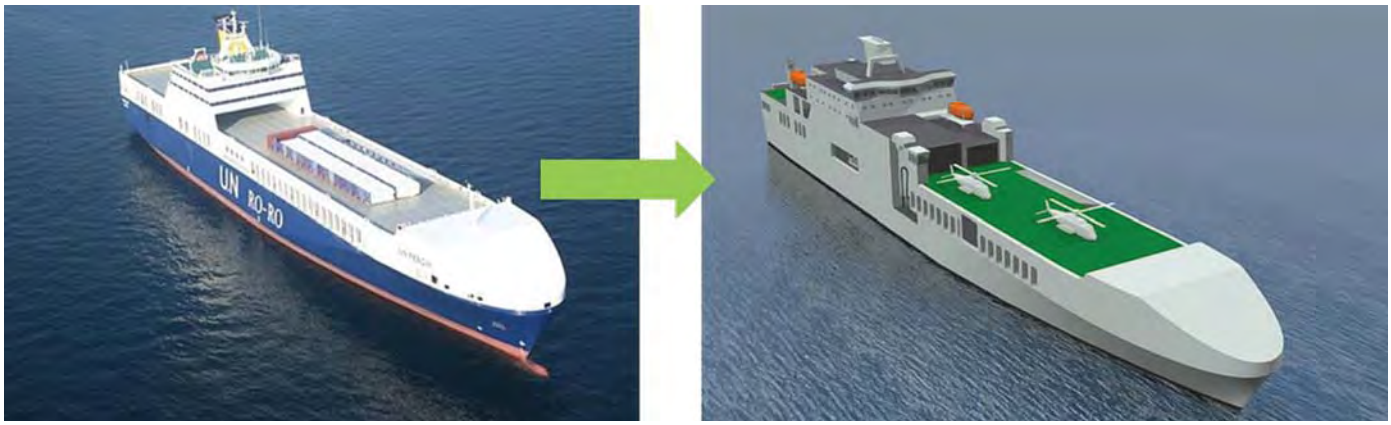
Vehicles would be able to access all decks, including a flight deck, at sea via internal ramps. A total of 230 semi-trailers could be accommodated and a 17-metre wide stern ramp would allow access to the shore or use as a docking area for boats in calm water. Two 36-tonne cranes would provide self-unloading capability and the means to deploy landing craft.

The design also offers a helicopter hangar and large flight deck forward. The hangar area would allow for maintenance and storage of several helicopters, as well as a fuel bowser for on-deck and helicopter in-flight refueling. Additional utility to support fleet operations could be offered by fitting a basic replenishment-at-sea capability.

The MSS solution is not simply a concept on paper. An MSS has recently been converted for special operations for the US Navy, and the UK Ministry of Defence (MoD) has four similar Ro-Ro vessels on permanent contract to support its strategic joint rapid reaction force, with a further two at notice for MoD tasking. The French Navy's SeaOwl contract employs two modified commercial vessels to service naval training and exercises. These successes of Canada's allies would be fundamental in reducing the risk of a similar MSS approach for Canada.

Ideally Canada needs two of these proposed ships – one on each coast to provide for prompt HA/DR response, and to act as a backup replenishment-at-sea capability when the JSS is unavailable. Even one, however, would be a significant national asset.

The MSS concept assumes a Canadian registered and flagged ship with a Canadian civilian crew numbering approximately 37. Depending on the mission the crew could be augmented by an RCN/CAF contingent – around 40 additional



Credit: Left: Ro-Ro ship from http://www.unroro.com.tr/media/en/12/photo-gallery/39); Right: Irving Shipbuilding

Proposed conversion of a civilian Ro-Ro vessel into a Maritme Support Ship.

personnel. This capability would therefore have only minimal impact on RCN personnel, with small numbers augmented as required.

Preliminary estimates indicate that the vessel conversion cost and an associated five-year lease would be under $300M CAD. This would include the full cost of converting, operating, maintaining and crewing the vessel, except for government-furnished equipment such as communications equipment and cryptographic equipment, plus the cost of food, fuel and cargo.

Conclusion

Canada has regularly responded when disasters strike. The DART, airlift of relief supplies and the generosity of Canadians have consistently assuaged suffering. However Canada's response has been limited by a lack of capacity.

A specialized naval vessel dedicated to HA/DR would offer an adaptable solution to address catastrophes worldwide. It would represent a visible symbol of Canada's commitment to bringing stability to fragile states and helping societies recover in the aftermath of crisis. A recent report by the Canadian Global Affairs Institute argued that a dedicated HA/DR ship "would likely be among the most heavily utilized assets in the future CAF inventory."[16]

With options of acquiring amphibious vessels, additional JSSs or interim AORs assessed as too expensive, too risky and/or providing inadequate capability, converting a suitable civilian Ro-Ro vessel for naval use on a time charter basis is an effective solution. This would offer Canada significant HA/DR capability at a relatively low cost and low risk, and in a short time-frame. Possessing such a capability in addition to but separate from the JSS would ensure its availability whenever needed. Furthermore its flexibility would make it a useful asset for other applications when not being used for HA/DR. Having such a resource would give the Canadian government increased flexibility, offering a range of options to respond rapidly and with a capability commensurate with its determination to make a contribution to a peaceful world.

The government has vowed to support international peace operations with the United Nations, make capabilities available in responding to conflicts, strengthen the navy within a better-equipped military, and develop an agile force that can provide support during natural disasters and humanitarian missions. As the Defence Policy Review Public Consultation Document states, "disaster relief and humanitarian assistance remain a priority for the Government of Canada."[17] The strategic flexibility inherent in a Maritime Support Ship offers the best possible means to do this and to further Canada's leadership role in the world.

Notes

1. Stephanie C. Herring et al. (eds), "Summary and Broader Context," in "Explaining Extreme Events of 2014 from a Climate Perspective," *Special Supplement to the Bulletin of the American Meteorological Society*, Vol. 96, No. 12 (December 2015), pp. 168-171.
2. For a list of these operations see Department of National Defence, available at www.forces.gc.ca/en/operations.page. In addition to a CAF response, the response to these emergencies included a range of Canadian government assets as well as Canadian non-governmental organizations.
3. Don DeVoretz, "Canada's Secret Province: 2.8 Million Canadians Abroad," in *Canadians Abroad Project 1* (Asia Pacific Foundation of Canada, 2009), available at www.asiapacific.ca/sites/default/files/filefield/PP_09_5_DD_estimate_0.pdf.
4. The report by the Standing Senate Committee on Foreign Affairs and International Trade noted that "high international demand for the limited commercial maritime and airlift capabilities capable for immediate use" made it difficult to contract sufficient evacuation support to extract the 14,370 Canadians from Lebanon. The report concluded that the government "should study its options for responding to large-scale crises overseas and future evacuations … to determine the most cost-efficient and effective policy tools to address these issues." Standing Senate Committee on Foreign Affairs and International Trade, "The Evacuation of Canadians from Lebanon in July 2006: Implications for the Government of Canada," Parliament of Canada, 2007.
5. Department of National Defence, "Defence Policy Review Public Consultation Document," 2016, pp. 16-17.
6. "Canada Buys Additional Military Cargo Jet as C-17 Production Wraps Up," CBC News, 19 December 2014.
7. Roll on/roll off (Ro-Ro) refers to a vessel's capability to carry wheeled vehicles such as trucks and semi-trailers that are driven on and off the vessel via a ramp connected directly to the shore.
8. Commander David Peer, "Estimating the Cost of Naval Ships," *Canadian Naval Review*, Vol. 8, No. 2 (2012), pp. 8-12.
9. Liberal Party of Canada, Election Platform 2015.
10. Serge Bertrand, "Future Roles for the RCN," Canadian Global Affairs Institute, 2016 Policy Review Series, July 2016, p. 4.
11. As David Perry, defence analyst at the Canadian Global Affairs Institute, has argued, "the single biggest policy problem facing the Canadian military is an inadequate supply of funding to recapitalize." Dave Perry, "The New Defence Policy Needs to Focus on Procurements, Not Prose," *Canadian Naval Review*, Vol. 12, No. 1 (2016), p. 16.
12. The government of Canada has allocated $2.6 billion for two Joint Support Ships. See Department of National Defence website, available at www.forces.gc.ca/en/business-equipment/joint-support-ship.page.
13. The CAF has used chartered Ro-Ro vessels to deploy forces into operational theatres for many years. However, the number of ships available in the world's Ro-Ro fleet continues to decline, while charter rates are increasing. In 2015 charter rates increased by up to 40% year on year for larger vessels, while rates for vessels of under 2,000 lane metres capacity increased by approximately 20%. "Shipping and Shipbuilding Markets: 2016 Annual Review," Paris: Barry Rogliano Salles/BRS PLC, 2016, pp. 105-109, available at www.brsbrokers.com/flipbook_en2016/#p=1.
14. TEU is a twenty-foot equivalent unit shipping container, which is a large metal box into which cargo is packed for shipment by sea, rail and truck. Standard lengths include 10, 20, 30 and 40 feet.
15. Lane metre is a method of measuring the space capacity of Ro-Ro ships whereby each unit of space (linear metre) is represented by an area of deck 1.0 metre in length by 2.0 metres in width. The rule of thumb is that a car on a car ferry will need six metres, and a semi-trailer with a European truck 18 metres.
16. Bertrand, "Future Roles for the RCN," p. 4.
17. DND, "Defence Policy Review Public Consultation Document," pp. 16-17.

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Deterrence is Not Only about Nuclear Weapons

Vice-Admiral Sir Jeremy Blackham

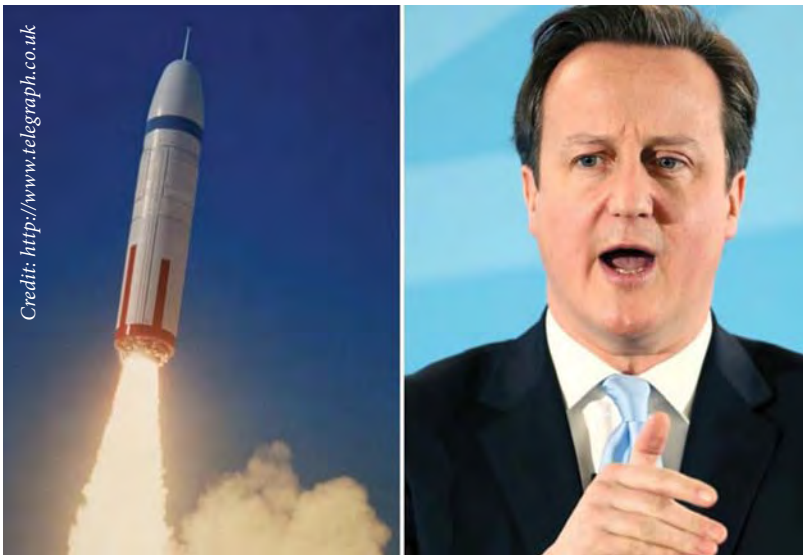
Credit: CPOA(Phot) Tam McDonald, RN

*HMS **Vanguard** of the Royal Navy is the lead boat of her class of **Trident** ballistic missile-armed submarines. Shown here returning to her base at Faslane, HMNB Clyde, Argyll, Scotland, 29 November 2010.*

Last summer the UK confirmed the decision to replace its four ballistic missile nuclear submarines, and presumably in due course the nuclear missiles that they carry. This would provide a nuclear deterrent until after 2060 if required.

Does this matter to Canada? This article uses a UK issue as an example but nuclear deterrence, and deterrence in general, certainly is of fundamental interest to Canada and many other NATO states in their own considerations of force structure plans and NATO strategy more generally. Canada and other NATO countries shelter under the nuclear deterrent umbrella. They should realise that their own force planning must take account of the need to sustain the credibility of that deterrent if their own security is to be guaranteed. The UK deterrent is part of a joint NATO plan. NATO states can seek to shape their forces to complement those of other states, and help to fill the gaps that other states might have and which threaten the credibility of the whole alliance. After all, if NATO's defence and security posture is at risk, then so is Canada's.

So Canada, like other NATO members, needs to take account of this in its own force planning and an understanding of the problem is of critical importance to it. This article is written in strategic philosophic terms, using the UK's case to illustrate a general NATO issue. The argument here is that the cost of sustaining the nuclear deterrent threatens to reduce the UK's conventional underpinning of that deterrent and that this, and its solution, are very much the concern of non-nuclear NATO members. For simplification some key, highly vulnerable areas of the defence structure, the failure of which will have a hugely detrimental impact, such as manpower, infrastructure, support and industrial capacity are not directly addressed here.[1]



On a visit to western Scotland, where the submarines that carry the Trident missiles are based, Prime Minister David Cameron insisted: "I strongly believe we should replace [Trident] on a like-for-like basis. Why? Well because the world we live in is very uncertain and very dangerous." 4 April 2013.

UK's decision in principle to renew the nuclear deterrent was taken some time ago. At that time, the defence budget was predicted to be rather higher than it is now, with larger conventional force structures. It is therefore hard to avoid the conclusion that the confirmation of the nuclear decision has swallowed up a greater share of the defence budget than originally envisaged. Consequently conventional force level projections have declined and may decline further. This depends chiefly on the economic growth of the UK (which is committed to spending 2% of Gross Domestic Product on defence and security), governmental spending priorities in a world more unstable than for some time, and holding the Deterrent Successor Submarine program to budget.

In recent UK defence reviews, despite the entry into service of some excellent equipment, major strategic decisions have been ducked and masked by the continuing tendency to 'salami slice' the defence program in order ostensibly to retain as full a range of capabilities as possible. The almost inevitable consequence of this is that some capabilities have shrunk to the point of questionable viability, and some have effectively ceased to exist. This situation seems at least as likely to get worse as it is to improve.

To answer the question 'does this matter,' I shall examine this phenomenon's impact on the overall deterrence posture of the UK and NATO, and in particular on the credibility of the nuclear deterrent and the relationship between conventional and nuclear capabilities in the pursuit of a credible overall deterrent strategy.

First let us consider the principles of deterrence. It is not simply about nuclear weapons. The basic idea is very simple. You demonstrate to your adversary, and critically he (or she) believes you, that if he were to embark on certain courses of action, then he cannot expect to make gains from it and indeed is likely to suffer disproportionate and unacceptable losses. He is therefore likely to conclude that it would be foolish to embark on the dangerous action. In the case of an action which provoked a nuclear response, the consequences would obviously be catastrophic. However, because the nuclear deterrent works both ways, the consequences for us are likely to be catastrophic too, since he would be able to respond in kind to any use of nuclear weapons. The key to this is the second-strike capability which a system such as the British ballistic submarines equipped with Trident missiles confers. We will investigate the impact of this later.

In April 2013 then Prime Minister David Cameron made an important speech reaffirming his strong commitment to the full replacement of the UK's strategic nuclear deterrent as the ultimate guarantee of the country's security (confirmed by his successor, Theresa May, in late summer 2016). He also said that the services were receiving the best conventional equipment. But he ignored some highly significant capability gaps created both by the 2010 Strategic Defence and Security Review and by the growth of so-called 'hybrid warfare' which, together with depleted equipment numbers, have unbalanced and seriously undermined British force structure and arguably NATO's too. Although action has been taken to restore some of the missing capabilities (eg., maritime surveillance), others remain lost and overall force structures have declined further to accommodate these new plans. It is my contention that this has produced a paradox which seriously undermines the major premise of nuclear deterrence for all NATO members.

This paradox is dangerous and misleading. The replacement nuclear deterrent will pose a far more severe challenge to a shrinking UK defence industry than did either Polaris or Trident. Already the estimated cost of the new submarines, and in due course the new missiles, has risen and it is difficult to estimate the impact on the overall defence budget since most of them lie outside the current financial planning period. There is good reason to believe that, without new money, there is a considerable risk to the affordability of the remaining conventional program and to the acquisition of new capabilities needed to counter the hybrid warfare threat. Conventional force levels may well be again at risk and so therefore would be the credibility both of the nuclear deterrent and of deterrence more generally.

To understand this crucial point, we need to understand how the broad strategy of deterrence has evolved. The initial highly dangerous, and surely incredible, doctrine of 'nuclear tripwire' which envisaged early and possibly massive use of nuclear weapons in the event of almost any

Soviet aggression was abandoned in the 1960s. The Cuban Missile Crisis amply demonstrated both its perils and its lack of utility. The more persuasive, although still dangerous, 'flexible response' which followed and importantly included a variety of nuclear escalation options, assumed that use of nuclear weapons was a last resort. NATO members agreed to this strategy and its consequences for defence spending. It has been UK policy that nuclear weapons would never be used against non-nuclear states party to the Nuclear Non-Proliferation Treaty, although during the Cold War first nuclear use was not actually ruled out, and indeed could not have been without considerable extra expenditure on conventional forces. The conventional forces at NATO's disposal were sufficient to ensure that a high level of fighting had to be reached before the nuclear question was asked. However, it was desirable to convey to the enemy that there was, nonetheless, a level of conflict at which nuclear use was a serious possibility.

The cardinal point is that the nuclear deterrent was not then, and is not now, a substitute for conventional capabilities. The credibility of the flexible response doctrine depends upon deferring any decision to use nuclear weapons until the very existence of the nation is at stake. In the Cold War, the UK had the conventional strength to do this. A principal reason for this is that those countries which maintain a nuclear deterrent own a second-strike capability so that any use of nuclear weapons may inflict huge damage on one's adversary but inevitably invites at least equal damage to oneself. To call it a risk or gamble is seriously to underplay the consequences. Any issue of lesser significance than national survival is unlikely ever to justify such a gamble. This means that NATO's conventional forces must be of sufficient capability to deal with any lesser conventional threats; and that one's potential enemy must believe this to be so. Nuclear deterrence comes into its own when the matter at issue is of such severity that the risk of nuclear obliteration is worth accepting. And effective deterrence depends upon one's opponent believing you.

If a nuclear power like the UK, or a nuclear alliance like NATO, has inadequate conventional means at its disposal, the point at which a decision must be made either to surrender or to escalate to nuclear use may be lowered to levels at which the risk of catastrophic nuclear damage is self-evidently disproportionate to the issue at stake, so self-evident that an adversary can recognise that too. At that point, it is likely that deterrence through the threat of nuclear use becomes incredible and can be so perceived by an opponent – it is a bluff waiting to be called. Thus, through *conventional* weakness, the credibility and effectiveness of the nuclear deterrent is compromised whether it is a rogue state or a major power that is involved. If the opponent believes that resort to nuclear weapons is unlikely because of the wholly disproportionate risk to the user, the user's bluff is called and the war could be lost through conventional means.

The conclusion to be drawn is that, in order to be credible, nuclear deterrence must be underpinned by strong conventional deterrence. That conventional deterrent must be sufficient to deter an opponent from embarking on adventures which fall well short of threatening national survival. A weak conventional deterrent is effectively a return to the discredited and incredible tripwire doctrine. Nuclear deterrence is not strong defence on the cheap. 'Big bang' is not 'big defence' – quite the reverse. Deterrence, then, is a continuum of capability from the policeman on the beat to strategic nuclear weapons. Moreover, there is little evidence from the past 50 years that a nuclear deterrent is particularly effective at deterring the actions of non-nuclear states or rogue groups for precisely the same reason. It is not credible that nuclear weapons would be used

Credit: John Kowalski USN

*An unarmed Trident II D5 missile launches from the **Ohio**-class fleet ballistic-missile submarine USS **Maryland** (SSBN 738) off the coast of Florida, 31 August 2016.*

Credit: http://www.dailymail.co.uk

Project 885 ***Yasen****-class fourth-generation nuclear submarine* ***Kazan*** *was launched in Severodvinsk, Russia, 31 March 2017. It has been under construction since 2009 ahead of being released to the Northern Russian Fleet ready for 2018.*

against such threats. Indeed the UK has specifically ruled that out.

Conventional military action must also be deterred. The key is that there is a continuum; conventional deterrence also deters. The threatened use of conventional force, at a lower level of intensity, is genuinely credible because it is plainly *usable*. A potential adversary is likely to believe in its use, provided that it is also clearly sufficient for the particular purpose or operation to hand. Its goal is to snuff out dangers before they escalate. That is the key point of conventional deterrence – to prevent bad things happening or getting worse, so that escalation towards nuclear territory does not occur. There may be some who believe that bad things will not happen but this demands a very eccentric view both of human nature and of the whole of human history. If you remember nothing else from this article, remember this. When bad things don't happen, it is usually because they have been deterred. Nuclear deterrence is simply the most extreme example of this.

Interestingly, in the 1950s and 1960s, Soviet strategists recognised this. Admiral Sergei Gorshkov, architect of the great Soviet navy of the Cold War and creator of Soviet maritime and nuclear strategy, understood it particularly well. He strongly opposed cuts to surface forces, demanded by Nikita Krushchev whom he noted as being "transfixed by the hypnosis of nuclear weapons,"[2] by arguing for a broadly balanced fleet to undertake the supplementary enabling aspects of deterrence, and to obtain sea control/denial in the near and far zones of the world's oceans.[3] For example, he argued that substantial conventional surface forces, would be required to support Soviet missile-carrying submarines. Surface warships were seen as the means of securing key check points, such as the Greenland-Iceland-UK Gap, to allow Soviet submarines free and secure access to the open ocean to patrol within missile range of their US targets, although as the range of missiles increased, this role changed. He also saw such surface forces as the means of pursuing the more traditional conventional deterrence tasks of a navy – the 'eternal verities.'

Today the situation is further complicated by the growth of hybrid warfare, involving the use of non-kinetic weapons like cyber warfare. Some remarks made recently by a Georgian student on the UK's Advanced Command and Staff Course and reported to me by a fellow Royal Naval student[4] are relevant here:

> I am ... in a syndicate with a very engaging Georgian Army officer who was 2ic of one of their regiments on the front line with Russia in 2008. Listening to his experiences is extremely instructive. All communications, C2, ECM and EW were completely jammed from 30 seconds before the first attack. It puts the supposed 'tier 2' training from Flag Officer Sea Training in context![5]

It is essential to understand the changing nature of hybrid warfare and its relationship to both nuclear and conventional force structures. Unfortunately, the invention of new ways of warfare does not remove from our risk

register the already existing types of warfare; we have to cover both.

In UK, the Parliamentary Select Committee on Public Administration has, in the last five years or so, produced two condemnatory reports on the inability of the UK and its government to make coherent strategy. This failure has led to the arbitrary creation of defence force structure through individually uncoordinated decisions such as, in this case, a decision to replace the nuclear deterrent submarines without recognising the overall strategic implications. That this, and other force structure decisions, have frequently each been made in isolation from other issues, and also that one of the predominant motives has been the achievement of short-term financial savings, has fought against coherent strategy.

It is the reflex action of the services, when forced to save, to make salami cuts across the top of the program, increasingly leaving some capabilities below their critical mass for sustainment. The result is a confused program with some capabilities reduced to a level at which they cannot be sustained, uninformed by any serious attempt at strategic vision and the matching of force structures to this strategy. Of course, for a country like the UK, which continues to have aspirations to a major global role, the latter approach might be extremely expensive. This suggests that if a state is not prepared or able to match its strategic vision with appropriate force structures, it may need to revisit its strategic ambitions. If it does not then, as I have suggested, it may well be pursuing a very dangerous game of bluff which, if called, might lead to national disaster, and will certainly lead to major costs if deterrence fails.

That is the missing link in Prime Minister Cameron's 2013 speech and the UK government's decision. But who can correct it, and how? The two condemnatory reports of the Public Administration Select Committee concluded that there is no coherent strategic vision in Westminster or Whitehall, nor understanding of how and why British force structures have evolved. Lord Stirrup, whilst Chief of the UK Defence Staff in the run-up to the 2010 UK Defence and Security Review, thought that the Ministry of Defence had lost the ability to make strategy. This is a dangerous failure. One would like to think that Britain is alone in lacking strategic vision but many other NATO countries show similar failings whilst, ominously, geopolitical thinking seems to be alive and well in, for example, Russia, India and China.

This kind of strategic ignorance and detachment has apparently been a hallmark of recent UK government practice in defence under any party. Serious strategic policymaking is trumped by expediency and budgets trump military credibility, and so we are at risk of being trumped by events. In Britain today 'policy' appears to be to have a nuclear deterrent and then buy whatever else can be afforded, with little informed consideration of how the whole strategy fits together. This is absolutely not to argue that the UK should not possess a nuclear deterrent but rather that, if deterrence is to be effective and credible to friend and foe alike, it must be part of a coherent overall deterrence strategy.

All this matters. Without national strategic principles based on a comprehensive understanding of real threats, how can there be any real stability in the defence program?

Credit: Brian Burnell/Wikimedia Commons

*HMS **Daring** (D32), an area defence anti-aircraft Type-45 destroyer of the Royal Navy, outward bound from Portsmouth Naval Base, UK, 1 March 2010.*

Credit: ukdefencejournal.org.uk

Conventional surface combatants are still required for non-nuclear deterrence. Shown here is an artist`s depiction of the Type-26 frigate.

How can any particular part of force structure be accorded a consistent cross-party and cross-service priority? How can NATO produce coherent forces whereby one state's 'gaps' are met by another state's force structures? Lacking this, one cannot formulate a coherent and consistent defence industrial strategy. From a government perspective, it might even make it rather pointless to do so. Graduated deterrence looks implausible.

Some people believe that the days of force-on-force engagements are over and that interventions and conflicts of the future will be limited and more concerned with state-building, general stability and anti-terrorism support for allies and friends. Similarly, some believe that there is not presently a plausible and credible road to war. But our knowledge of Russian intentions and strategy is very incomplete.[6] Moreover, the lamentable record of history and human nature and our demonstrable inability to forecast events suggests that, whilst a reluctance to go to war is highly commendable, there is little evidence that this makes aggression unlikely. Even those who think like this must surely acknowledge that preventing war and conflict is, above all, the goal. We are not debating ends, but ways and means. Deterrence depends absolutely on a graduated scale of response using suitable tools, both soft and hard. We surely know by now that, whilst the cost of effective deterrence is high, the cost of conflict is much higher. This applies to NATO as a whole as much as it does to an individual state. Nonetheless, I am suggesting that one of the consequences of the UK's nuclear decision will be a reduction in its conventional contribution, which will need to be compensated by other NATO member states.

What does this mean to Canada and to the RCN? An inevitable consequence of any lack of agreed strategic vision, and the will to support it with real and relevant force structure, is inter-service in-fighting and costly competition between states over defence manufacture, leading to inefficiency and degradation of the defence industry. There are other consequences. Without clear, coherent, comprehensive and realistic strategy, a precise sense of direction is impossible and military commitment becomes even more dangerous and uncertain.

The starting point for all of this must be rigorous and clear strategic thought. We need coherent recognition of what constitutes an affordable, effective and credible set of deterrent and fighting capabilities for a country or an alliance. National leaders, whether in UK, Canada, or elsewhere in NATO, need the honesty, courage and vision to face the world as it is, not as they wish it were, and to ensure their people understand it too. They need jointly to understand and match their strategic intent and build forces which are strategically coherent with each other, throughout the full spectrum of warfare. The consequences of a missing rung of the escalation ladder might be catastrophic.

Notes

1. They were touched on in a commentary by the present author in *CNR*. See Jeremy Blackham, "Capability and Capacity: All that Glitters is Not Gold," *Canadian Naval Review*, Vol. 12, No. 4 (2017), pp. 32-34.
2. R.W. Herrick, *Soviet Naval Strategy: Fifty Years of Theory and Practice* (Annapolis: US Naval Institute Press, 1968), pp. 70-71.
3. I am grateful to Lieutenant-Commander Ben Power, Royal Navy, for drawing my attention to this.
4. I am grateful to my correspondent who must unfortunately remain anonymous.
5. Note that '2ic' stands for second in command; 'C2' stands for command and control; 'ECM' stands for electronic countermeasures; and 'EW' is electronic warfare.
6. What for example is the true nature, purpose and credibility of Russia's so-called 'Gerasimov Doctrine'?

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Dollars and Sense: The 2017 Defence Budget

Dave Perry

The federal budget released on 22 March was a remarkable one for the Department of National Defence (DND). The only item of significance for the military was a deferral of the budget funds set aside for defence procurement – $8.48 billion to future years. While previous budgets have moved funding around in the same manner, this movement of procurement money was unprecedented. The budget shift was by far the largest amount of money ever moved in this fashion. It also moved the money over an unprecedentedly long time-frame. The shift was also notable for being effectively unexplained by the budget document itself. This lack of clarity was remarkable on its own since the budget was published in the wake of several months of discussion about burden sharing by NATO allies driven by the election of President Donald Trump.

The key item of relevance in the budget for DND is the following paragraph:

> The reallocation of $8.48 billion of funding from the 2015-16 to 2035-36 period to future years is required to accommodate two key capital projects: the procurement of fixed-wing search and rescue aircraft, and the modernization of light armoured vehicles that were originally scheduled to receive only partial upgrades. While there is sufficient funding available for these projects, the expected profile of large-scale capital funding does not align with the timing of expenditures associated with these projects.[1]

The $8.48 billion in funding being shifted is part of DND's 'accrual space,' the fiscal construct established by the Department of Finance for DND as part of the Canada First Defence Strategy (CFDS). It is an allocation of Canada's fiscal framework set aside to account for the depreciation of DND's capital assets. Under accrual accounting practices, instead of the full amount of any annual spending counting in full against the defence budget, capital assets are amortized over their expected lifespan, and only an annual depreciation charge is counted against DND's budget. The annual amount is based upon guidelines provided by the Treasury Board Secretariat for the type of asset in question. For buildings, the time period is 10-60 years, for military vehicles 3-25 years, for aircraft 20-40 years and for ships and boats 10-45 years.[2]

This practice effectively takes what would otherwise be a large capital cost incurred over a short time period, and spreads the budgetary impact into smaller amounts over multiple years. Importantly, DND does not start to depreciate a capital asset until the asset in question is actually in service with the Canadian Armed Forces. Thus, DND actually needs to acquire equipment or build infrastructure before it then needs to account for an annual depreciation charge in its accrual space. Depending upon a project's structure, pieces of equipment or buildings will enter into service, and therefore require that annual depreciation charges be booked in DND's accrual space, well after DND starts spending money to acquire the piece of equipment or asset. The bottom line is that if DND does not buy something, it does not need to make use of the accrual space set aside to account for the acquisition.

Prior to the 2017 budget, three past federal budgets – 2012, 2014 and 2016 – announced reprofiles of the accrual space, all citing the need to align project funding with when the resources are actually required. As Table 1 shows, however, these shifts have all paled in size in comparison to the published total reprofiling announced in Budget 2017.

As Table 1 depicts, a substantial amount of accrual space has been moved in successive budgets. Analysing the shifts itemized in various budget tables suggests that just over $11 billion in funding has been removed from DND's budget between 2011/2012 and 2021/2022. The cumulative sum of the published totals is just under $19 billion. This picture is potentially incomplete, however. With the exception of the 2016 budget, most published shifts of DND's accrual space have only indicated in which years funding was removed, and in 2012 and 2017, even this description was incomplete, as the budget plans in those years did not itemize the amount removed. Notably, with the exception of the 2016 budget, federal budget documents have provided no specific indication about how much of the reprofiled funding was reallocated to which years. It is therefore possible that some of the funds reprofiled in the 2012 or 2014 budgets were subsequently moved again in 2016 or 2017.

Making sense of the funding shifted in Budget 2017, moreover, is effectively impossible with public documents, given the confusing and vague budget language. Only two projects were mentioned in the budget plan itself, the fixed-wing search and rescue aircraft, for which a contract was signed late last fall, and the Light Armoured Vehicle (LAV) upgrades, the latest tranche of which was announced in February 2017. The contract for the former is worth $2.4 billion in the acquisition stage, while the one for the latter is worth only $440 million. Thus, together,

Table 1. Budgetary Reprofiling of DND Capital Funds ($B)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	Itemized Total	Published Total
Budget 2012*	-0.400	-0.500	-1.300	-0.700	-0.300	-0.100						**-3.300**	**-3.540**
Budget 2014**			-0.592	-0.575	-0.900	-1.075						**-3.142**	**-3.142**
Budget 2016***					-0.205	-0.090	-1.319	-0.911	-0.684	-0.507		**-3.716**	**-3.716**
Budget 2017****						-0.197	-0.017	-0.102	-0.014	-0.091	-0.512	**-0.933**	**-8.480**
Total	**-0.400**	**-0.500**	**-1.892**	**-1.275**	**-1.405**	**-1.462**	**-1.336**	**-1.013**	**-0.698**	**-0.598**	**-0.512**	**-11.091**	**-18.878**

Credit: Author

* A total impact of $3.54 billion was announced in Budget 2012, Table 6.3, p. 236. The annual reductions depicted are those shown in Budget 2012, Table 6.3, p. 236, and do not sum to $3.54 billion

** Budget 2014, Table 4.1.1, p. 260.

*** Budget 2016, Table 6.1, p. 204 and information provided by government of Canada officials.

**** Budget 2017, Table 3.2, p. 204 and p. 186.

The column 'Itemized Total' provides the cumulative total shifts itemized in a budget table. The column 'Published Total' refers to the total amount which the budget stated was reprofiled.

the capital costs of these two projects fall well short of the total funds shifted.

An explanation for the shift was made available to the author by defence officials after the budget was published. The shift of the $8.48 billion can be better understood if broken into two distinct issues: (1) the source of the shifted funds; and (2) the planned future use of those funds. The 'source of funds' issue is similar to the problems experienced over the last several years in that the budget moved some effectively unusable defence funds forward into a time-frame in which the funding could be usefully employed. Much of the funding was allocated to projects that have fallen behind schedule, resulting in changes to their forecasted depreciation schedule.

As well, a significant component of the $8.48 billion shift announced in Budget 2017 is moving, once again, some of the same funding that had already been moved forward in Budgets 2012, 2014 and 2016. Some of the dollars moved forward in 2012, 2014 and 2016 had been shifted with the anticipation that the accrual space would be needed to account for equipment and infrastructure depreciation, based on the expectation that the procurements to which the accrual space was attached would successfully move forward on revised schedules. As it turns out, these assumptions were not completely accurate. Some of those procurements continue to lag on their revised schedules, so the budgetary funding in the accrual space to account for them is still unneeded in the near term. As previous analyses have shown, in recent years almost all of the military's major Crown projects for military equipment (the most costly equipment projects) have failed to reach an initial operating capability on their originally published schedule. Given this, delays with multiple projects have contributed to reprofiling of the accrual space over time. In Budget 2017, the single largest source of underutilized funds moved forward was the Canadian Surface Combatant project. That project is still very much active, but it is not moving forward on the schedule originally anticipated.

Further, some of the accrual space that has been reprofiled in Budgets 2012, 2014, 2016 and 2017 was never actually allocated to a specific project to begin with. Defence officials have conducted an analysis of all the shifts to DND's accrual space since 2005, and analysed the change to that fiscal room between the year 2005 and 2035. Over that 30-year time period, DND has had $9.3 billion in accrual space removed and shifted out to future years. Of that $9.3 billion, only $4 billion was ever actually allocated to

Credit: Lars Hagberg/Canadian Press

Chief of Defence Staff General Jonathan Vance says there is no point in giving his department more money for purchases when it cannot spend the money it already has.

Credit: Canadian Army

The first upgraded LAV III is unveiled in London, Ontario.

specific projects. The remaining $5.3 billion was funding set aside to account for unforecasted requirements and future government direction.

The second aspect of the Budget 2017 reprofiling of $8.48 billion relates to the intended 'use of funds.' This is what the language in the budget alluded to. The most recent component of the LAV upgrade project included a number of additional vehicles added to the previously planned order, requiring additional funds. Similarly, the contract awarded for fixed-wing search and rescue aircraft was for an amount higher than the previously allocated project budget, requiring a multi-decade increase to the accrual space allocated for that project. Finally, the Canadian Surface Combatant project required an adjustment to add additional funding, again over multiple decades.

Defence officials appear to be content with this overall movement of their procurement funds. Chief of Defence Staff (CDS) General Jonathan Vance stated in an interview that "[t]here's no point giving us billions when we can't spend it."[3] Relative to what would have happened under the previous accounting rules, DND is not losing outright the budget space it is not using, but simply shuffling that funding out into the future.

It is difficult to look at this pattern of recent changes and view it positively, however. Some of the funding which has been moved, $4 billion according to data provided to the author, has been shifted due to delays in delivering procurement projects. This means that the military has been forced to wait longer than anticipated to receive the capability those projects would deliver. Furthermore, the accrual space itself is not adjusted for inflation, so when funds are shifted into the future, they effectively lose significant purchasing power.

Beyond this, by deferring funding into the future – and in the case of Budget 2017, the funding is shifted over multiple decades – it introduces huge uncertainty into the supply of funding. Even near-term funding levels are subject to change with government priorities and fiscal fortunes.

The Canada First Defence Strategy was supposed to provide a stable, long-term funding plan for DND. But the Great Recession in 2008 threw the strategy off track in just two years. It is impossible to have anywhere close to the same level of confidence that funding moved from a five-year window will actually be available several decades from now when DND thinks it can actually use it.

Finally, the continual shifting of defence funding raises an important issue of DND's credibility with governments and the central agencies that may have bearing on the discussion of the Defence Policy Review which is ongoing as this article was written. From the CDS's comments about the shifts in funding, a simple takeaway is that over the last five years, DND has had far more money than it could actually use. The Canadian military was provided a funding infusion in 2005 but has been unable to make use of all of that money.

Heading into the Defence Policy Review, DND had a long-term funding deficit that it needed to rectify to continue delivering on status quo Canadian defence policy. Having spent several years continually shuffling budget funds forward because it cannot spend them, it is hard to think DND will find a sympathetic audience for proposals with increased budget levels. While DND has undergone a series of major improvements in its costing and financial management practices in recent years, having moved so much money in so many consecutive budgets has undoubtedly undermined the department's ability to convince government and the central agencies that it actually needs more funding.

Notes

1. Budget 2017, "Building a Strong Middle Class," Ottawa, Department of Finance Canada, 22 March 2017.
2. Government of Canada, "Tangible Capital Assets," available at www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=32518.
3. Lee Berthiaume, "Canada's Top General Says Military Not Hurting for Money, Defends Spending Delay," CBC News: Politics, 30 March 2017.

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Making Waves

Comments on "Canada's Submarines are Sunk Costs" by Michael Byers

Eric Lerhe

In the Winter issue of *Canadian Naval Review*, Michael Byers gave us a thoughtful review of the history of the *Upholder*-class submarines, valuable insights on the cost of maintaining submarines, and a good tour of today's submarine market with its plentiful sellers and eager buyers.[1] I am not, however, sure as to his claim that the sunk cost fallacy is the "main reason" why Canada has stuck with the *Upholder*-class "instead of purchasing new ones" that is the central theme of his article (noting he also suggests getting rid of the class as another option).[2]

Sunk costs and the sunk cost fallacy have been defined as follows:

> In economics, a sunk cost is any cost that has already been paid and cannot be recovered. The sunk cost fallacy is a mistake in reasoning in which the sunk costs of an activity – instead of the future costs and benefits – are considered when deciding whether to continue the activity.[3]

Byers illustrates this well with his example of the holder of a $50 concert ticket holding back from selecting a viable, and in this case more preferable, alternative option of going to a friend's party. Throughout the economic literature the presence of such a credible alternative option is key to understanding the sunk cost fallacy.[4]

Yet early in the 1990s and well before sunk costs entered the picture, credible options to buying used submarines were few and getting rid of them was indeed considered. Certainly, the 1992 Liberal Green Paper on defence had submarines, with some other equipment, under review with the note that "Canada must decide if they are cost-effective in the effort to enhance Canadian security and sovereignty interests."[5] Cost-effectiveness has been a recurring theme.

The 1994 Parliamentary review of defence policy that followed the election of the Jean Chrétien government soon heard more on submarines including calls for eliminating them. The Canada 21 Council, led by Ivan Head and Janice Gross Stein, was one of the most influential participants early in the review, and it argued for purchasing peacekeeping support vessels over submarines and eliminating the existing ones.[6] This recommendation and many of the Canada 21 Council's other suggestions for eliminating combat capability more generally failed to gain the Parliamentary Committee's support. In the end, the committee's report on future defence policy argued for keeping submarines based on their effectiveness and low operating costs. Their recommendation, however, came with a major caveat in that it would not sanction a "conventional capital replacement program" for the aging *Oberon* submarines that would cost $4-6 billion. Rather, it argued

> If it should prove possible, in the current environment of military downsizing around the world, to acquire 3 to 6 modern diesel electric submarines on a basis that was demonstrably cost-effective (i.e. that could be managed within the existing capital budget), then the government should seriously consider such an initiative.[7]

Canada's economic situation and strained government finances had effectively eliminated the 'buy new' option. In 1993, Canada's 10.8% unemployment rate was exceeded only by Australia and Spain amongst the 13 heavily industrialized states, while the federal debt to GDP ratio approached 68%, a level only surpassed by Italy and Belgium. It was argued that Canada's $750 billion debt drove up interest rates, hazarded economic recovery and hampered the government's future ability to pay for services to the hard-pressed and unemployed. As a result the 1993 election was fought on the two issues of debt and

Credit: Jacek Szymanski, Navy Public Affairs, DND

*HMCS **Victoria** transits in the vicinity of Esquimalt during sea training trials and exercises, 20 February 2012.*

Credit: Chris Howell/http://www.shipspotting.com

*HMCS **Onondaga** (S73), an **Oberon**-class submarine, Montreal, 8 October 1985.*

the economy, with the Liberal Party's manifesto, the Red Book, promising to lower unemployment and reduce the government's annual deficit to less than 3% of GDP by 1997. The Department of National Defence (DND), ominously, was the only federal department specifically singled out in the Red Book for a spending cut.[8] With the navy at that time consuming the largest part of DND's capital plan as a result of the Canadian Patrol Frigate Project, and the army carrying the weight of the multiple peacekeeping operations and needing new equipment, a $5 billion brand new submarine program similar to the ongoing Australian *Collins* purchase was not a realistic option. The White Paper that followed concluded similarly, and stated it planned to "explore the option" of acquiring the *Upholders* which had recently been put up for sale.[9] The case for retaining the submarine capability had been effectively made, and the *Upholder* purchase was named the 'Submarine Capability Life Extension' in order to make clear that this was not a new submarine buy.

This is not to say that buying used submarines did not bring problems. Certainly, the extended period – six to 10 years – the submarines lay awaiting a buyer until they were delivered to Canada presented reactivation issues and Byers makes this clear. However, Captain (N) Norman Jolin argues that during that reactivation:

> Yes they found problems, but in speaking with four initial COs all were adamant that the British fixed all the issues *at their cost* and the submarines were turned over to Canada exactly as agreed to. So to suggest they were in poor material shape on turnover is not true.[10] (Emphasis in original.)

After discussing the submarine purchase, Byers then argues that the sunk cost argument was resorted to whenever governments questioned the submarine capability.[11] However, on each occasion his wording is very tentative with no citations in support of DND's apparent sunk cost thinking. Thus we have his assertion that when the Chrétien and Harper governments questioned the need for submarines, "on both occasions, [mid-1990s, and 2007] proponents of the submarine program *would have* pointed to the large amounts of money that had already been spent," and "the sunk costs argument *may have* been invoked again [in 2012]."[12] (The italics are mine.)

Credit: Andrew Vaughan / CP

*HMCS **Windsor**, one of Canada's four **Victoria**-class submarines, is returned to the waters of Halifax harbour after a five-year refit, in Halifax, 11 April 2012.*

In the years since 1994 I have served as Director Maritime Force Development, Director NATO Policy and as a member of the Naval Board, and at no time was I ever aware of any example of DND resorting to the use of past high expenses – sunk costs – to justify retaining a submarine capability. More typically DND managers defend capabilities by arguing in precisely the opposite direction outlining how inexpensive a platform was, is and will be. In fact, the Leblanc article Michael Byers cites includes elements from a recent navy briefing note on submarines that brags:

> "This [the *Upholder* buy] compares most favourably with the cost of six Australian submarines at over $5-billion, or French or German submarines costing approximately $600-million or more each," the navy said. "The Victoria class submarines represent excellent value for the money invested."[13]

Using past large expenses or future cancellation costs as a justification for retaining a program was also a sure loser with the Chrétien and current Justin Trudeau governments during elections. For example, the EH 101 helicopter program was summarily cancelled despite the known $478 million contract closing penalty, while the F-35 fighter jet procurement was written off during the election despite Canada having paid some $160 million, and possibly more, to be a 'level three' participant in the program.

Byers' article is on far firmer ground when he discusses the high costs of submarine maintenance. Indeed, the excellent Andersson article he cites shows many navies are facing difficulty providing adequate and, especially, economical maintenance for their submarines. While Byers cites the case of HMCS *Windsor*'s refit stretching from two to five years, extended refit times are shown to be problematic elsewhere, including states with newly-delivered subs.[14] In fact brand-new submarines do not seem to fare any better in this regard. The Australian National Audit Office has estimated that in 2008 the *Collins*-class (with six submarines) consumed some $235 (A) million annually in contracted maintenance.[15] Byers' data show Canada's annual contracted rate, based on $2.6 billion over 15 years, equates to $173 million per year, although this is for four submarines. New-build has not delivered significantly lower costs and the in-depth Andersson report provides no hint of any other state doing any better.

Another point Byers tackles is the apparent low availability rate of the *Upholders*, noting "only one is currently available for immediate employment."[16] This availability rate is actually the norm in the US Navy which aims to have 10 submarines ready for deployment based on a fleet size of 40-48.[17] The availability of Australia's *Collins*-class appears similar and, again, the Andersson article does not suggest anyone is doing much better.[18]


Credit: LSIS Yuri Ramsey, Royal Australian Navy

*HMAS **Collins** arrives in Sydney Harbour, 24 September 2010.*

Finally, the *Collins*-class submarine history also shows that new submarines do not necessarily have an easier or shorter route to full operational capability than Canada's used submarines did. It took some 10 years for the *Collins*-class submarines to reach full capability and that required replacing the entire combat system and one of the submarine's sonars and upgrading its torpedo to the US Mk 48 mod 7 standard.

Canada's *Victoria*-class took the same time to get sorted out. It too eventually got the same high grade torpedo, a new firing system to manage it, the Canadian towed array, and the BQQ 10 sonar system, the same one fitted in the most advanced US nuclear submarines. Rear Admiral John Newton has called this sonar and torpedo combination "the most lethal submarine weapons system on the planet."[19] The article by David Perry in the same issue of *CNR* as the Byers' article also outlines in detail how HMCS *Windsor* is performing very well in international exercises and was recently assigned by NATO to the tracking effort against four Russian nuclear and one conventional submarines operating near Greenland.[20]

Byers correctly points out that Canada is fast approaching the time when it must consider the replacement of the submarines, and he provides an excellent review of the

alternatives. He also suggests that the decision to replace must also consider "shut[ting] the program down."[21] In his article, he approaches divestiture in a very balanced way, noting the many arguments for and against it. Canadian governments have also considered this option, but each time they have come solidly down for submarines and provided the funds to upgrade and maintain them. In part, this recognizes that Canada has no other vehicle offering stealth and lethality. However, it is also clear that with submarines we can expect Canadian governments to fund them, and defence needs generally, with, as Kim Richard Nossal has recently written, "the minimum money we can get away with."[22]

Notes

1. Michael Byers, "Canada's Submarines are Sunk Costs," *Canadian Naval Review*, Vol. 12, No. 4 (2017), pp. 20-24.
2. *Ibid*., p. 20.
3. "Sunk Cost Fallacy: Throwing Good Money After Bad," Strategic Thinking and Strategic Action, 21 March 2015, available at http://leepublish.typepad.com/strategicthinking/2015/03/sunk-cost-fallacy.html.
4. This important point was first raised in this context by David Perry at the Naval Association of Canada Conference in his presentation, "Recapitalising the Fleets of the Government of Canada – What Next for Canada's Shipbuilding Strategy?" Ottawa, 20 October 2016. And many thanks.
5. Liberal Party of Canada, *Green Paper on Defence*, Ottawa: Liberal Party of Canada, 1992, p. 18.
6. Canada 21 Council, "Canada 21: Canada and Common Security in the Twenty-First Century," Toronto: Centre for International Relations, University of Toronto, 1994, pp. 64, 79.
7. Canada, Special Joint Committee of the Senate and the House of Commons on Canada's Defence Policy, *Report of the Special Joint Committee on Canada's Defence Policy - Security in a Changing World 1994* (Ottawa: Parliamentary Publications Directorate, 1994), p. 38.
8. Liberal Party of Canada, *Creating Opportunity: The Liberal Plan for Canada* (the 'Red Book'), Ottawa: Liberal Party of Canada, 1993, p. 20.
9. Canada, Department of National Defence, *1994 Defence White Paper*, Ottawa, 1994, p. 47.
10. Capt (N) Norman Jolin (Ret'd), email to author, 28 March 2017.
11. Further, the citations he provides do not fully support his claim that various governments "considered scrapping" the *Upholders*. The Ivison footnote provided makes clear the claim that the government of Prime Minister Jean Chrétien "considered getting out of the submarine business altogether" was made before the *Upholders* were purchased. In the 2007 and 2012 cases, the evidence that the Conservative government was thinking of eliminating the submarines is based entirely on the unsubstantiated and much-extended speculation of the reporter and no evidence of Conservative government intent is provided. Even the reporter admits "sources suggest the submarine fleet will survive Mr. Flaherty's budget axe." See John Ivison, "Sinking Canada's Troubled Sub Program at Budget Time May Make Sense," *National Post*, 28 December 2012. The other source provided cites "federal sources," and "some officials," not the Conservative government. In fact the only Conservative cited, the Minister of National Defence, "offered his full support to Canada's submarine program." See Daniel LeBlanc, "Submarines Good Value, Navy tells MacKay," *The Globe and Mail*, 18 March 2008.
12. Byers, "Canada's Submarines are Sunk Costs," pp. 21-22.
13. Leblanc, "Submarines Good Value."
14. Jan Joel Andersson, "The Race to the Bottom: Submarine Proliferation and International Security," US *Naval War College Review*, Vol. 68, No. 1 (Winter 2015), pp. 18-20.
15. Australia, Australian National Audit Office (ANAO), "Management of the Collins-class Operations Sustainment - Department of Defence," Audit Report No. 23 2008–09, Canberra, 2009, p. 39. I have removed the Australian contracted training costs as this was not in the Canadian contracts.
16. Byers, "Canada's Submarines are Sunk Costs," p. 22.
17. Ronald O'Rourke, "Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress," Congressional Research Service, 22 March 2017.
18. John Coles, *Study into the Business of Sustaining Australia's Strategic Collins Class Submarine Capability,* Government of Australia, November 2012, 1-111, pp. 9-14. See also ANAO,"Management of the Collins-class Operations Sustainment - Department of Defence," pp. 57, 58
19. Canada, Standing Committee on National Defence, "Evidence," 22 November 2016, No. 29, 1st Session, 42nd Parliament, p. 1130.
20. David Perry, "The Navy's Prospects in Trudeau's Defence Policy Review," *Canadian Naval Review*, Vol. 12, No. 4 (2017), pp. 25-29.
21. Byers, "Canada's Submarines are Sunk Costs," p. 24.
22. Kim Richard Nossal, *Charlie Foxtrot: Fixing Defence Procurement in Canada* (Toronto, Dundurn, 2016), p. 108.

Ocean Patrol Corvettes for the RCN Now

David Longdale

Limited budgets and rapid acceleration in the development of anti-ship weapons are all having a major effect internationally on the selection of future naval vessels, their weapons, defence and the strategic scenarios of future conflicts. High-value targets such as aircraft carriers, cruisers and destroyers are already vulnerable even after spending more on their defence than on offensive weapons.

Now falling into the category of high-value targets, at between $2.5-3 billion USD each, are the new batch of sophisticated frigates now entering navies worldwide or under consideration by many navies including Canada. By the time these enter service from the late 2020s through until 2045, the threats will undoubtedly have multiplied, making their defence and weapons already obsolete at time of delivery.

To address this problem, the following commentary outlines the rationale to proceed with the immediate purchase of 12 Ocean Patrol Corvettes (OPC)[1] for the Royal Canadian Navy (RCN) – in the same urgent spirit of the WW II corvette program – to ensure Canada's sovereignty in these challenging times.

The RCN's duties and responsibilities are considerable and include homeland coastal and trading route protection, keeping alliance commitments globally, responding to crises worldwide, and protection of Canadian sovereignty. All this is to be achieved with a small fleet and the longest coastline in the world. This clearly is a major undertaking for a country with a small population as a tax base, and perhaps this is why an international survey puts Canada's coastal defence on a level with Bangladesh and Indonesia.[2]

The RCN currently has capable, but limited, assets. These include the 12 frigates of the *Halifax*-class which joined the fleet as they were built from 1988 to 1996. These frigates have just completed the *Halifax*-class FELEX Modernization Program which has upgraded them mostly on weapons, defence and communications with only minor upgrades to the aging hull and machinery. These vessels are highly utilized covering extensive and mostly international commitments. Although upgraded, however, they

Credit: Naval Museum of Manitoba

*HMCS **Norsyd** was a modified **Flower**-class corvette that served with the Royal Canadian Navy during the Second World War. She served primarily in the Battle of the Atlantic as a convoy escort.*

are still below par in comparison with many in-service modern frigates including some NATO allies in Europe, as well as in Russia, China and India.

As well, the RCN has 12 *Kingston*-class Maritime Coastal Defence Vessels (MCDVs), which were built from 1996 to 1999. The MCDVs are being used as a substitute for the frigates in some cases but are unsuitable for many of these missions. The MCDVs were a compromise design and they are not suitable for all offshore use and are lightly armed with limited mine countermeasure capability to counter current sophisticated mine technology.

There are also four *Victoria*-class submarines which Canada purchased from the United Kingdom. This story has been well covered, and the RCN deserves better.

And, finally, there will be five (or six?) of the *DeWolf*-class Arctic Offshore Patrol Ships (AOPS) arriving between 2018 and 2022. These will be light ice class vessels with minimal armament, slow speed and not really suitable for deep ocean use or heavy multi-year ice. Although they are expensive at $600 million each, they will still be no match for the high-powered Russian icebreakers which are being delivered in large numbers. In this regard, I lament the cancelling of the CCG Polar 8 in the 1990s, on which I was a member of the design team. It was an opportunity lost to show the world that Canada is serious about protecting its Arctic sovereignty.

With the National Shipbuilding Strategy, the Canadian Surface Combatant – the frigate replacement program – has begun. But the process has slowed down, and it seems from the recent budget that there will be further delays. Also the competition has been opened to vessels that have no service experience which adds risk. The latest budget estimate being bandied around is north of $40 billion[3] which is bound to escalate further as there is no competition. There is also an estimated further $64 billion for operations, crew and life-time support. I believe the first vessel will come into service after 2025 and the final ship is projected for 2045+. When delivered, it's likely the weapon, defence and communication systems will already be obsolete especially on the earliest vessels.

Naval history shows that by ignoring evolving threats even the mightiest vessels can come to grief. Changing technology and changing threats create obsolescence. For example, battleships of WW II were built only to fight other similar ships, and that meant that most were lost to air attack. As well, in the Falklands War in 1982, Royal Navy cruisers were vulnerable to Exocet missiles due to aluminum superstructures plus limited air defence.

In the 21st century will this be repeated? Up until now, aircraft carriers have survived due to a massive protective bubble, but they are now vulnerable due to these current (known) threats:

- multi-head anti-ship ballistic missiles;
- third generation cruise missiles (air, submarine and land launch);
- hypersonic anti-ship missiles with speeds to 4,500 mph;

Credit: Author

*The ship **Vigilant** of the Mauritius Coast Guard.*

- 100+ knot long-range smart torpedoes (multi-launch) with 200 knot coming soon;
- cyber intervention including taking control of equipment (for example, denial of satellites, GPS);
- drones (surface, submerged and air drones);
- new generation stealth submarines;
- littoral-based threats (including, swarming, long-range shoulder-fired missiles, long-range smart shells and laser); and
- advanced smart mines.[4]

High-value targets will always be vulnerable to attack. After all, they are high-value not only to the possessor but also to the enemy. Will the new high-cost frigate replacements also be a major target? They will be high value to Canada because they will be few in number and therefore each critical to any defence strategy.

But what if Canada had another option? Let us explore the Ocean Patrol Corvette concept as an option to the new CSC/frigates. The trend worldwide is a rapid build of OPV/Corvettes ranging in length from 75m to 110m with various degrees of military specialization which greatly affects cost and delivery. Most are commercial standard hull and machinery with optional weapons and defence packages. Australian and Indian Navy reports in 2016 indicate there are 136 on order worldwide in 24 countries, 276 are in advanced planning in 30 countries, and China has built 40 of 60 Type-056 corvettes with 30 in service.[5]

Why is the world building these ships in such quantity? These can be formidably equipped vessels. They can fulfil 70% of a frigate's platform requirements, at a fraction of a modern frigate's cost. They are versatile and they are easily adapted to different mission profiles, and they are ideal platforms for plug-and-play weapons systems (LCS model). As they are commercial-off-the-shelf (COTS) plus best available quality (BAQ) equipment and materials, they have low through-life costs and parts are available worldwide. They are built to high international standards in accordance with universally accepted marine inspection classification societies (such as ABS, Lloyds, DNV/GL) which approve design, equipment and inspect vessel compliance throughout the construction and delivery process. Because of this, they can be built at low cost in most countries, and with fast delivery.

These ships are not unknown to Canada – the RCN has had experience with corvettes. The RCN's corvette experience

Credit: Irish Defence Forces

*The Irish Naval Service ship **LÉ Samuel Beckett** (P61) on naval exercise manoeuvres, 19 June 2014.*

Credit: New Zealand Defence Force

Fleet Officer of the Watch manoeuvres in the Hauraki Gulf in northern New Zealand, including HMNZS ***Otago*** *(foreground), and other ships of the New Zealand navy, 14 December 2010.*

in WW II was the most significant contribution to winning the Battle of the Atlantic. By 1945 Canada had the fourth largest navy in the world. The RCN trained numerous emerging navies after WW II, including the Indian Navy, which purchased many of the Canadian corvettes. In the 1980s two OPVs were constructed for the Canadian Coast Guard (CCG)/Department of Fisheries and Oceans (DFO) – *John P. Tully* and *Lenard J. Cowley*. These ships are continuing to provide sterling service with their 75m length and 14m beam.

Canada's OPV/Corvette designs are currently recognized internationally, and include such design companies such as VARD, Naviform and Robert Allan in Vancouver. Since the 1990s, Canada has also been involved in constructing corvettes for other countries, including Ireland, New Zealand and Mauritius.

The Mauritius OPV example is interesting. Based on the CCG/DFO OPV design, Western Canada Marine Group (WCMG), an engineering, procurement, construction and maintenance (EPCM) company of which I was President, won an international tender for an OPV for the government of Mauritius in 1994 against fierce competition among naval shipyards including from the UK, France, Germany and the Netherlands to name a few. The ship was delivered in 1996. It was constructed in the Chilean Navy shipyard ASMAR as no Canadian yards were interested in bidding at that time.

This was the first of what is now a significant lineage of OPV designs from Canada. The Canadian influence on OPV/Corvette design continued with the delivery of six Irish Navy vessels. I was involved in the contract negotiations for the first two *Rieson*-class 75m OPVs as President of WCMG. These evolved to the Irish Navy *Samuel Beckett*-class which are 90m long with a 14m beam. All are designed by VARD (then Polar Design) in Vancouver and

Table 1. Comparison of an OPV and a New Naval Frigate

Type	Irish Navy 90m OPV	BAE Type 26 Frigate
Cost each 2017 Can$	**$80,000,000***	**$2,800,000,000++**
In-Service Delivery	20 months	6 years?
LOA	90m/300'	150m/492'
Beam	14m/46'	21m/68'
Speed max	23 knots	26 knots
Crew	44 + 15	120 + 80
Standard	COTS/BAQ/Class	Mil Spec.
Weapons/Defense	1 x 76mm Ot.Mel. +LCS Pacs.	Full Suite
Upgrades/Refits	Fast/limited drydock	Extended periods
Features	Plug&play: high interior volume	Full Nav/Mil Spec.
Survivability	Steel construction/ subdivision	Full Nav/Mil Spec.

* *Plymouth Herald*, "Babcock Appledore announcement of another Irish Navy OPV priced 48 million pounds," (Cdn) $80 million, 16 June 2016.

Credit: Author

Proposed Pacific Corvette Squadron 2024.

which was the naval architect for the original Mauritius OPV. They were all constructed at Babcock Appledore, UK.

The ship design is very flexible and there are different versions of this OPV concept. New Zealand's navy now has two 85m OPV with a large helideck. In September 2016 the US Coast Guard awarded a contract for 25 OP Cutters with a length of 105m to Eastern Marine, Florida. It is also a design by VARD, Vancouver and it is now completing the detailed design.

The typical OPC provides flexibility. It has space for weapon/defence systems, command centre and large crew accommodation. The main propulsion option of diesel electric provides low radiated noise, redundancy, flexibility and reserve power for weapon/defence systems. The option of split offset engine and control room provides for redundancy. There is space for a typical weapon/defence package. It has the option for a large helideck with hangar suitable for mid-sized helicopters or large unmanned aerial vehicles (UAVs). And, finally, it has space for four fast rescue/boarding RHIBs.

Is plug-and-play and low radiated noise realistic for corvettes? Yes. Modern OP corvettes have to accommodate the rapid installatioin and removal of weapon and defence packages to be effective in fulfilling many of the roles of the modern frigate. They also have to meet comparative low radiated noise criteria.

Recently I was Program Manager for the design and construction of two US Navy/Office of Naval Research 74m research vessels (*Neil Armstrong* and *Sally Ride*) and, in 2006, for the University of Delaware/NSF research vessel *Hugh R. Sharp*. These complex vessels met the following:

- very low radiated noise in accordance with ICES requirements. This was achieved by 3D resilient mounting of all rotating machinery, careful routing and support of piping, isolation from hull of all equipment and use of special tiles, etc.;
- zero cavitation propellers and zero bubble sweep down achieved by careful propeller design and special hull techniques;
- allowance for large arrays of sonars in various configurations with quick change out capability;
- easy access exposed layers of cable trays with transit between spaces and through decks for cables, piping, utilities;
- exposed area decks and designated internal spaces have high load sockets throughout to allow quick installation and removal of equipment; and
- adequate reserve clean electrical and utility power supplied to stations at strategic locations for fast removal/installation of systems.

By adopting these same features in the OPC design, construction is not an expensive item and provides the plug-and-play flexibility.

How will a Fleet of OP Corvettes Benefit Canada?

While Canada waits for the first new CSC/frigates to appear, a fleet of 12 (six East Coast/six West Coast) 90m OP corvettes could be in operation by 2024. The first could be in service by 2019. The cost of the 12 OPCs, excluding weapons and defence systems, based on an existing proven design such as the Irish OPV, would be (Cdn) $1.2 billion. Adding weapon/defence mission packages for 12 vessels would cost (Cdn) $3.0 billion, for a total of (Cdn) $4.2 billion. This compares to 15 new surface combatants/frigates at $42 billion (plus through-life costs plus expensive upgrades and spares due to military specification requirements, especially later in the life cycle).

Credit: Author

Design of a future Fast Attack Corvette with advanced wave-piercing hull form.

The OPCs would quickly be able to help perform the RCN's major roles and relieve pressure on the existing frigates at considerably reduced operating costs. It would also be possible to train crews on mission-specific packages ashore and/or at sea resulting in fast crew workup with specialized knowledge when deployed with their package. Finally, repair/maintenance of the OPC platform is relatively simple and easy due to COTS design and low-cost parts which are available worldwide.

There is also a possibility of an attractive support vessel option for the OPCs. It is recommended that the RCN investigate acquiring sophisticated inspection, maintenance, repair (IMR) vessels to support an OPC squadron. These are versatile vessels normally used extensively on deep well offshore oil work. They have many features that are ideally suited to OPV support including large helidecks, up to 250 crew accommodation, major fuel and water cargo capacity, highest dynamic positioning certification (DP3), major propulsion redundancy, high volume storage space under and on deck, remote-operated vehicles (ROVs), large command centres and bridges, and up to 400 ton motion-compensated cranes, to name a few. They are available, often new out of a shipyard, for very low prices of around $30 million. Prices would normally would be $160+ million but they are low now due to a major overbuilding of these types of vessels worldwide and low utilization because of the downturn in oil prices and production.

To make this project feasible, the Canadian government would have to adopt a hands-off approach and allow it to be organized as a commercial project. This is a new mindset but is the only way of avoiding long approval processes and having too many fingers in the pie which would escalate costs and disrupt the whole production process. I have had success with the EPCM ship construction projects in the past in a number of different formats and feel that this is the most advantageous approach in this case. An EPCM company – let's call it Corvette Constructors Canada (CCC) – would be totally responsible for the project including design, detailed engineering, procurement, quality assurance, management and, most importantly, in control of the funds. These can be very dynamic organizations and generally use modern management techniques. EPCM companies are common on large industrial projects worldwide.

Sourcing would be worldwide using commercial-off-the-shelf material and equipment and best available quality, including the actual shipbuilding portion. Canadian content would be considered but not as a policy. It is recognized that Canada does have many companies with quality and technically competitive expertise and on the Mauritius OPV project over 100 BC companies supplied material and services. Non-traditional sources should be investigated especially from emerging naval powers such as India and Turkey that have a growing expertise in naval systems. For vessel construction, the UK, Korea, Poland (BC Ferries had all its recent ferries constructed in Poland with excellent results) and some non-navy yards in the United States could be investigated.

Why now? Commercial shipbuilding worldwide is in major recession due mainly to overbuilding of offshore oil service vessels, container ships and bulk carriers. Due to the collapse of oil prices and slowing trade, there is now a large surplus of building capacity worldwide for commercial vessels such as OPCs. This is not the case in naval construction. Worldwide naval vessel construction is at

record peace-time levels and growing fast in the Asia-Pacific region. It is the same in Canada where the three major players – Irving, Seaspan and Davie – are busy for the foreseeable future on RCN/CCG projects. Based on this, it is prudent and timely to go out into the market today with a large commercial project based on multiple numbers of the same vessel. This would get high interest and allow CCC to negotiate incentives, offsets, securities, bonds etc. Now is the time, it will not last.

Conclusion

Canada could be a leader by facing the new reality of naval operations and taking into account the rapidly changing threats to ships and homelands. Canada has the knowledge, experience, innovation and capability to lead in this new naval age by being bold, in the spirit of the WW II corvette program, and proceed immediately with a new corvette program. As Canada did in WW II, the navy could obtain extremely capable ships, quickly and at a reasonable cost.

Notes

1. These OPCs are sometimes also called Offshore Patrol Vessels (OPVs) or Frigates-lite!
2. See Mark Montgomery, "More Trouble for Canada's Navy and Its Only Destroyer," Radio Canada, Inet, 7 October 2015.
3. Murray Brewster, "Ottawa to Face Decisions on Navy's Frigate Replacement Program," *The Globe and Mail*, 20 March 2016.
4. See *Naval Forces*, Vol. 38, Numbers I, II (2017). These issues contain articles about the defence of and threats to aircraft carriers.
5. Defence IQ (UK), "Global Offshore Patrol Vessels Market Report 2015/16," Australia CASS-India Study "Role of Offshore Patrol Vessels (India)," 2016.

Diminishing Numbers

Poseidon

It is a bad time to be adding up numbers in Canada's Naval Order of Battle (ORBAT). Canada's last destroyer, HMCS *Athabaskan*, was paid off 10 March after 44 years of service, and will soon join her sisters at a scrap yard. The AOR *Protecteur* is being scrapped at Liverpool, NS, and HMCS *Preserver* is being de-stored and readied for a similar fate. Both of these ships were essential components of the fleet for four and a half decades: much longer than intended when the ships were built. The Naval Oceanographic Research Vessel *Quest*, one of the world's quietist surface vessels for many years, will join the disposal queue without replacement. Meanwhile, one modified interim AOR is being converted from a secondhand container ship at Davie Shipyard in Quebec and there are plans to build two Improved *Berlin*-class AORs at Vancouver Shipbuilding – one hopes that steel will be cut soon after many delays and promises. A cynic might say

Credit: Torphoto/Wikimedia Commons

The last of Canada's ***Iroquois****-class destroyers. HMCS* ***Athabaskan****, 19 April 2009.*

I'll believe they're really going to be built when the Prime Minister attends the keel-laying.

What of replacing the destroyers and eventually the existing frigates, with the Canadian Surface Combatant, or will that wait until the Liberal government balances the budget in 2050? Pardon me for expressing doubt, but while tuning in to Mount Olympus recently I heard an interview with Finance Minister Bill Morneau. He informed the interviewer that there was no intention for large defence capital expenditures until 2035. He may have been badly informed or he was telling the truth – I hope it was the former! Perhaps politicians actually believe destroyers, support ships and maritime aircraft last for 45 years (55 and counting in the case of the Sea King!) because that has become the norm in recent decades. In the case of the ships, they may continue to float and look impressive to the uninitiated alongside in their dockyards, but they have a propensity to develop cracks, undependable engines, or the odd unexpected fire due to the ravages of old age.

Such age-related issues are not the fault of their operators, who in my experience work very hard to squeeze the last few months and years out of their weary ships. It is the fault of uncaring politicians who don't believe that there are many votes to be won through defence spending, and who hope that these weapons will never be needed to defend the voters who elected them. In these increasingly uncertain times, I would prefer that the politicians spend the measly amount dedicated to defending Canadians in a more-timely manner, rather than pray the fleet is never needed to defend the country from a determined enemy. Perhaps they are also praying that President Trump will not hold Canada's feet to the fire to honour its promise to spend not 1% but 2% of Gross Domestic Product on defence?

With funding like that, the ORBAT could be fleshed out to adequate numbers composed of less arthritic ships.

Research and Development on Maritime Hybrid Warfare: It's in Canada's Interest

K. Joseph Spears

The President of the United States has called on Canada (and some other NATO members) to spend 2% of its Gross Domestic Product (GDP) on defence to meet its NATO commitments. There is no binding obligation under the North Atlantic Charter which has as its underpinning the collective defence of all 28 NATO member states. Presently Canada spends $20 billion a year on defence expenditures, and a major proportion of the government budget, which represents 0.9% of GDP. Canada takes the position that it is a strong NATO partner both historically and at present, and there will be no increased defence funding. Canada's political leaders argue that there are different ways to calculate the value received from defence expenditures and measure contributions to NATO not solely related to domestic defence expenditures. In the early part of the Cold War, Canada spent 7% of GDP on defence, much of it committed to NATO obligations in northern Europe.

The NATO discussion is a healthy one and highlights many issues in a rapidly changing and complex threat environment that the NATO alliance faces. Canada's ongoing defence review can provide a starting point for how Canada links research and development in its vital national interests which are interwoven with defence expenditures.

The defence review has been the subject of a number of articles.[1] The articles have examined national interests and the importance of defining these interests because they are the foundation on which an integrated foreign, security and defence policy rests. Arguably, this extends to Canada's commercial and international trade policy as well. All these issues are interconnected and interact in the national interest and real time.

One emerging area of defence which requires ongoing thinking and research and development is hybrid warfare. In general, commentators, scholars and military officers cannot agree on the definition of hybrid warfare. Leading naval thinker US Admiral (Retired) James Stravridis, a former NATO Supreme Commander, and now Dean of the Fletcher School of Law and Diplomacy in Boston, had this to say on the subject in a recent article:

> Given its need to appear somewhat ambiguous to outside observers, maritime hybrid warfare generally will be conducted in the coastal waters of the littorals. Instead of using force directly from identifiable 'gray hull' navy platforms, hybrid warfare will feature the use of both civilian vessels (tramp steamers, large fishing vessels, light coastal tankers, small fast craft, and even 'low slow' skiffs with outboard engines). It also will be conducted and likely command-and-controlled from so-called white hulls assigned to the coast guards of given nations.[2]

Credit: Petty Officer 2nd Class Corbin J. Shea, USN

An unmanned underwater vehicle surfaces to be recovered in the Arabian Gulf during bilateral mine countermeasures exercise between the US Navy and Royal Navy, 27 October 2016. The exercise was designed to provide an opportunity to share knowledge of techniques to respond to mine threats.

It is clear that hybrid warfare, also often called asymmetrical warfare, is not limited to land operations. Given Canada's research capabilities, this presents an opportunity to develop expertise and research and development on this topic in the maritime domain. Canada's navy has been at the forefront of innovation in years past, and Canada has a long background in marine domain awareness, space-based sensors, synthetic aperture radar, artificial intelligence and the fusion of data from a variety of sensor sources. As well, Canada has longstanding proven expertise in applied ocean science and remote sensing. Interconnected with this is the use of cyber-technology which is growing in importance in the marine domain. Maritime hybrid warfare could be the core of the NATO Centre of Excellence in Canada.

Canada has had a long involvement in remote sensing and developing unmanned systems for various applied purposes. This presents an opportunity for Canada to develop a hybrid warfare focus. Presently, through the National Shipbuilding Strategy, Canada is spending in excess of $30 billion on naval vessels. This industrial output is for domestic consumption for the Royal Canadian Navy and there is very little opportunity for potential exports as this is not new technology. However, this increased shipbuilding capability could be leveraged and serve as a catalyst for a new approach to maritime defence and create new opportunities for Canada in maritime hybrid warfare. In commercial terms, the NATO market alone is 28 countries. Canada's future actions should be guided by the words of Admiral Stravridis:

> The United States must start to consider its responses to hybrid warfare at sea, which may require developing new tactics and technologies, working closely with allies and partners, and

building U.S. hybrid capability to counter its deployment by other nations and eventually transnational actors.[3]

The development of technology and new ways of thinking and doctrine need to be integrated into addressing changing threats and changes to maritime warfare. Canada's investment in research and innovation could be leveraged into sales and cooperation with other NATO states that are all subject to the same maritime threats and who work together at sea. This presents a unique opportunity for Canada, and the creation of research clusters that bring together the scientific, academic and commercial communities is a step in the right direction. In Halifax, the Centre for Ocean Ventures and Entrepreneurship (Cove Centre) at the former Canadian Coast Guard base is moving forward to develop a marine sensor research cluster of academic institutions supported by government but does not at this time have a defence application.

Maritime hybrid warfare calls for a change in naval warfare and new thinking. It is in Canada's national interest to get involved on the ground floor. This mission and evolving threats present an opportunity for Canada to develop focused maritime expertise and research and development in a specific area. This would complement NATO's maritime capability to protect critical underwater infrastructure.[4] As well, a focused national approach presents an economic opportunity for Canada. This is especially so as Canada is a maritime trading state, and dependent on maritime transport for exports and imports.

Getting the Canadian research and development community involved in the study of hybrid warfare in the maritime environment could have many positive commercial and defence benefits. This could lever in the $30 billion expended in the NSS and create strong economic benefits for Canada. One of the most important results of developing a robust response to maritime hybrid warfare is that this will lead to increased stability in the global commons on which 90% of international trade flows. Like at Vimy Ridge in 1917, Canada is up to this maritime challenge which is a vital national interest.

Notes

1. See the Special Issue published by *CNR* on the Defence Policy Review, Vol. 12, No. 1 (2016). See also Chris Maclean, "Defence Portfolio to get a Real Shake-up?" *FrontLine Defence*, Vol. 13, No. 1 (2016).
2. Admiral James Stavridis, USN (Retired), "Maritime Hybrid Warfare is Coming," *US Naval Proceedings*, December 2016.
3. *Ibid*.
4. See K. Joseph Spears, "Protecting Critical Undersea Infrastructure," *Frontline Defence*, Vol. 13, No. 1 (2016).

We Need a Navy, Right?

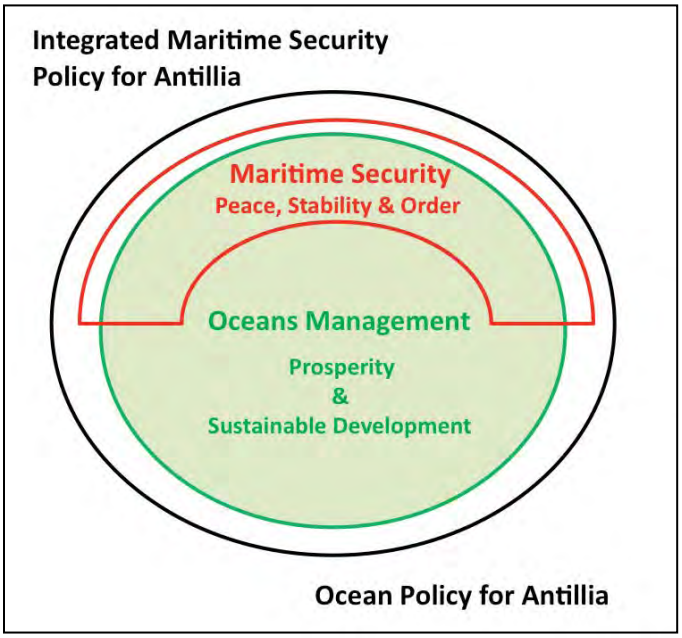
Bob Edwards

So, we need a navy. Right? Why not a coast guard instead – or do we need both? These are some of the questions overheard as training program participants begin work on developing a maritime security policy for 'Antillia,' a fictitious island state in the 'Lambent Sea.'

Neighbouring states are not unfriendly, but cooperation within the marine sector is virtually non-existent, and to the northeast lies Penagarria, a state with warlords and instability. The resulting piracy reaches into regional waters, and desperate migrants in unseaworthy craft pose a challenge to Antillia's leadership. Compounding the problem of confronting the multiple maritime threats facing Antillia are squabbles among government ministries for scarce funds, conflicting mandates and consistently poor on-scene coordination during marine incidents.

Each summer, Halifax's Dalhousie University hosts the International Ocean Institute (IOI) training program on ocean governance.[1] A diverse group of international participants from various marine-related disciplines are brought together for an intense interdisciplinary eight-

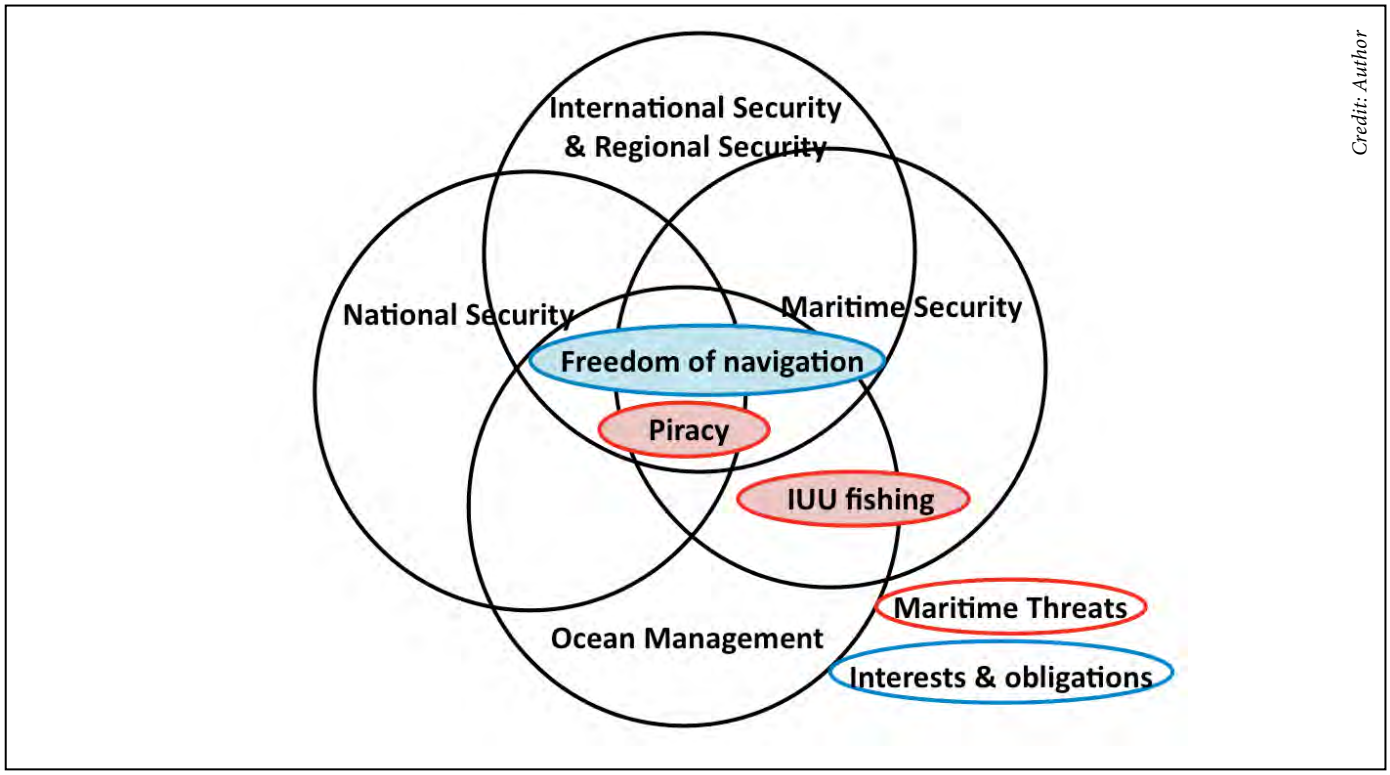
Figure 1. Maritime security as both an 'umbrella' over and an integral component of ocean management



Credit: Author

Source: Francois N. Bailet, Fred W. Crickard, Glen J. Herbert, ***Integrated Maritime Enforcement: A Handbook*** *(Halifax: Centre for Foreign Policy Studies, Dalhousie University and International Ocean Institute, February 2000), p. 5.*

Figure 2. Concepts and Principles



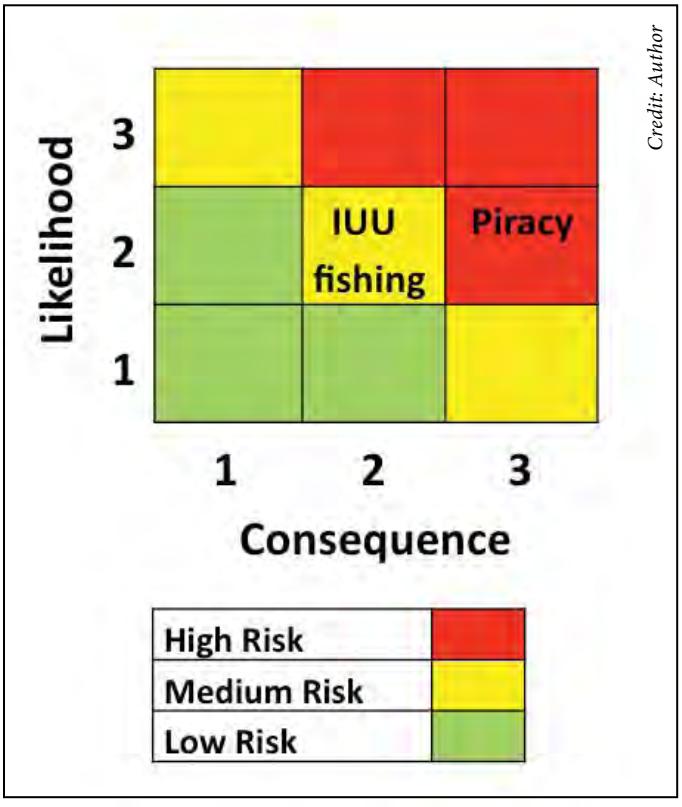
week program run by IOI-Canada, one of five IOI training centres worldwide. The program is aimed primarily at developing country mid-career professionals and has trained more than 680 people from over 100 countries – mainly from Asia, Africa, the Americas, the Caribbean and the South Pacific – since its inception in 1981.[2]

Conflicts and multiple users are ongoing features of ocean usage, so the IOI training program is grounded in the Law of the Sea Convention and international law. Prevention, response, cooperation and the peaceful use of the seas and coasts are ongoing themes.

The IOI program covers a range of thematic areas including: ocean sciences; integrated coastal and ocean management; fisheries and aquaculture; law of the sea and principled ocean governance; communication and negotiation; maritime security; marine transportation; and energy. A sophisticated program-long group simulation serves to consolidate the knowledge gained by the participants from these modules and has them form a national task force to develop an ocean policy for Antillia.

As part of this process, the participants must produce a maritime security policy which can then be integrated into the more comprehensive ocean policy document. A challenge for anyone thrown into group work is the issue of personal dynamics (been to Staff College?), but more

Figure 3. Risk Matrix
(IUU fishing = illegal, unreported and unregulated fishing)



so on this course with participants from very different backgrounds and cultures and, in some cases, representing states on different sides of current maritime disputes.

Prosperity and sustainable development within the marine sector require, of course, order and security on the oceans and along the coasts, and IOI's maritime security module with its policy exercise component addresses this important issue. In a way, the policy exercise is a legacy of the extensive work done at Dalhousie University by the Centre for Foreign Policy Studies (CFPS) since its founding in 1971.[3]

Among a number of ocean policy projects, the CFPS and Dalhousie University's Marine Affairs Program (MAP) produced a training manual in 1992 titled *An Integrated Approach to Maritime Enforcement*.[4] This was used as the basis for a workshop which was incorporated into MAP and IOI-Canada programs. The updated *Integrated Maritime Enforcement: A Handbook*[5] provides both a sound theoretical and practical basis, as well as the methodology, for the current IOI maritime security policy exercise, and adds the important compliance component, which includes ocean users such as industry and coastal communities, to the model.

The training program participants are asked what they think of this diagram showing the overarching necessity of stability in order to achieve prosperity (see Figure 1). The point is to engage the participants and force them to assess ideas and material critically to assist them as they work through the policy development phase. Further, although efforts are focused on the end result, it is really the *process* which is important.

Figure 4. Example of a Final Matrix Worksheet (SUR = surveillance, MON = monitoring, CON = control)

Maritime Security - Shortfalls & Excess Capabilities

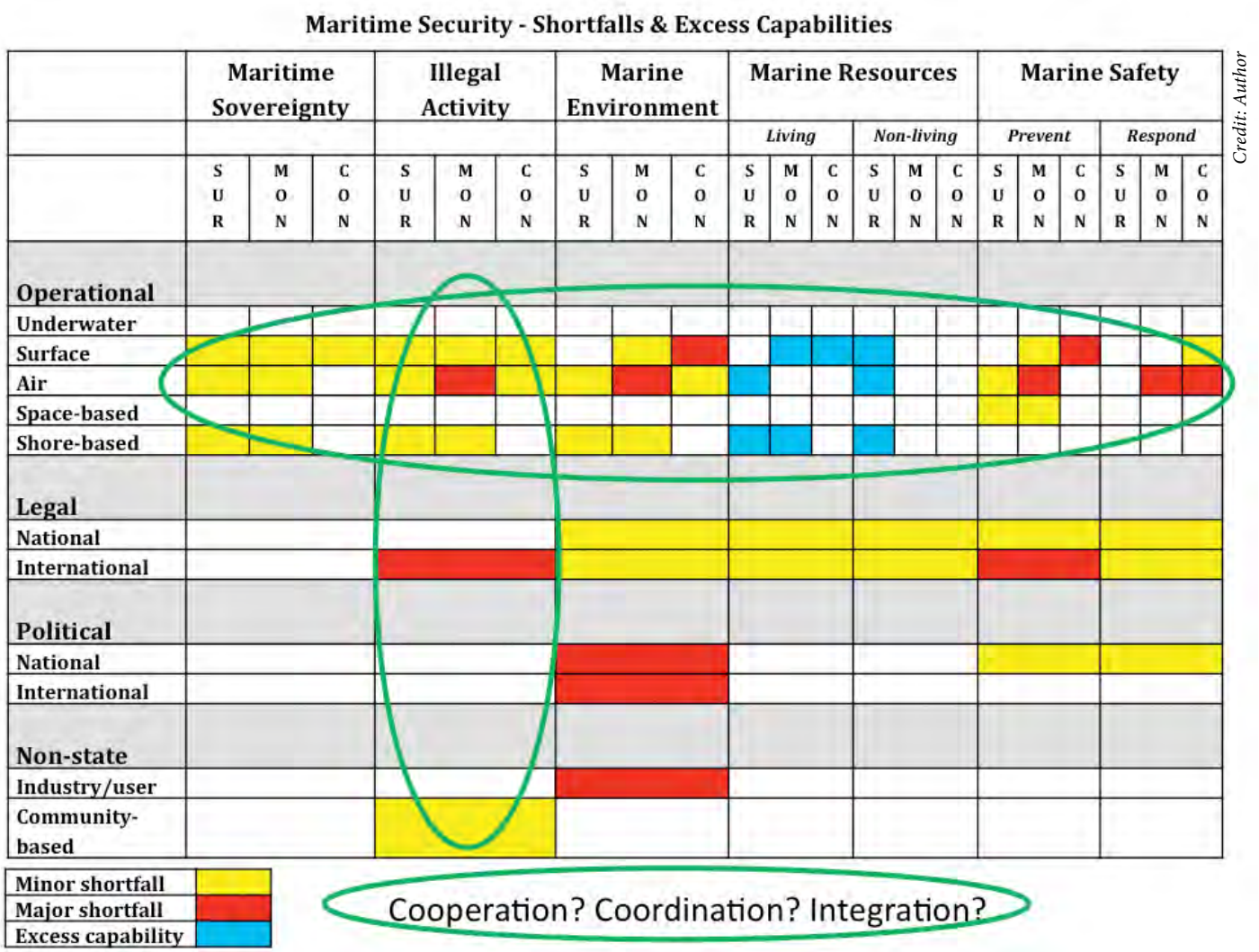
	Maritime Sovereignty			Illegal Activity			Marine Environment			Marine Resources						Marine Safety					
										Living			*Non-living*			*Prevent*			*Respond*		
	SUR	MON	CON	SUR	MON	CON	SUR	MON	CON	SUR	MON	CON	SUR	MON	CON	SUR	MON	CON	SUR	MON	CON
Operational																					
Underwater																					
Surface																					
Air																					
Space-based																					
Shore-based																					
Legal																					
National																					
International																					
Political																					
National																					
International																					
Non-state																					
Industry/user																					
Community-based																					

Minor shortfall	
Major shortfall	
Excess capability	

Credit: Author

Source: Worksheet adapted from Integrated Maritime Enforcement Matrix, in Francois N. Bailet, Fred W. Crickard, Glen J. Herbert, ***Integrated Maritime Enforcement: A Handbook*** *(Halifax: Centre for Foreign Policy Studies, Dalhousie University and International Ocean Institute, February 2000), p. 31.*

Figure 5. Point of departure for discussions about cooperation-coordination-integration.
(SUR = surveillance, MON = monitoring, CON = control)



Source: Worksheet adapted from Integrated Maritime Enforcement Matrix, in Francois N. Bailet, Fred W. Crickard, Glen J. Herbert, ***Integrated Maritime Enforcement: A Handbook*** *(Halifax: Centre for Foreign Policy Studies, Dalhousie University and International Ocean Institute, February 2000), p. 31.*

As the discussion proceeds, questions fly. What's the difference between a policy and strategy? *Canada's Oceans Strategy* leads off by stating it is a 'policy framework,' so what gives? What does 'integrated' mean in *Africa's Integrated Maritime Strategy*, and why doesn't it use the term 'cooperative' as in the US *Cooperative Strategy for 21st Century Seapower*? Guidance is provided rather than a definitive answer. And considering the participants' backgrounds, which are almost exclusively in non-security marine sectors, as well as the plethora of relevant material, efforts are made to concentrate on basic concepts, information and principles (see Figure 2).

Antillia has a navy and coast guard. But does it have the right balance of capabilities to counter the numerous maritime threats and protect its national interests? Is the navy too small, too big? As the discussion unfolds, the complexity of these issues sinks in. Talks move in a building-block approach from the make-up of a warship on to force structures, doctrine, costs, interoperability issues, and so on. Case studies and examples are used to draw out important lessons. Throughout, a focus is kept on what capabilities navies and coast guards provide across the spectrum of marine activities, and on the benefits of effective coordination between the two.

The analysis itself is straightforward. After identifying maritime challenges, threats, interests and obligations as they relate to Antillia's maritime security, participants move on to a risk assessment to prioritize maritime threats (see Figure 3).

The next steps involve completing two matrix worksheets using a numerical system to determine, first, what is needed and, second, what capabilities currently exist. These two matrices are then compared to determine shortfalls and excess capabilities, as shown in Figure 4. Figure 4 shows an example final matrix worksheet which shows shortfalls which need to be bolstered, and excess capabilities which can be reassigned or deleted.

Armed with an analysis of the threats and a good sense of Antillia's maritime interests and obligations under international law, along with a visual representation of capability shortfalls, the group can then progress to an informed discussion as it develops its maritime security policy. At this stage, the emphasis is on where efficiencies can be gained through cooperation or coordination, or even integration where possible, both horizontally across the range of marine activities as well as vertically within the operational, legal, political and non-state areas. Figure 5 provides a point of departure for discussions concerning cooperation-coordination-integration.

As the group continues its work, there is an interruption – a garbled voice message was received from the M/V *Super Puffin*. Something about being shadowed by a small vessel thought to be a pirate mothership. Last known position about 250nm to the northeast of Antillia. Of course, the national task force is preoccupied with policy development, but some have 'day jobs' as well within their ministries and are expected to respond in crisis situations. What to do? Later, word is received that foreign naval vessels have been spotted operating unannounced within Antillia's Exclusive Economic Zone. Is that allowed by international law?

And on it goes until the group finishes its work and presents its maritime security policy for Antillia. Understandably, the result is very much a work-in-progress, but it is always gratifying to see the participants' progress over the course of the exercise.

Back to the original question, we need a navy, right? To date, each training program has responded *yes*.

Notes

1. See International Ocean Institute, Training at IOI-Canada, available at http://internationaloceaninstitute.dal.ca/training.html.
2. International Ocean Institute, IOI-Canada, 2016 Course Report, available at http://internationaloceaninstitute.dal.ca/2016CourseReport.pdf.
3. For example, see John Orr, *Canada's Oceans Strategies Project – The Atlantic*, 3 July 2014, available at www.dal.ca/dept/cfps/Pillars/mspp/canada_s-oceans-strategies-project-the-atlantic.html.
4. Fred Crickard, Bruce Donaldson, Iain Stewart, Jeremy Conway, *An Integrated Approach to Maritime Enforcement: Training Manual* (Halifax: Marine Affairs Program and Centre for Foreign Policy Studies, Dalhousie University, 1992).
5. Francois N. Bailet, Fred W. Crickard, Glen J. Herbert, *Integrated Maritime Enforcement: A Handbook* (Halifax: Centre for Foreign Policy Studies, Dalhousie University and International Ocean Institute, February 2000).

Editor's Note: Please note that authors are welcome to provide their own photos and graphics, but in the absence of photos provided by the author, CNR will select the photos and captions to illustrate the material. In most cases, the authors are not responsible for the selection of photos and captions.

A View from the West:

Two Emerging Threats to Maritime Security: Climate Change and IUU Fishing

Diana Edwards

The Maritime Security Challenges (MSC) conference series is the pre-eminent maritime security conference in the Pacific region, providing quality proceedings and unique networking opportunities. The seventh iteration of MSC took place in Victoria, British Columbia, 3-6 October 2016, and garnered the largest and most diverse group of participants to date. The conference involved 184 delegates from 25 states, including 11 senior serving flag officers, as well as ambassadors, senators, retired and serving military members, and leading figures in the defence and security sectors. The proceedings of MSC 2016 featured diverse topics and panelists from many different countries, including the Commander, US Pacific Fleet, a Malaysian Vice-Admiral, the Philippines Permanent Representative to ASEAN, as well as many academics and industry experts.[1] A new addition to the MSC program was the Future Leaders Program, which ran parallel to the MSC conference proceedings. This program gathered mid-level naval officers and defence and security professionals from 11 countries to participate in a collaborative simulation exercise designed to foster new approaches to maritime security issues and strategies.

Credit: http://worldoceanreview.com

An armed unit of the South Korean Coast Guard arrests Chinese fishermen who have been fishing illegally in South Korean waters.

Although the conference happened several months ago, the topics discussed continue to reverberate. Delegates and speakers discussed what they thought were the most pressing emerging maritime threats, in particular what they thought was the pre-eminent threat. Of the many challenges discussed, a few brought intense debate. The two that will be discussed here are climate change and the growing issue of illegal, unreported and unregulated (IUU) fishing and how these two threats affect the maritime realm.

Climate Change

From a maritime security lens, climate change presents a tremendous threat. The danger of drastic, severe and unpredictable weather patterns and disappearing coastlines – even entire islands – brings unprecedented problems for all maritime countries. Since 2011 the world has experienced the most extreme weather in the past 500 years, with 2013 being one of the hottest years on record.[2] As well, the Arctic is melting at an unprecedented rate, which will lead to a dramatic rise in sea levels worldwide. The global sea level is expected to rise one metre by 2050[3] which will have significant impacts, especially on maritime states with low-lying coasts. Bangladesh, for example, which produces just 0.3% of global emissions is expected to lose 17% of its land mass by 2050, thereby displacing about 18 million people.[4] As well, the top five populations at risk from sea-level rise by 2050 – with a total 121 million people – are all Indo-Pacific countries.[5] Key infrastructure along coastlines, such as ports, will also be compromised, causing a serious impact to the shipping industry and the 90% of international trade which is transported by sea. An increase in the global ocean temperature and acidity will also have impacts, with increased production of toxic gases. This will increase the rate of climate change and hasten the destruction of fragile marine ecosystems, such as coral reefs, which will compromise food security for millions of people.

Shipping companies, navies and other maritime operators are now becoming increasingly aware of the potential for climate change to be a destabilizing force for maritime security and a global threat multiplier as climate change exacerbates other threats. As well as the threats to marine life and coastal communities, climate change can affect the water density, underwater acoustic properties and increase the severity of weather. All of these factors can have effects on naval operational ability, through instruments, crews and weapons. A 2014 US Navy (USN) report recognized the threat of climate change to its operational environment, including inhibiting amphibious landings, requiring more humanitarian response operations, greater demand for Arctic surveillance, etc.[6]

As the earth changes and coastal areas become submerged or inland areas experience desertification, another challenge presented by climate change is the potential for environmental refugees. The UN Refugee Agency reported that since 2008, 22.5 million people annually have been displaced due to changing climate or natural disasters.[7] It is estimated that this number will grow to 50 million environmental refugees by 2020, with a majority coming from Africa and Asia.[8] This is a highly troubling prospect, especially considering the already distressing maritime security situation in the Mediterranean and the political hesitance among European countries to tackle the growing problem. An important question for maritime security is how countries and their navies will deal with an ever-increasing refugee problem.

Illegal, Unreported and Unregulated Fishing

Discussions about maritime disputes often focus on the exploration of hydrocarbons and oil deposits. However, illegal, unreported and unregulated (IUU) fishing is an arguably more pressing issue, and has led to the depletion of stocks in many fisheries around the world. A study conducted 10 years ago predicted the complete collapse – meaning 90% of the baseline population has disappeared – of all fishing stocks by 2050.[9] More specifically, fishing stocks in members of the Association of Southeast Asian Nations (ASEAN) have been estimated to be 50% fully exploited, 25% over-exploited and 25% collapsed. The South China Sea (SCS) is home to 3,365 species of fish but in some places in the SCS fish populations are reported to have been depleted by 70 to 90% since 1950.[10]

Credit: Kadir Van Lohuizen/www.nytimes.com

Residents of Tarawa, the capital of Kirabati in the central Pacific Ocean, use sandbags to protect their homes from the rising sea. Extreme saltwater flooding and population growth have damaged supplies of fresh water and destroyed arable land.

Chinese boats being chased after alleged illegal fishing in South Korean waters in the Yellow Sea, 16 November 2011.

Given that 75% of the global fishing fleet comes from Asia, this exploitation of fishing stocks is troubling.[11] A collapse not only means the ruin of an industry that generates USD $225-$240 billion annually, but also the removal of a main source of protein upon which one billion people rely.[12] IUU fishing is one of the greatest maritime threats because it occurs throughout all types of fisheries, it can be associated with corrupt administrations, and can potentially exacerbate geopolitical concerns.

There are regular clashes over fishing in the disputed South China Sea, with most relating to disputes over the different definitions of borders. The SCS, while small in size, accounts for 12% of the global catch and is home to 1.72 million fishing vessels.[13] Reportedly, 30 to 50% of the fish catch there is unreported – apparently over 30% of the IUU fishing occurs in Indonesia alone.[14] And this does not include the 16.6 million tonnes of known catch.[15] This level of IUU fishing can have devastating maritime impacts. While cooperation on fishing in the region has been moderately successful – the 2000 Vietnamese-Chinese Gulf of Tonkin agreement is an example of cooperation – with so many competing interests, it's hard to imagine how a global fishing strategy could be negotiated.

Conclusions

These issues will not go away on their own, and the topics of climate change and IUU fishing should not be overlooked. They need to be researched and discussed, and policies/strategies need to be made and adopted. MSC 2016 presented a forum for delegates to discuss pressing maritime concerns. A key issue is the question of maritime borders – a factor in both climate change and fishing – and this came up in many discussions at MSC 2016. If each country has a different definition of where their borders lie, how do you define where you are legally allowed to fish? Fish do not respect borders and their migration is not encumbered by artificially generated political boundaries.

A similar issue comes up with regard to climate change. Given that pollutants also do not respect borders, who is responsible for addressing the growing issue? The question of responsibility and the significance of the impacts mean that climate change and IUU fishing will have important short- and long-term effects on navies, shipping industries and other maritime operators.

Notes

1. To see conference presentations go to http://www.mscconference.com.
2. Abhijit Singh, "Climate Change and Maritime Security in the Indian Ocean," *Journal of Defence Studies*, Vol. 9, No. 1 (January-March 2015), p. 64.
3. See the Intergovernmental Panel on Climate Change (IPCC).
4. Gardiner Harris, "Borrowed Time on Disappearing Land," *The New York Times*, 28 March 2014.
5. Singh, "Climate Change and Maritime Security in the Indian Ocean," p. 67.
6. US Department of Defense, "Climate Change Adaptation Roadmap," 2010 and 2014, p. 4, available at www.acq.osd.mil/eie/Downloads/CCARprint_wForward_e.pdf.
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Warship Developments:

Offshore Patrol Vessels

Doug Thomas

The Canadian Navy has conducted patrols in national waters to support other government departments for many years but it is overkill to dedicate a major warship to these tasks – these ships are expensive to acquire and operate. Destroyers and frigates can patrol very well, as they have large manpower resources, excellent ability to develop a recognized maritime picture covering a huge area, and can enforce laws and regulations if necessary. I remember a time in the early 1970s when the defence budget was reduced to the point that there was very little funding for at-sea training. The navy was happy to have fuel provided by the Department of Fisheries and Oceans to conduct patrols (Fish Pats), and it provided good training for the fleet at that time.

Since the late 1990s the Canadian fleet has included coastal patrol vessels – the 12 Maritime Coastal Defence Vessels (MCDVs) – built to provide mine-warfare capability and reserve sea training. They also conduct sovereignty patrols and routinely support the Department of Fisheries and Oceans. These ships have deployed well beyond their home ports of Halifax and Esquimalt, normally with a sister-ship for mutual support, to the Arctic, Caribbean, European waters and recently to West Africa for exercises and operations with allied states. They have many shortfalls: limited sea-keeping and speed (15 knots) and command and control capability. Some of the MCDVs have been manned with regular-force personnel which is an excellent way to maintain sea-going skills during a time of frigate modernization refits and pending delivery of the initial units of the Canadian Surface Combatant.

Many countries have coast guards or navies that greatly resemble the US Coast Guard (USCG). They operate primarily along their country's coasts, with tasks focused mostly on search and rescue, smuggling and fisheries enforcement, and their ships tend to be small and unsophisticated. Sometimes, as with the USCG, this force is composed of a considerable spectrum of capabilities, ranging from ships similar to frigates in size and capability to those designed to service aids to navigation (i.e., buoy tenders). Increasingly, we are seeing robust ships of frigate size with good sea-keeping capabilities, which span the middle of this spectrum and thus are capable of performing many naval and constabulary (i.e., law enforcement) operations. Whether on national missions or perhaps UN deployment, their main tasks are the protection of territorial waters, participation in global peacekeeping measures (such as anti-piracy patrols and escort in the Arabian Sea) and cooperation in crisis management. With such vessels, reliability, availability and minimum crew size are important factors. Long-range capabilities for patrol missions, good fuel efficiency and an adequate turn of speed for deployment to the operating area and while on patrol are essential.

An excellent example of a very capable offshore patrol vessel (OPV) is the four-ship *Holland*-class of the Royal Netherlands Navy. These ships are as big as the frigates

Credit: Mona Ghiz, MARLANT PA

*HMCS **Moncton**, a Maritime Coastal Defence Vessel, departing Halifax for Neptune Trident on 18 February 2017.*

Credit: Ministerie van Defensie Netherlands

HNLMS ***Groningen****, a* ***Holland****-class Offshore Patrol Vessel, 2 December 2013.*

that they have replaced, have a very small and economical ship's company of 50 (with space for another 40, such as boarding parties, medical teams, etc.), and good speed and endurance. They are well-armed with guns for constabulary duties but no sonar or missiles, and can embark a medium helicopter such as the NH-90 and high-speed launches which would prove very useful during anti-smuggling patrols in the vicinity of Dutch Caribbean islands – likely a principal area for operations.

The British *River*-class OPVs are also good examples of general purpose vessels, and perform an important role in the Royal Navy, both in European waters and British overseas territories where they perform constabulary and defence missions. These robust vessels are also being built for Brazil and Thailand.

The new Canadian Arctic/Offshore Patrol Ships (AOPS) are capable of distant operations anywhere in the world, but they are expressly designed for Canada's northern waters. Canada has the longest coastline of any state on this planet, with much of that in the far North. The AOPS have space for additional personnel, considerable storage space for food and spares, and the ability to put people and supplies ashore in remote areas, especially in the far North. They are very lightly armed however, and rather slow at 17 knots which is an adequate speed in the North but would impose limitations in more temperate waters when intercepting suspect vessels. To offset the ship's lack of speed, they can embark a high-speed launch and helicopters up to the size of the CH-148.

The AOPS is larger and certainly much heavier than other OPVs – much of the extra tonnage is required for an ice-reinforced hull designed to operate in first-year ice with occasional old-ice inclusions. Very few other countries have built OPVs as robust as these. Two of the exceptions

Credit: RCN

Artist's impression of the ***Harry Dewolf****-class Arctic/Offshore Patrol Vessel.*

are Denmark which has two classes of vessels with ice-reinforced hulls for operations in Greenland waters, and Norway with HNoMS *Svalbard*, the OPV which may have inspired the design of HMCS *Harry DeWolf* and five sister-ships.

Conclusions

The OPV is proving to be a very useful vessel, and they are replacing smaller frigates in a number of navies. These ships tend to be much less expensive to build and operate than frigates, but they are capable of performing many of the same peace-time tasks. Individual states tend to specialize in certain characteristics to fulfill national requirements – for example, the UK needs guard ships for the Falklands and perhaps the West Indies, while Canada and Denmark require vessels for operations in the far North. These ships will look quite different from each other, but they all have important roles and they all can be classified as offshore patrol vessels.

Book Reviews

Athenia Torpedoed: The U-boat Attack that Ignited the Battle of the Atlantic, by Francis M. Carroll, Annapolis, MD: Naval Institute Press, 2012, 218 pages, photographs, notes, index, $29.95 (US) cloth, ISBN 978-1-59114-148-8

Reviewed by Ken Hansen

The sinking of SS *Athenia* on 3 September 1939 was the inaugural tactical action of the Battle of the Atlantic. It was conducted by U-30, a Type VIIA submarine, commanded by KptLt. Fritz Julius Lemp. *Athenia* was bound from the UK for Quebec City and Montreal on a round trip of 24 days.

Francis Carroll, Professor Emeritus of History at the University of Manitoba, has delved deeply into the social aspects of the 1,102 passengers and 316 crew members onboard and explored the profound impact this had on them. He has done a very credible job of researching the lives and fates of a very good representative sampling of both the passengers and crew. The style of writing is smooth and integrated, providing a thoroughly enjoyable reading experience. Had he limited himself to this aspect of the story, it would have been easy to recommend this work highly. Unfortunately, about one-quarter of the book is devoted to the tactical action and its strategic consequences. This part relies mainly on secondary sources and some very dated analysis.

Carroll is clearly not a naval historian and the book is littered with errors of technical and procedural fact. A Type VIIA boat, U-30 was not "the workhorse of the early U-boat war" (p. 28). Only 10 in number, they were a developmental model before the more numerous Type VIIB (24) and the ubiquitous Type VIIC (568). U-30 carried 11 torpedoes, not 10, displaced 626 tons when surfaced, not 500, and developed 750-shaft horsepower on electric motors, not 350. Her torpedoes were not air powered, but the electric types G7eT2 (with a contact detonator) and G7eT3 (with a magnetic influence detonator).

The book's key question is why Lemp attacked a passenger liner when the international rules of submarine warfare forbade it and Kriegsmarine orders reinforced them. Despite repeated references to the Geneva and Paris international conventions and the Anglo-German Naval Treaty, none are cited in the bibliography. Also missing are key technical and biographical references, such as H.T. Lenton's *German Warships of the Second World War* plus Rainer Busch and Hans-Joachim Roll's *German U-boat Commanders of World War II*. Conspicuously absent is reference to the phenomenal uboat.net. Had the author consulted any of these, he may have come to different conclusions other than Lemp was "an impetuous submarine commander" and "Germany's U-Boat policy was both catastrophic and unsuccessful" (p. 158).

To be identifiable and claim protection under the Submarine Protocols, merchant ships were required to be brightly lit, remain in traffic lanes and not take tactical evasive measures. *Athenia* did none of these things. Under Admiralty orders, she was well north of the normal route, darkened and steering a zigzag evasive course. Clearly, the Admiralty had no faith that the treaty restrictions on U-boat operations would hold and had already abandoned them. Captain James Cook, Master of *Athenia* and a veteran of destroyers in First World War, ordered maximum speed (15 knots), despite the adverse weather (4-6 foot swells and whitecaps). The term 'danger zone' is used repeatedly but its tactical significance is never explained (p. 24).

It took Lemp three hours to close the range from about 10 miles to 1,600 yards when two torpedoes were fired at 19:40. *Athenia*'s speed would have given him less than a three-minute 'window' to slow, aim and make the final shoot/don't shoot decision. It was fully dark but a bright moon was rising. One weapon struck the ship, meaning it was a contact Type G7eT2, and the other malfunctioned, as did two subsequent torpedoes. Lemp closed the range to 300 yards and only then realized this was a passenger liner. At only 26, he was a young and inexperienced commander of a minor warship. He had made a mistake.

Athenia was indistinguishable from liners requisitioned as auxiliary warships. Fifty-six were under conversion by the first days of the war. Visual identification of individual identity under the conditions Lemp experienced was extremely unlikely. *Athenia*'s behaviour suggested an armed merchant cruiser or a troopship, both valid targets. Afterward, Lemp realized the mistake and expressed regret (p. 31).

Nazi propaganda attempts at denial of responsibility were characteristically clumsy and ineffective. Lemp carried on with his patrol and, despite having expended nearly half of his weapons, sank three other British ships and damaged the battleship HMS *Barham*. He was awarded the Knight's Cross in August 1940, misidentified as the Iron Cross in the photo caption showing him in company with Admiral Karl Doenitz, who had undoubtedly just presented it.

The Battle of the Atlantic shaped the nature of the entire war in Europe for both sides. When *Time Magazine* identified its 100 most influential figures of the 20th Century, it chose Karl Doenitz as the naval personage, because "he accomplished more with fewer resources than anyone else." This book does illuminate interesting human

aspects of the war's opening event. However, it clouds *Athenia*'s significance in outdated analysis and factual errors. For those reasons, I cannot recommend it.

21st Century Ellis: Operational Art and Strategic Prophecy for the Modern Era, edited by B.A. Friedman, Annapolis: Naval Institute Press, 2015, 150 pages, $20.90 (softcover), ISBN 978-1-61251-807-7

Reviewed by Colonel P.J. Williams

A colleague of mine who had formerly worked as part of the Department of National Defence (DND) Defence Renewal Team said that what was needed in teams such as his were people who could see the future. We prize this characteristic in folks working within the intelligence and the force development realms, although many of us plan on the assumption that either 'the money will be there' or that something will come up on a Friday afternoon! Even better, I would suggest, is someone who can predict the nature and form of future conflict, map out what is required and how such a conflict would be fought. This would also involve convincing those who can take the necessary actions to ensure one's forces are prepared and will prevail.

Lieutenant- Colonel Earl 'Pete' Ellis, United States Marine Corps (USMC) was such a visionary and it is he who is credited with developing the amphibious doctrine which the United States successfully employed in the Pacific Theatre in World War II. As part of its 21st Century Foundations series, the US Naval Institute Press, which seeks to give a modern perspective on the writings of past military philosophers and strategists, has in this volume combined all the major writings of this prophet whose legacy remains relevant today. Indeed, some say that his influence extended into areas of counterinsurgency, and that the USMC's initial doctrinal work in the field, *The Small Wars Manual* of the inter-war period, owes much to Ellis.

The editor of this book, a serving USMC officer, states that the genesis of this book came from another volume in the series on the noted US naval strategist Alfred Thayer Mahan. Ellis, by comparison is not as well known, particularly outside of amphibious circles. He was born in 1880, and as a young man he enlisted in the Marines and was eventually commissioned. He made a strong impression as a staff officer and attended the US Naval War College while only a Captain. He served in staff capacities in World War I, and came to the attention of many Marine leaders such as General John A. Lejeune (he of Camp Lejeune). Unfortunately, he also gained a reputation of being somewhat of an alcoholic. In the early 1920s he undertook a study of the Pacific and of the Japanese islands in particular, a period which no doubt influenced the writings for which he is most known. Sadly, he did not live to see the fruits of his writings, dying in 1923 on Japanese-held Palau. Alcohol was involved, though whether it was a deliberate act on the part of his hosts to sabotage his work is unclear.

Those parts of the book which analyse Ellis' writings are divided into five chapters, each covering a separate work by Ellis: "Bush Brigades" (1921); "Liaison and the World War" (1920); "Naval Bases: Their Location, Resources and Security" (1911/12); "The Advanced Base Force" (1912); and perhaps his best known work, "Advanced Base Operations in Micronesia" (1921).

Ellis showed a remarkable prescience in being able to predict, as early as the 1920s, that the United States would fight a future conflict against Japan in the Pacific. In his writings he also conducted detailed troops-to-task analysis of the types of landing forces that would be required for the inevitable amphibious assault that would be so integral to these operations. Key elements of the current concept of anti-access/area denial (A2/AD), the key precepts of air-sea battle and even the perils of information overload are also evident in Ellis's writings, over half a century before they became part of the modern military *lingua franca*.

The United States indicated that it was going to 'pivot' to the Pacific region to focus on new potential challengers, China in particular. This is the same type of environment of which Ellis wrote and thus the publication of this volume is very timely in that regard. From a wider perspective however, and perhaps more germane to Canada's force which cannot execute such regional shifts, the challenge is to determine the 'next big thing' in terms of future threats and prepare to meet it. We have cyber-threats/warfare and there's much talk of 'hybrid warfare,' but what are the challenges decades out, and where is Canada's own 'Pete' Ellis to help see the future? Highly recommended.

21st Century Sims: Innovation, Education, and Leadership for the Modern Era, edited by Benjamin F. Armstrong, Annapolis: Naval Institute Press, 2015, 162 pages, $19.80 (softcover), ISBN 978-1-61251-810-7

Reviewed by Colonel P.J. Williams

It seems that everything old is new again. In its *Wheel Books* series, the US Naval Institute Press has recently published some of its best writing over the last century, with volumes on naval leadership[1] and naval command.[2]

In a similar vein, it has also embarked on a new series, 21st Century Foundations, which seeks to give a modern perspective on the writings of past military philosophers and strategists. (See my review of Lieutenant-Colonel Earl 'Pete' Ellis above.)

Admiral William Sims (interestingly, born in 1858 in Port Hope, Ontario to American parents) was one of the foremost US naval thinkers of his generation. It was a reputation gained at a relatively early stage, when in 1902, he wrote a letter directly to President Theodore Roosevelt in which he was highly critical of US Navy (USN) gunnery procedures. The President subsequently ordered that Sims, then a Lieutenant (N), be appointed the USN Inspector of Gunnery Practice, a move which eventually enabled the USN to overtake the Royal Navy in gunnery skills in the early 20th century.

Later, as a Vice-Admiral, Sims commanded USN forces in Europe in WW I, and his account of that command, *The Victory at Sea*, won the 1921 Pulitzer Prize for History. His wartime service was also uniquely flanked by two tours as President of the US Naval War College.

The editor of this book is a serving USN officer and also the editor of *21st Century Mahan*, another volume in this series. His aim is to acquaint readers with Sims' writings, some over a century old, and to draw out the lessons from them. The book is organized into six chapters, each based on one of Sims' writings: "The Inherent Tactical Qualities of all-Big-Gun, One-Caliber Battleships of High Speed, Large Displacement, and Gun Power" (1906); "Military Character" (1916); "The Practical Naval Officer" (1916); "Military Conservatism" (1921); "Naval Morale After War" (1922); and "Promotion by Selection" (1934).

Each chapter is given context by the editor, who describes the circumstances of Sims' career at the point when it was written and the main issues that would have been shaping his thinking. The full article or essay is then reproduced. There's also an article, titled, "Sims the Iconoclast," by a former classmate of Sims, Harry A. Baldridge, written after Sims' death, and which notes that, "... the iconoclast is a blessing when he's steering a true course."[3]

From reading Sims' various writings, it appears that he was right on the mark on many occasions. Indeed, no less an authority that Alfred Thayer Mahan himself, perhaps *the* foremost US naval thinker of his time, deferred to the points Sims raised in the first of the writings mentioned above, an article which in itself was written in criticism of views expressed by Mahan on the same subject. In other areas, it becomes clear that Sims was ahead of his time in many respects, writing of the need, as early as 1916, for what we now know as 'mission command,' and in 1934 when he was critical of the USN promotion system then in use.

I found other aspects of Sims' writings to be similarly timeless. In "The Practical Naval Officer," he draws an analogy between football and war winning, stating that the three keys to success are well trained and led units, leaders trained in the art of war, and leaders who are mentally prepared for their roles. In "Military Character" he offers the advice that one should make a request of one's superiors only after they have had lunch! I'll have to try that one on my boss some time.

Sims' passion for bettering the US Navy is evident in all his writings. But be warned that his articles are not short by the standards of today's *Proceedings*, and indeed many take up more than 20 pages. The classics never go out of style, and despite the odd use of 'verily' and 'bedizened,'[4] Sims' articles maintain great relevance for the leaders of today. Highly recommended.

Notes

1. Thomas J. Cutler (ed.), *The US Naval Institute on Naval Leadership* (Annapolis: Naval Institute Press, 2015).
2. Thomas J. Cutler (ed.), *The US Naval Institute on Naval Command* (Annapolis: Naval Institute Press, 2015).
3. Original article Harry A. Baldridge, "Sims the Iconoclast," *Proceedings*, 1937. Quotation is from the article, which is reproduced in the book currently being review, p. 157.
4. Meaning, 'to be decorated or dress up gaudily.' Try that one in your next briefing note!

A Handful of Bullets: How the Murder of Archduke Franz Ferdinand Still Menaces the Peace, by Harlan K. Ullman, Annapolis, Maryland: Naval Institute Press, 2014, 226 pages, index, ISBN 978-1-61251-799-5

Reviewed by Ann Griffiths

Since 2014 there has been much discussion about the First World War – the War to End All Wars – as we commemorated the 100th anniversary of its beginning. It's remarkable that this war continues to resonate in our world.

As we all know, the assassination of the Archduke Ferdinand (and his wife Sophie) in Sarajevo in June 1914 was a catalyst to the war. In the Introduction to *A Handful of Bullets*, Harlan Ullman asks "[d]id the archduke's death bequeath other, less visible legacies that have transformed and even revolutionized the geopolitics of the twenty-first century?" Answering this is the focus on the book. Ullman argues that there were three major hidden legacies of the war: (1) the end of the old order created by the Congress of Vienna in 1815 which had established peaceful relations among European powers; (2) the beginning of the unraveling of the Westphalian state system; and (3)

the creation of "Four New Horsemen of the Apocalypse" (failed or failing states; economic despair, disparity and dislocation; radical ideologies; and environmental calamity). *A Handful of Bullets* "tells the story of how these three legacies have induced profound transformations, created new vulnerabilities (and opportunities) while exacerbating older, traditional threats" (p. 4).

According to Ullman, the major threat to the United States (and the West in general) is the first Horseman – failed and failing states (pp. 4-5). But he discusses the threats posed by all four of the Horsemen. He argues that there are now many potential archdukes and many bullets in the world, any of which could trigger a new war. Ullman notes that the events of 9/11 are a modern-day equivalent of this fundamental moment in history, with Osama bin Laden as the assassin.

The beginning of the end of the Westphalian system unleashed by WW I comes from the fact that with the action of one man, and the death of one man, states were no longer the only actors that could have major effect on the world. Ullman argues that since then this trend has only been magnified. The United States used to be able to protect itself by its geographic isolation or its ability to spend its way out of trouble via its military. This is no longer the case as threats are not state-based, states don't control the means of force, and power is diffused. Thus the self-immolation of one man in Tunisia could unleash the Arab Spring, and years of unrest in the Middle East. Ullman argues that "governments seem incapable of understanding and keeping up with these and other consequences rising from a more complex, complicated, globalized and tightly interconnected and interdependent world" (p. 4). Governments, he says, now need to *think* their way out of danger, not *spend* their way.

In the Conclusions, Ullman spends time discussing how the US federal government is unprepared to deal with the complexities of threats in the modern world. He points to the all-out conflict between the political parties, the untrammeled role of money in election campaigns and the fact that people who become presidents do not have the experience or expertise to deal with complicated foreign policy issues. His recommendation for a solution to the many archdukes and the many bullets in the world is that the United States needs to think, and to think strategically. Unfortunately, given the state of American governance right now, that seems unlikely.

This book is extremely interesting. My only criticism is that it's very repetitive – he makes the same point, in the same words, over and over. Nonetheless, it's an excellent argument, and perhaps we need to be beaten over the head with it, made by an astute and experienced scholar.

Fremantle's Submarines: How Allied Submariners and Western Australians Helped to Win the War in the Pacific, by Michael Sturma, Annapolis, Maryland: Naval Institute Press, 2015, 248 pages, US $32.95 (hard cover), ISBN 978-1-61251-860-2, also available as an e-book

Reviewed by Colonel (Ret'd) Brian K. Wentzell

Professor Michael Sturma has taken a different approach in his recounting of the submarine war in the southwestern Pacific Ocean from March 1942 through to the Japanese surrender in 1945. The analysis is neither a top-down assessment of naval strategy, nor a bottom-up analysis of the success or failures of naval tactics employed by the US Navy and its allies against the Japanese naval and military forces that controlled a vast area stretching from Indonesia and Malaya through the Philippine Archipelago by March 1942. Rather, he has approached the subject through an engaging discussion of individual personal experiences of military members and civilians during these years. Thus, he has created an unusual perspective that should interest political science students and military historians. In essence, multiple human faces of war are revealed.

This book will not answer all the questions that a reader may have about the organization, ships, equipment and activities of the United States, British and Dutch submarine forces. However, it provides a good base for further investigation by those interested in exploring particular issues or events. The allied naval strategy is discussed, but the relationship of the war at sea with the people of Western Australia is the real subject of this book. This is important because such military-civilian relationships are not frequently discussed in the literature. For example, Newfoundlanders experienced a similar set of conditions when their Dominion supported the naval and military bases and operations of Canada and the United States during and following World War II. There is an opportunity for a comparative analysis to be undertaken of the resulting life-long personal, social, political and economic relationships.

I recommend this book as an informative, easy-to-read text that should prompt some comparative research in Canada.

Have you read an interesting book lately? If so, send us a review. Is there a book you'd like to read? If so, contact us and maybe we can get it for you.

2017 Canadian Naval Memorial Trust Essay Competition

Canadian Naval Review is holding its annual essay competition again in 2017. There will be a prize of $1,000 for the winning essay, provided by the Canadian Naval Memorial Trust. The winning essay will be published in *CNR*. (Other non-winning essays will also be considered for publication, subject to editorial review.)

Essays submitted to the contest should relate to the following topics:

- Canadian maritime security;
- Canadian naval policy;
- Canadian naval issues;
- Canadian naval operations;
- History/historical operations of the Canadian Navy;
- Global maritime issues (such as piracy, smuggling, fishing, environment, human migration via the sea);
- Canadian oceans policy and issues;
- Arctic maritime issues;
- Maritime transport and shipping.

If you have any questions about a particular topic, contact naval.review@dal.ca.

Contest Guidelines and Judging

- Submissions for the 2017 *CNR* essay competition must be received at naval.review@dal.ca by **Monday, 12 June 2017**.
- Submissions are not to exceed 3,000 words. Longer submissions will be penalized in the adjudication process.
- Submissions cannot have been published elsewhere.
- All submissions must be in electronic format and any accompanying photographs, images, or other graphics and tables must also be included as a separate file.

The essays will be assessed by a panel of judges on the basis of a number of criteria including readability, breadth, importance, accessibility and relevance. The decision of the judges is final. All authors will be notified of the judges' decision within two months of the submission deadline.

An Omani Navy corvette ONS *Al Rahmani* outward bound from Portsmouth Naval Base, UK, 27 June 2013 and still in builder's hands and flying the British Merchant Navy Red Ensign. *Al Rahmani* is a *Khareef*-class corvette built by BAE Systems in Portsmouth.

Credit: Brian Burnell/Wikimedia Commons