CANADIAN NAVAL REVIEW

VOLUME 11, NUMBER 1 (2015)

The Russian Federation Navy Post-2015: Implications for Western Navies

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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: UK Ministry of Defence

Here come the submarines! Pictured is HMS ***Ambush*** *returning to HMNB* ***Clyde*** *in Scotland 15 July 2013.* ***Ambush****, second of the nuclear-powered* ***Astute****-class attack submarines, was launched on 5 January 2011.*

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Time for Genuine Engagement

The commemoration, in the same two-year cycle, of the death of Winston Churchill, the beginning of World War I and the end of World War II does not obscure the harsh reality of the growing instability in large parts of the world. In fact, these historic anniversaries should remind us all of the costs of miscalculation, delay and avoidance in the face of genuine threats. From Sudan to Ukraine, Gaza to Kashmir, Syria and Iraq, Somalia and Nigeria, instability, random and planned violence are proliferating. While many of these acts of aggression are purported to be happening in the 'name of Islam,' it is largely Muslims who are dying. And turning away when innocent civilians of any faith are slaughtered because of their denomination or because of their politics is not an option for the civilized world, as we found out during and after World War II.

Dithering in the face of evil is never a virtue. Modest engagement against all-out violent evil only encourages the dark and criminal forces arrayed against civilian and civil populations everywhere. While careful foreign and defence policy requires sensitivity to and facility with nuance, using nuance as a refuge from necessary action and commitment is really about the absence of defence and foreign policy altogether. There is no nuanced riddle to young criminals who behead, burn alive and slaughter civilians as a regular part of their so-called 'jihad.' Not engaging with the full force of the civilized world's capacities is the worst kind of abdication. The governments and democracies of the western world are flirting with this kind of abdication.

Linked-up terrorist armies espousing a murderously arcane and extreme jihadi doctrine found nowhere in the Quran are on the rampage in Syria, Iraq, Libya, Somalia, Nigeria, Mali and Yemen, killing, beheading, raping, kidnapping and marauding. In Libya, the ISIS beheading of Coptic Christians is an ominous predictor of what would transpire if Libya is used by ISIS as a jump-off point for southern Europe. Allied air strikes have slowed the tempo of ISIS forces in Syria and Iraq but are absent, for political and logistical reasons, elsewhere. The 'coalition of the willing' involving Gulf Cooperation Council countries and some NATO members seems more like the 'coalition of the partially engaged.' ISIS clearly has designs on Lebanon, Egypt and other countries in the region. It uses its terror, cruelty and anger to entice a stream of unemployed, young, largely male recruits attracted to the 'up against the established powers' claim (however

Credit: LA (Phot) Stuart Hill/MOD

Ships from the United Arab Emirates, Qatar, Bahrain, United States and the United Kingdom participated in a joint exercise in the waters of the Arabian Gulf in January 2010.

fraudulent) of the ISIS forces plus the chance to be wildly violent without any fear of being brought to justice. Not unlike the Waffen SS, ISIS uses violence, torture and beheading to establish its authority, intimidate its enemies and placate the criminals and gratuitously violent and cruel among its numbers.

As the balance between stability and chaos becomes more uncertain in the Middle East and Africa, Russian and Chinese military build-ups continue at a rapid and concerning pace. Most NATO countries, including Canada and the United States, have reduced defence expenditure by five to 20 per cent. As China and Russia increase naval procurement, the UK and United States are cutting their fleets. And Canada's endlessly dragged-out shipbuilding strategy appears to exclude any near-term arrival of ships to bolster the tiny fleets operating on either coast. With previously modest deployability abroad, naval, Special Force and air engagements in the Middle East and in the NATO countries of Eastern Europe, while professional, competent and well-intentioned, are minuscule and token.

In the beginning and in the end the capacity to deploy and defend in a meaningful way is about a mix of air, land and sea resources that can protect coastlines and trade routes, project power and protect core interests in the near and far abroad. When, some years ago, warlords and pirates in their employ interrupted shipping off the coast of Somalia, there was a unified naval response that acted to engage and constrain. Canadian surface combatants at sea and RCN Reserve specialists in communications worked in

unison with allied NATO and European Union navies to bring this threat under control. Maritime freedom and balance are lifelines for global security and survival.

There is no way to look at ISIS and its Al Shabaab, Boko Haram and Al Qaida confederates other than to conclude that we are at war and that enemy combatants will stop at no land or sea border in their violence. And if we look at Russian aggression in Crimea and proxy combat in Ukraine then we must conclude that we may well be facing another front. We need, with our allies, to prepare.

War is never a first or second choice. It is always and justifiably a last choice. But not preparing usually leaves countries with little choice. And the first choice must always be having the capacity to fight one's enemies as far away from one's own soil and territorial waters as possible. This requires enhanced naval, Special Force and long lift capacity. Canada should procure quickly any surplus, modern ships from friendly navies that have cut back. The new Minister of National Defence needs to push Public Works and Treasury Board colleagues to get off the dime and acquire combat ready ships now – not in five years. A Cabinet War Committee should be formed. A National Security Council should be assembled. Opposition leaders should be regularly briefed, in confidence, on relevant intelligence and engagement developments. Contingency plans must be detailed and exercised.

To use the ever-present hockey metaphor in Ottawa, Canada cannot poke-check its way through the war in

*Should Canada expedite the lease or purchase of two Fast Combat Supply Ships, like USNS **Bridge** (T-AOE 10), which could be available from the US Navy?*

*HMS **Al Siddiq** of the Royal Saudi Naval Forces participated with Combined Task Force 152, working with various ships and headquarters staff from the Gulf Cooperation Council (GCC). This was a coordinated operation to deter criminal and terrorist activity in the Gulf region, March 2015.*

the Middle East, north Africa and sub-Saharan Africa, or against the historically driven and classically authoritarian Russian hostility and aggression in its near abroad. We must be ready, with the rest of NATO and other allies, to engage fully to the extent of our real capacities: politically, intellectually, militarily and strategically. That has been the Canadian way on land, above and under the sea and in the air in both World Wars, the Korean War and the Cold War. Containing a threat does not mean either minimizing or ignoring it. It means facing it, with all the imponderables and uncertainties, head on.

If there is a diplomatic sort-out with Russia in Eastern Europe that respects NATO democracies, Ukrainian self-determination and respect for Russian borders and minorities, it should be attempted. But its chances for success, without clear NATO strike and defence capacity that is taut, exercised and ready, is slim. The end of the Cold War, which happened without shots being fired, occurred because of a mix of internal Soviet economic pressure and NATO's steadily building theatre and strategic deployability.

Keeping Gulf Cooperation Council states and air forces and armies on side, along with Egypt and Turkey, against the explosive ISIS menace can be sustained if NATO and a genuinely strategic coalition of the willing are fully engaged.

Creating a frame for a peaceful accommodation among Japan, China and the Philippines over aggressive territorial assertions by China requires an active naval presence by Pacific countries, of which Canada is one. A genuine peace is always about a demonstrable balance of power. Canada and its allies must step up before authoritarian, terrorist or revanchist entities do away with any hope of peace at all.

Hugh Segal

The Russian Federation Navy Post-2015: Implications for Western Navies*

David Rudd

Credit: Mitsuo Shibata/Soviet Military Power, 1986, Defense Intelligence Agency

*A starboard bow view of the Soviet **Kirov**-class nuclear-powered guided-missile cruiser **Frunze** underway, 25 March 1986.*

In the wake of the crisis in Ukraine and the general deterioration of relations between Russia and NATO, Western strategists and policy-makers must consider how to deal with what appears to be a revanchist and opportunistic Russia. The seizure of Crimea, a poorly-concealed intervention in eastern Ukraine, and statements that Moscow would intervene on behalf of Russian-speaking populations outside Russia proper, are challenging the notion held in much of the West that great power confrontation in the Euro-Atlantic space is a thing of the past.

While it may be premature to characterize naval capability development in Russia as a build-up, efforts to arrest and reverse the post-Cold War atrophy of the Russian Federation Navy (RFN) are underway. In what might be more accurately termed a slow rebirth, the RFN has been the recipient of greater attention from the Kremlin in terms of policy direction and investment since the early 2000s. The navy's short-term force development priorities are discernible, as is its overall strategic purpose. The Royal Canadian Navy (RCN) and allied counterparts should take these matters into account as they contemplate their own future.

Policy Context

A combined reading of the Russian National Security Strategy (2009), Military Doctrine (2014) and Foreign Policy Concept (2013) reveals that Russia sees four external threats: NATO expansion; the deployment of ballistic missile defence capability in Europe; regional and local wars on Russia's borders; and terrorism/radicalism.[1] Collectively, the policy documents illustrate a perception of insecurity and vulnerability in the face of Western technological superiority, soft power and military operations in areas of interest to Russia. The policy tone is decidedly more anti-Western/American and considerably more nationalist than in the previous decade.

The purpose of the RFN and its place within the country's security hierarchy is defined at the highest level by the National Security Strategy. This document outlines that security is derived from various elements of national

power including, *inter alia*, defence against foreign and domestic threats, socio-economic growth for citizens, and advances in science and technology.[2] Military (and naval) spending is regarded as one means of achieving these ends.

Although Russia has not articulated a naval doctrine since 2001, the 2010 Russian National Maritime Policy made an oblique yet important reference to naval strategy. It observed that unfettered access to the world's oceans was essential to Russia's economic well-being and that beyond the critical tasks of defence and deterrence, the RFN could undertake maritime peace support and humanitarian operations, maintain freedom of the seas, and engage in naval diplomacy. In contrast to the defensive/nationalist undertones in Russian defence and security policy, this reflects an outward-looking, potentially cooperative approach to maritime security not unlike those of Western states.[3] Indeed, the RFN has been an active contributor to anti-piracy operations in the Gulf of Aden since 2007. However, Russia's disinclination to attach its ships to either NATO or European Union naval task forces suggests that while there is a common interest in assuring good order at sea, Russia prefers to act independently to achieve this, thereby avoiding any appearance of subordination to the West.

Credit: Photographer's Mate 1st Class William R. Goodwin, USN

On 6 May 2010, Russian naval infantry from ***Marshal Shaposhnikov*** *rescued the tanker MV* ***Moscow University*** *which had been hijacked by Somali pirates off Socotra Island. Here* ***Marshal Shaposhnikov*** *enters Pearl Harbor for a port visit in October 2003.*

The Arctic and Pacific Oceans are considered to be the most important maritime thoroughfares for Russia. Access to and development of the Northern Sea Route, the Arctic continental shelf and port infrastructure in the Russian Far East are considered critical to facilitate intercontinental trade through Russian waters, the exploitation of untapped natural resources, and to give Russia options for dealing with the shift of the global economic and strategic centre-of-gravity to Asia. Like the desire to match US nuclear capabilities, these politico-economic considerations will influence the contours of RFN capability development.

The small Baltic and Caspian Sea Fleets are destined for capability renewal due to oil and gas infrastructure located there, although re-capitalization will favour smaller vessels rather than ones capable of expeditionary operations. A Black Sea-based Mediterranean *Eskadra* of five to 10 surface vessels as well as submarines may also be expected to take shape. This notional formation may be useful for showing the flag, maintaining economic ties with littoral states and pursuing training opportunities. It would also allow Moscow to probe international naval reaction/readiness at a time when virtually all Western navies are struggling with budgetary austerity.

Russian naval manoeuvres reflect both an attempt at outreach to partner states, as well as the conduct of what could be called assertive naval diplomacy. Russo-Chinese manoeuvres in the East China Sea took place in May 2014, while exercises in the Black Sea a month later may have been staged in part to warn Western states about intervening militarily in the Ukraine crisis. Some recent deployments have caused consternation among Western states, including that of an *Akula*-class attack submarine to the Gulf of Mexico in 2012, and the transit of a task force, including the missile cruiser *Pyotr Veliki*, the aircraft carrier *Admiral Kuznetzov* and several escorts, through the English Channel in May 2014. The deployment of a naval task force off the coast of Australia during the G20 summit likewise did not go unnoticed. These and other drills seem to bear out the statement of a former US Chief of Naval Operations, who told a congressional sub-committee in 2011 that "the Russian navy is moving again."[4]

Capability Investment and Development

Until the recent sharp drop in the price of oil and the value of the rouble, it seemed clear that the RFN would not lack budgetary support in the short to medium term. Indeed, President Vladimir Putin had re-confirmed the Kremlin's commitment with a (US)$130 billion allocation up to 2020.[5] But aside from the price of fossil fuels – upon which Russia's economy and re-armament plans heavily depend – the greatest challenge to the renewal of the RFN is the ability of the defence-industrial base to deliver new, technically-advanced naval vessels while maintaining existing ones. Cuts to research and development after the end of the Cold War meant the RFN lost ground to other navies in both qualitative and quantitative terms.


Credit: Xinhua

Chinese President Xi Jinping (left) and Russian President Vladimir Putin shake hands with members of the naval forces from both countries before the launch of the China-Russia Joint Sea-2014 exercise at Wusong naval port in Shanghai.

After 2000, over-capacity in the shipbuilding sector was met with a vigorous consolidation drive. But since this process was state-led and in response to primarily domestic demand, there has been little incentive for surviving firms to achieve production efficiencies on par with their Western counterparts.

An ageing labour force, a lack of up-to-date skills and old production machinery and infrastructure could also impede development or renewal of certain key systems such as aircraft-capable ships and other large surface combatants. A large portion of the current Russian fleet will almost certainly face decommissioning by the middle of the next decade. As some of these units are considered to be the RFN's most capable, the loss will be qualitative and well as quantitative. The short-term implications of this may include reduced (or tiered) readiness across the fleet, and the repeated appearance of 'showcase ships' on international manoeuvres.

Another major challenge is recruiting and retaining adequate personnel to operate and maintain the future fleet. The professionalization of the Russian Armed Forces allowed for the enforced retirement of a large portion of the legacy officer corps, with a simultaneous retirement of older hulls. However, efforts to achieve desired personnel levels (one million positions across the various services) will be impeded by unfavourable demographics combined with the need to foster technical proficiency to operate advanced systems. There will be pressure on authorities to find adequate numbers of personnel with the requisite skills for specialized naval trades, and to persuade them to choose the navy over the private sector. It should be noted, however, that over the past few years there has been "a dramatic increase in Russian naval-school enrolment."[6]

The jewel in the RFN's crown continues to be its submarine fleet. In keeping with the primacy of nuclear weapons in the country's defence, a new generation of nuclear-powered ballistic missile-firing (SSBN) boats and advanced attack submarines (SSN) are in development. Eight *Borei*-class SSBNs (each with 16 Bulava inter-continental ballistic missiles, which are still in development) are planned, as are eight *Yasen*-class SS(G)Ns. The latter are equipped with highly advanced quieting technologies and will be armed with long-range cruise missiles and the super-cavitating VA-111 *Shkval* torpedo. These units will serve alongside ageing yet still-capable Delta IV SSBNs and *Akula*-class SSNs, providing a respectable degree of strategic deterrence, long-range sea control/denial and land-attack capability to the Northern and Pacific Fleets.

For operations in Russia's near abroad, the RFN diesel-electric submarine (SSK) fleet is composed of 17 *Kilo*-class boats, with another six 'improved' *Kilos* entering service. Armament includes torpedoes, anti-ship missiles and, interestingly, surface-to-air missiles to defend against anti-submarine warfare (ASW) aircraft. All RFN fleets (except the land-locked Caspian) will receive these latter units, with the first to be based in the Black Sea to buttress task group operations there and in the Mediterranean. A trio of more advanced *Lada*-class units – with air-independent propulsion – are due to enter service by 2019.

The renewal of the surface fleet will include the commissioning of different classes of multi-mission escort-type vessels. For medium-range operations, up to 20 of the 4,000-ton *Admiral Gorshkov*-class general-purpose frigate will be built. Concurrently, up to 20 of the 2,200-ton *Steregushchiy*-class guided-missile corvettes are to enter service for operations closer to shore. Both are intended to match the stealthy designs and advanced combat systems of contemporary Western ships.

Although the Kremlin had high hopes to build and service larger units, Russia's industrial incapacity has compelled it to source some from foreign builders. A novel joint construction project was to have seen a pair of *Vladivostok*-class helicopter landing platforms acquired with assistance from French shipbuilder DCNS. It was anticipated that an additional two units would be built in Russia. This looks unlikely given international concern over the ongoing crisis in Ukraine and the pressure being exerted on the French government to delay or cancel the original order. For the moment, domestic industry will furnish smaller amphibious ships suitable for short-range operations. These will give the RFN the ability to influence matters along Russia's borders, including along the northern Black Sea coast.

Credit: Royal Navy

*HMS **Dragon** (foreground) with the Russian **Kirov**-class battlecruiser **Pyotr Velikiy**. The RN warship tracked and met up with a Russian task group off the coast of Brest as it entered the English Channel to sail north, 7 May 2014.*

The same industrial challenges have forced the RFN to walk back on plans to build and/or maintain more complex combatants for blue-water operations. The fixed-wing aircraft carrier *Admiral Kuznetsov* is being re-fitted for further service, but any plan to build new, larger carriers does not yet have political support. And while the formidable *Pyotr Veliki* will likely be joined by her modernized sister, *Admiral Nakhimov*, in 2018, senior officials seem to have discounted the possibility that any more missile cruisers will be built. Instead, the RFN may take a page from the US Navy playbook and design an advanced, multi-purpose destroyer that could deliver air defence and surface attack capability in a smaller and less maintenance/manpower-intensive package. This would seem logical given the pending obsolescence of the current *Udaloy*- and *Sovremenny*-class destroyer fleets which, along with the ageing cruisers, have given the RFN its strategic reach.

One of the most significant (non-)developments is the apparent lack of attention paid to underway replenishment. The ageing stable of RFN auxiliaries does not seem to be the subject of a re-capitalization plan. Possible explanations include the lack of capacity of the ship-building industry to do concurrent work, the priority the government attaches to operations closer to home, and the hope that Russia will be able to secure logistical support from friendly states. Still, failure to address this deficiency could impede the deployment of surface task groups drawn from the Northern and Pacific Fleets.

Possible Implications for the RCN and Allied Navies

What Russia's naval renaissance means in strategic terms for the West is difficult to discern. It does not point definitively toward competition, confrontation, or limited cooperation at sea, any of which could occur in the years ahead. A period of modernization after years of stagnation may be natural and not cause for undue concern. Indeed, building smaller surface combatants instead of replacing the ageing stable of larger ones indicates that an offensive naval posture is not the desired end – at least in the short term. It may also reflect Russia's perception of itself as a Eurasian (i.e., land) power where trade and prosperity are less dependent on use of the high seas. (Notwithstanding the importance attached to the Northern Sea Route, Russia's main export continues to be delivered by overland pipelines.) If this is so, one should not expect that the RFN will have first call on defence procurement funds in the medium or long term. One exception could be additional investment in the sea-based arm of Russia's nuclear deterrent, which Putin regards as a sign of national virility.

Still, the determination of the Kremlin to minimize Western influence its near abroad and to take swift military action when it perceives its great power prerogatives are being challenged (i.e., Ukraine 2014, Georgia 2008) may portend a renewed drive to assert primacy in waters shared with Western states, such as the Black and Baltic Seas. Western naval planners will need to ponder how the assertive nationalism expressed at the highest levels of the Russian government might influence the country's naval strategy, to say nothing of the actual conduct of RFN operations. Close encounters at sea and in the air, or brief incursions into Western territorial waters (occasionally

Credit: Schekinov Alexey Victorovich/ Wikimedia Commons

*The Russian **Borei**-class ballistic missile submarine, **Yury Dolgorukiy** (K-535), during sea trials.*

Credit: Wikimedia Commons

The new generation Project 22350 frigate ***Admiral Gorshkov*** *(hull number 417) for the Russian Navy, 9 November 2014.*

backed up by information and cyber operations against allied and partner governments) could become the new norm.[7]

To help minimize the effects of recent political tensions, all parties should re-commit to the principles of safe navigation and good order at sea. Confidence and security-building measures – such as advanced notice of naval exercises – have been useful in the past and should continue to be practised.

Canada shares ocean spaces with Russia, and the Canadian government has expressed concern about Russian motives there. But Moscow's recently announced plans for the Russian Arctic – the establishment of two army brigades and the upgrade of ports and airfields along its northern coastline – are intended for territorial security, commercial development and search and rescue rather than the projection of naval power into Canada's Far North, which is mostly impassable to naval surface vessels. A prudent response could include efforts to enhance maritime domain awareness, backed up by an appropriate level of capability to deter incursions into ice-free waters. Meanwhile, the need to reassure allies dealing with RFN 'probing' actions in shared seas or near allied coastlines requires Canada to project a modest but credible naval presence on an as-needed basis.

Curiously, the RFN's short-term outlook resembles that faced by the RCN: a temporary dip in the number of operational units while industry re-capitalizes and delivers new or upgraded capabilities plus the ongoing challenge of recruiting and retaining skilled personnel. Also, lower energy prices affect the national revenues of both countries and could therefore slow the pace of naval re-capitalization. But while the quantity of new vessels under construction in Russia is meant to cover its dispersed maritime spaces simultaneously (a challenge also faced by Canada), it may also reflect the age-old Russian belief that combat resilience is, in part, a function of mass. RCN planners who believe that quality can adequately compensate for quantity should take careful note. Smaller numbers of 'exquisite' ships may be a strategic handicap – even in operations short of combat.

As a hedge against uncertainty over the medium to long term, the RCN and its counterparts should seek to remain *collectively* proficient in all naval warfare domains. Collective proficiency recognizes that few navies are full-spectrum forces, and that it is critical to foster interoperability through regular and realistic training so that navies with 'niche' capabilities can bring value to naval coalitions. This would help with budgetary pressures that threaten the breadth and depth of capability in each navy. Since Western inventories of ships and maritime aircraft are slowly contracting, collective investments in intelligence, surveillance and reconnaissance are needed so that navies allocate their remaining combat platforms more effectively.

Even if the RFN and Western navies do nothing more than eye each other warily, close attention should be paid to the proliferation of Russian naval technology to both state and non-state parties, as post-Cold War conflicts have routinely pitted Western forces against Russian-pattern equipment. The export of ever-quieter submarines could complicate littoral operations in areas of concern to the West, while counter-ASW technologies could spread to new and existing submarine operators. Russia has also made great strides in cruise missile technology and has either adopted or exported systems that can out-perform many of their Western counterparts.[8] Since advanced anti-ship/land-attack cruise missiles provide considerable striking power to even less-advanced navies (and

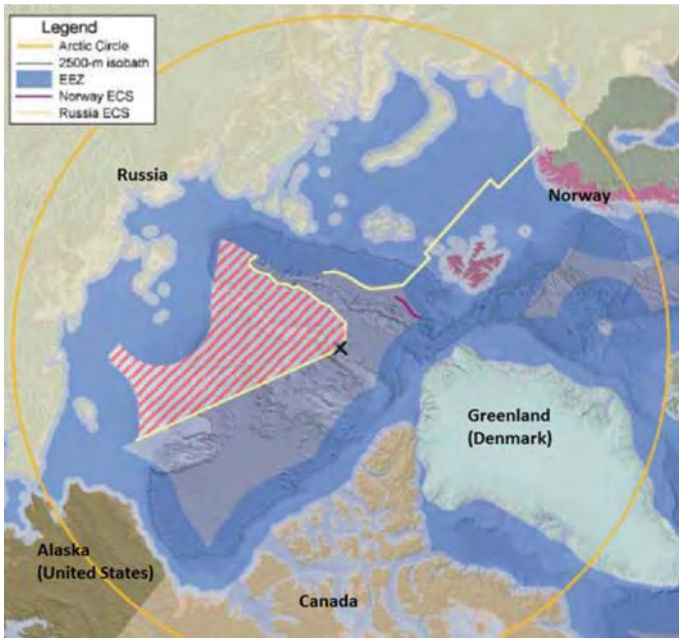
shore batteries), improved surface ship defences must be sought to detect the launcher and defeat multiple, incoming rounds in a compressed time-frame. Alert and robust defences will be required when operating in the littoral regions, as non-state actors may also obtain access to missile technology from external sponsors or as a result of state failure.[9] In the interim, NATO allies should explore how innovative doctrine based on cooperative engagement could make better use of existing defence systems.

Credit: Wikimedia Commons

*A port quarter view of the Soviet replenishment ship **Berezina**, with a tugboat alongside, 1 January 1988.*

Conclusion

Under President Putin Russia has entered a period of intense nationalism, anti-Westernism and assertiveness in its pursuit of security in its near abroad. The RFN's slow but steady rebirth illustrates the Kremlin's desire to undertake the full range of naval missions ranging from nuclear deterrence to sea control in adjacent waters to limited presence/power projection in distant seas. However, the number and type of new builds, and the lack of investment in at-sea replenishment, suggest that the RFN is not positioning itself to confront the combined Western navies globally. Putin's nationalism and the RFN's force posture may, therefore, be defensive in nature (at least as perceived by Moscow). Historically, Russia has been a land power and this places natural limitations on the growth of the RFN. Therefore, while striving to maintain current force levels, Western navies should seek qualitative improvements in key capability areas. Still, the possibility of confrontational behaviour in shared waters and the proliferation (or leakage) of leading-edge technologies to unstable third parties should give pause for thought.



Credit: Wikimedia Commons

Russia's Arctic claims.

It is unclear whether Russia's defence-industrial base and recruiting system will be able to fulfil Moscow's naval ambitions. Budgetary austerity resulting from Western sanctions and a decline in energy prices could also delay re-capitalization plans but will not halt them entirely given the importance that Putin attaches to military and defence-industrial renewal. Therefore, without despairing that a new Cold War is at hand, Canada and its allies should maintain a close watching brief on the RFN's evolution.

Notes

* This is a condensed, updated version of an internal report published in October 2014. The views expressed are those of the author and do not necessarily reflect those of the Department of National Defence, the Canadian Armed Forces, or the Government of Canada.

1. Gudrun Persson, "Security Policy and Military Strategic Thinking," in Jakob Hedenskog and Carolina Pallin (eds), *Russian Military Capabilities in a Ten-Year Perspective, 2013* (Stockholm: FOI, 2013), p. 74. The 2014 Military Doctrine has not fundamentally changed from the 2010 version in terms of identified threats, but re-affirmed the primacy of nuclear weapons in the defence of national interests and announced that the Russian armed forces could be deployed outside of the country to defend Russian citizens. See Sputnik/RIA Novosti, "Russia's Military Doctrine: Facts and Details," 5 February 2015.
2. Persson, "Security Policy and Military Strategic Thinking," in Hedenskog and Pallin (eds), *Russian Military Capabilities in a Ten-Year Perspective, 2013*, p. 72.
3. Thomas Fedyszyn, "Renaissance of the Russian Navy?" *US Naval Institute Proceedings*, Vol. 138/3 (March 2012).
4. Admiral Gary Roughead, Testimony to Senate Appropriations Committee (March 2011). Quoted in Fedyszyn, "Renaissance of the Russian Navy?"
5. See Stephen Saunders (ed.), *Jane's Fighting Ships 2013-2014* (Coulsdon, UK: IHS Jane's, 2013), p. 16.
6. Thomas Fedyszyn, "The Russian Navy 'Rebalances' to the Mediterranean," *US Naval Institute Proceedings*, Vol. 139/12 (December 2013).
7. There are strong suspicions that one or more Russian submersibles penetrated Swedish waters in October 2014. See Bruce Jones, "Swedish 'Mystery Submarine' Hunt Called Off," *Jane's Navy International*, 24 October 2014.
8. Daniel Baart, "Responding to the New Anti-Ship Cruise Missile Threat," *Canadian Naval Review*, Vol. 10, No. 2 (2014), pp. 38-39.
9. The damage inflicted on the Israeli corvette *Hanit* on 14 July 2006 is widely accepted to have been caused by a Chinese C-802 anti-ship missile transferred by Iran to Hezbollah forces in Lebanon.

Dave Rudd is a strategic analyst with the Centre for Operational Research and Analysis at National Defence Headquarters in Ottawa.

Changing with the Times: The Evolution of Canada's CP-140 Aurora

Colonel Iain Huddleston

A CP-140M Aurora long-range patrol aircraft starts its engine in Kuwait prior to taking off on its first intelligence-gathering mission over Iraq during ***Operation Impact*** *30 October 2014.*

In October 2014, two of the Royal Canadian Air Force's (RCAF) recently modified Block 3 CP-140M Auroras deployed to the Middle East to conduct intelligence, surveillance and reconnaissance (ISR) over Iraq in support of *Operation Impact*. Within 30 hours of the aircraft arriving in theatre, the crews, maintenance and mission support teams were ready to launch their first mission – the first operational overland mission flown by the CP-140M. To date, the detachment has completed over 100 missions, cancelling only twice over a period of four months. The performance of the crews and the aircraft have received a great deal of praise from coalition partners for the accuracy, clarity and timeliness of the resulting ISR product. Canada's Long Range Patrol (LRP) Force and the CP-140M are paving the way for the establishment of a robust Canadian Armed Forces ISR system.

Aurora Incremental Modernization Program

The sandy landscape of the Middle East is not the traditional operating environment for the CP-140 Aurora, but over the past 10 years this long-range patrol aircraft has undergone a significant transformation and has proven itself capable of adapting to almost any situation. Originally designed for anti-submarine warfare, the Aurora Incremental Modernization Project (AIMP) and Aurora Structural Life Extension Program (ASLEP) are providing the RCAF with one of the most capable, diverse and reliable ISR platforms in the world.

AIMP was proposed in 1998 as a method to upgrade the CP-140 through a series of 'blocks' or phases. The approach sought to balance the requirement for a fiscally responsible way to upgrade the technology in the aircraft while minimizing the negative impact of a reduced fleet of aircraft on RCAF long-range patrol operations. An additional consideration was minimizing the personnel costs associated with any conversion training required for crew members and technicians. The pros and cons of AIMP have been debated over the years as budget pressures mounted and military priorities shifted and evolved. The program was actually halted in 2007 but it was restarted and refocused shortly thereafter. A recent commitment by the government has set the final number of upgraded aircraft at 14, an increase from the previous commitment of only 10. The 14 CP-140 aircraft will all undergo the ASLEP and AIMP modifications, allowing the LRP Force to sustain CP-140 operations until approximately 2030. Overall this is a reduction in the total number of available CP-140s, as the fleet was previously comprised of 18 Auroras and three Arcturus, a CP-140 airframe equipped with radar and communications only. This reduction is offset by a significant increase in the capability of each aircraft.

There are currently four incremental 'blocks' within AIMP. Each block involves the upgrade or replacement of specific aircraft systems and sensors, with the most significant change in operational capability delivered with Block 3. Block 1 involved the replacement of a variety of legacy equipment and sub-systems, dealing primarily with critical supportability and compliance issues. Block 2 introduced a modern communications management system,

The crew members of a CP-140 Aurora control the mission from their workstations during ***Operation Impact*** *in Kuwait on 8 February 2015.*

including new high (HF), very high (VHF) and ultra-high (UHF) frequency radios, and satellite communications. It also upgraded navigation equipment and provided a modern cockpit which included a new autopilot and flight management system. In parallel with Block 2 but considered separately, an electro-optical infrared camera turret was installed underneath the nose of the aircraft. This replaced the forward-looking infrared system that was almost entirely ineffective in the traditional mission set. The new Wescam MX-20 and the associated Overland Equipment Mission Suite was the first real leap in operational capability that Aurora crews had experienced.

The current block, Block 3, replaces the mission computer, the acoustics system, electronic warfare system, magnetic anomaly detector and synthetic aperture radar, providing each operator with a modern display screen, touchpad and trackball controls. This is the point at which the old CP-140 earns the 'M' for Modernized, reborn as the CP-140M Aurora. Block 4, which is in the design phase at the moment, will add a high-speed beyond-line-of-sight communication system, a modern tactical data link called Link 16 and an aircraft self-defence suite.

ASLEP is a parallel effort to AIMP, intended to reset the structural life of the aircraft. It includes replacing the entire wing and horizontal stabilizer, and a number of additional structural problem areas are also addressed. ASLEP will add as many as 15,000 flying hours to the structural life of the aircraft, increased to 40,000 from its original 25,000 hour lifespan. This is a key factor in extending the fleet to 2030. To date, the LRP Force has received half of the Block 3 modified airframes from IMP Aerospace in Halifax, NS, with the remainder scheduled to be modified over the next four to five years. This timeframe includes the upgrade of all 14 aircraft to the Block 4 standard.

Transition to an Overland ISR Role

The Aurora's introduction to the overland ISR role began in 2006 with the installation of the electro-optical infrared camera. With this, crews experienced an immediate improvement to their ability to conduct the maritime mission, primarily by being able to identify maritime vessels beyond visual range. This improved the effectiveness of the aircraft significantly across the traditional set of domestic missions including fishery patrols, northern patrols and search and rescue operations. Training also began with ground-based units and against littoral target areas.

Extensive collaboration with Canadian and American personnel with previous experience operating unmanned aerial vehicles allowed the crews to gain insight into basic overland missions including reconnaissance, battle overwatch and convoy escort duties. The CP-140 brings significant capabilities to bear in the overland role and the crews' experience over water has translated directly to the new mission set, with the learning curve mainly rooted in understanding how the supported ground element thinks, communicates and operates. The CP-140 can be deployed quickly and its long endurance allows it to contribute

Sergeant Brian Nelson, an Airborne Electronic Sensor Operator, 407 Squadron at 19 Wing Comox, checks the MX-20 Wescam Turret Electro-Optic Infrared Camera System onboard the Aurora CP-140 aircraft, 3 August 2006.

significantly to understanding the pattern of life in areas of interest. Compared to an unmanned aerial vehicle, the Aurora is more capable of shifting its focus 'on-the-fly,' benefiting both from the size and experience of its crew and also from the fact that they physically are above and still operating within the battlespace.

Credit: Canadian Forces Combat Camera, DND

A CP-140M Aurora is readied for departure on an intelligence-gathering mission over Iraq during ***Operation Impact*** *on 30 October 2014. Note the new AN/ALQ-217 Electronic Support Measures system on the wingtip. The system contains receiver antennas that are used to detect and locate radio frequency emitters in a full 360 degrees around the aircraft.*

Since commencing overland operations in 2006, Aurora crews have been finetuning their abilities to utilize the electro-optical infrared camera in an operational context. Long-range patrol squadrons have supported a number of high-profile domestic security operations in the recent past such as the Vancouver 2010 Olympics, and the G8 and G20 Summits in 2010. The Block 2 Aurora had its baptism of fire in combat operations during *Operation Mobile*, the 2011 intervention in Libya. The Auroras initially operated over water, then in the littoral regions and finally over land.

And now with the Block 3 sensor suite added to the original camera capability, the aircraft is becoming even more effective. Both electronic warfare and synthetic aperture radar systems have been added to the mix in order to refine the information it is providing to ground and air elements. This evolution has created a high demand for the asset, with the Aurora recognized internationally as a platform of choice for ISR collection almost 10 years later.

The First Overland Success Stories

In 2009, the CP-140 was fitted with a high-resolution mapping camera, the Canadian-made Applanix DSS, in a belly bay originally fitted with a large format film camera system which was used for maritime reconnaissance. A two-aircraft, 60-person detachment was charged with the task of mapping the terrain of a large area of Afghanistan so that accurate maps could be created for Canadian and coalition partners. Given the high speed and endurance of the Aurora, it was ideally suited for this mission. With guidance and technical expertise from the Mapping and Charting Establishment, the Aurora and its crews completed the mapping mission in only one month of flying, mapping over 100,000 square kilometres in detail.

The ability to plug and play specialized equipment such as the mapping camera and various role-specific communication systems is testament to the versatility of the aircraft. The LRP fleet leverages the expertise in the Maritime Proving and Evaluation Unit to explore new technology to augment the standard sensor suite in support of particular missions. In addition to equipment, the size of the Aurora allows the core crew to be increased, assigning subject matter experts and liaison officers who can add value directly to the mission at hand. In 2011, *Operation Mobile* was the test case for this approach, and such augmented crew coordination achieved great success. First steps were taken by integrating Forward Air Controllers from the British Royal Marines in order to conduct naval gunfire support missions along the shoreline of Libya. Subsequently, Canadian Joint Terminal Attack Controllers joined the CP-140 crew for overland strike coordination and attack missions during which the crew was tasked to locate and identify specific targets within designated areas of operation before coordinating fighter strike assets to engage them. Domestically, the CP-140 has often integrated Environment Canada officials into the crew. This occurred, for example, in 2014 in order to provide accurate assessments of flooding in and around Winnipeg.

As the LRP Force prepared to deploy on *Operation Impact*, the Canadian mission to Iraq that began in the fall of 2014, it was immediately apparent that the mission would be different from *Operation Mobile*. The strike coordination and attack missions during *Mobile* took place at a point in the operation when the battlespace was relatively well defined, the enemy had been identified and a robust coalition command and control structure established. *Operation Impact*, however, would begin with very little in place and the aircraft and crews would immediately be over hostile territory, with no previous confidence-building period. The number of crew members with experience of *Operation Mobile* who remained in Greenwood and Comox was low, adding to the challenge of training and preparing them for this new fight. And this would be the first operational deployment of the CP-140M Block 3, with the associated support network that the new systems require being stress-tested for the first time in anger.

The Islamic State of Iraq and the Levant (ISIL) is more dispersed than the forces in Libya and, given its early successes against the Iraqi security forces, ISIL forces are

armed and equipped in a way that makes them almost indiscernible from allies on the ground. Also, there are no Western coalition ground elements supporting the operation, reducing overall situational awareness of the ebb and flow of the 'front lines.' Points of interest are, as a result, less obvious and the enemy is well versed in the need to utilize natural defences such as darkness and cloud cover to cloak their movements.

It is in this environment, though, where the Block 3 aircraft comes into its own. Undercast cloud cover and darkness certainly still hinder ISR operations, however, the CP-140M is equipped with a multitude of sensors to collect essential information even when objects of interest are obscured by cloud. The inverse synthetic aperture radar/synthetic aperture radar enables the aircraft and crew to collect large amounts of radar data and identify vehicular movement on the ground when weather is an issue for other types of sensors. In addition, the tried and true 'Mark 1 eyeball' has again proven its worth, allowing the crew to scan the horizon for breaks in the cloud and thereby providing opportunities to gather video information despite the weather. Adding modern night vision goggles to standard crew equipment has also proven to be an enabler, allowing crew members visually to cue the tactical crew and sensors to points of interest within the battlespace below and around the aircraft.

Although the aircraft itself has been described as having James Bond properties, the sleuthing skills of Sherlock Holmes more accurately describe the work of the crew. While the pilots scan the skies for breaks in the clouds and for conflicting air traffic, the tactical navigator acts as the maestro of the sensor operators and communicators, orchestrating the simultaneous gathering of information in several formats. The information is recorded, with an initial correlation performed immediately as part of the ongoing mission. Information can be immediately transmitted to ground stations within line-of-sight of the

Credit: Ben Montgomery, RAF Lossiemouth, UK/ AeroResource.co.uk

The CP-140M flight deck showing some of the Block 2 AIMP upgrades to navigation and flight instruments, and communications systems. These include: a new Electronic Flight Director Indicator, Electronic Horizontal Situation Indicator and Display Control Units, two new Embedded Global Positioning System Inertial navigation systems, a new Automatic Flight Director System, new Radar Altimeter and Altitude Warning System and Aircraft Collision Avoidance System.

aircraft for further processing and exploitation. All the while, crew members are manning the observer windows looking for significant activity on the ground that might merit further investigation or require the aircraft to manoeuvre for safety reasons. The observations and information recorded during each ISR mission reveal clues as to how the enemy conducts operations and what he might be planning next. The CP-140M Block 3 and crews have been persistently collecting clues since October 2014 and they are improving their investigative abilities with time.

As mentioned, the CP-140M is currently limited in that it can only transmit information in real-time to ground stations within line-of-sight of the aircraft. This results in a time delay in the passage of potentially critical information. In order to address this limitation, the Commander of the RCAF recently approved the installation of an interim Beyond-Line-of-Sight (iBLOS) VIASAT ArcLight capability on three CP-140M. This upgrade, involving among other things the installation of a new satellite antenna on the upper fuselage of the aircraft, was accomplished in record time through collaboration with key industry partners, IMP Aerospace, L3 Electronic Systems

Credit: Canadian Forces Combat Camera, DND

A CP-140M Aurora waits for its next mission in its improvised hangar in Kuwait during ***Operation Impact*** *2015.*

and General Dynamics Canada. Two of these aircraft have already been utilized in theatre and the new capability has proved useful in providing near real-time information to Canadian and coalition partners. Beyond-line-of-sight capability is the capability most easily associated with what one would see in the movies if James Bond were to ask for an ISR feed. The ability for the theatre commander to see what the crew in the aircraft is seeing reduces the ambiguity of combat engagements and allows for a faster targeting process. It also enables a more dynamic tasking process which helps make the time the aircraft spends on-station more effective.

Crew Training

For the first time in the history of the LRP Force, a comprehensive pre-deployment simulator-enabled training package has been developed in order to prepare crews for the operational theatre. 404 Long Range Patrol and Training Squadron and the Maritime Proving and Evaluation Unit combined forces to provide flight deck and tactical crew training in the overland mission prior to departure. Flight deck training was conducted using detailed visual simulation of the theatre operating environment in the CAE Full-Motion Flight Simulator, while tactical training took place in the new Procedural Crew Trainer (PCT) that replicates the tactical crew stations of the CP-140M. Within the PCT, 3-D targets are generated which allow Airborne Electronic Sensor Operators to operate their systems, including the electro-optical infrared camera, and the refinement of crew tactics, techniques and procedures. The advantages of simulation in this context include the ability of the simulator and training staff to inject challenging scenarios to gauge crew preparedness and to provide a detailed replay, debrief and evaluation of crew performance.

In the near future these efforts will be augmented by the arrival in Greenwood of an immersive Operational Mission Simulator (OMS). This device is more capable than the PCT and simulates the look and feel of the Aurora's tactical compartment, as well as the sensor capabilities. Operating in the OMS it is easy to lose oneself in the simulated mission – the crew is effectively transported into the area of operations, and benefits hugely from the experience gained.

Deployed Mission Support Centre

The long-range patrol contingent established itself for operations in theatre very quickly thanks to a robust Deployed Mission Support Centre (DMSC) and a comprehensive self-sustaining supply maintenance kit that arrived courtesy of a single CC-177 Globemaster flight. The DMSC is a home-grown command and control

Credit: Sergeant Mike Girod

Canadian CP-140 Aurora crew members participated in Exercise Joint Warrior, which was held in Scotland from 27 March to 11 April 2014.

capability which proved its worth during *Operation Mobile* and which has been critical to the success of CP-140M ISR operations from the outset of *Operation Impact*. Contained within two Mobile Expandable Container Configuration shelters, the DMSC houses all of the required communications, briefing, replay and exploitation equipment to support Aurora operations. The DMSC is unique to the Aurora fleet and has been designed to 'plug and play' into any long-range patrol operation – over land or over water.

The LRP self-sustaining supply kit is another innovation that supports the operational readiness of the aircraft and the effectiveness of deployed maintenance crews. Given the large number of sensors and corresponding parts associated with the effective operation of the aircraft, preparing the spare parts list for a prolonged deployment can be overwhelming. The LRP maintenance community has refined the supply requirements from *Operation Mobile* for Block 3 operations and evaluated and prioritized the spare parts and tools required to support this first CP-140M deployment. As the logistical chain for aircraft parts into theatre can be cumbersome, the combination of parts and support material that was provided in the initial supply kit has mitigated delays that might have been necessary to repair aircraft. To date the detachment has lost only one mission due to unserviceability, which is testament both to preparation and planning and to the dedication of the team on the ground.

Get-Well-Program

The RCAF has been armed with cutting-edge technology in the form of the CP-140M Block 3 Aurora. However, while AIMP and ASLEP have addressed a range of technological and structural issues, the airframe and a lot of its constituent parts are original and are, today, as much as 35 years old. The previous Commander of 1 Canadian Air Division, Major-General Pierre St-Amand, identified

historical poor serviceability and spare parts availability as long-term problems for the Aurora that could undercut the advantages gained through the two upgrade programs. In order to take full advantage of the investment made, the LRP Force will need to improve the way it conducts maintenance activities.

These aren't the only problems facing the fleet, of course. The new sensors, systems and expanding mission set meant that the entire family of tactics, training and procedures had to be reviewed and revised – and in many instances created from scratch. This was a daunting challenge in and of itself but, paired with the scope and scale of the maintenance issues, it seemed truly formidable. In an effort to frame the problem in a more constructive way, these two challenges have been captured in a long-term roadmap, called the LRP Get-Well-Program (LRP GWP).

The LRP GWP has two internally focused thrusts: Thrust 1, Operationalize the CP-140M Aurora; and Thrust 2, Aviation Maintenance Renewal. A third thrust, which focuses on linking the LRP community with all of its external stakeholders, is called Thrust 3, Leadership Engagement.

Initiated in late 2013, the LRP GWP uses the concept of 'incremental and early success' to motivate and drive the team forward and, over the past 18 months, these successes have been many. On the maintenance front, changes to unit mandates and manning, the adoption of civilian best practices and a more effective distribution of authority and accountability have resulted in overall fleet serviceability increasing from an average of 40% to almost 55%.

In the same time-frame, on the operational side, the approach to force development and training has been reviewed and streamlined. The CP-140M has been cleared for operations across its mission set, despite significant technical issues with the radar system in particular. Incremental improvements have stepped the aircraft forward to the point where we now stand, entirely capable of prosecuting the overland mission in Iraq. These efforts have been characterized by a renewed focus on collaboration among the LRP Force, supporting engineering organizations in Winnipeg and Ottawa, and industry partners. This focus on collaboration is also opening doors to strengthened operational links within the RCAF and externally with the Canadian Army and Royal Canadian Navy.

Final Words

With the recent emphasis on overland operations, it would be easy to forget the traditional strength of the CP-140 in anti-submarine warfare. International exercise

A technician guides a RCAF CP-140M Aurora to its parking space during ***Operation Impact****, 5 February 2015, Kuwait.*

opportunities and local missions with the Royal Canadian Navy allow crews to hone their skills on the new Block 3 acoustics system. With vastly increased processing power, new digital sonobuoys and a colour-mapping display system, the original capabilities of the aircraft have been significantly enhanced. Crews are capable of monitoring more sonobuoy channels and have more control over the buoys once they are launched and in the water, improving the accuracy and usefulness of the acoustic data collected. Paired with the improvements in the mission simulator and other training devices, the LRP Force will be much better prepared for operational missions in the challenging and complex underwater battlespace of the future. Initial results against a variety of live submarine targets have been very encouraging – again underlining the impressive multi-role character of the new CP-140M.

While technological challenges remain, the flexibility offered by the Aurora is simply unmatched by any remotely piloted ISR platform and the capabilities inherent to the new Block 3 rival those of any other manned ISR aircraft. The Long-range Patrol Force is well equipped to meet future challenges. The contribution to *Operation Impact* has been a successful joint effort between the teams at 14 Wing Greenwood and 19 Wing Comox, which is commanded by Colonel Tom Dunne and where one of the two operational LRP squadrons is located. The CP-140M Block 3 Aurora is rapidly being established as the pillar upon which Canada's overall intelligence, surveillance and reconnaissance system will be built. Canadians should be proud knowing that these capabilities exist to defend the country and to contribute to its international commitments.

Notes

* This article was written in collaboration with Major Ray Townsend, 405 LRP Squadron, Deputy LRP Detachment Commander *Operation Impact* Roto 0.

Colonel Iain Huddleston is Commander of 14 Wing Greenwood, Nova Scotia.

Future Canadian Submarine Capability: Some Considerations

Norman Jolin

As we enter the second century of submarines in Canada, it is reasonable to speculate what the future could look like for Canadian submarines. Any naval capability must accurately reflect the needs of the parent state, so this article will discuss the considerations necessary to develop a credible Canadian submarine capability for the 21st century. To put this issue into context, I would argue that there are two points that define Canada's navy. The first is *geography*. Canada is the second largest state in the world with the longest coastline and huge expanses of ocean estate. The second is *national will*. Involved in this are what naval capabilities Canadians are prepared to finance, and what capabilities Canadians will accept in their armed forces.

Credit: Rick Anthony

*HMCS **Corner Brook** (SSK 878) passing Fort Amherst and entering St. John's Harbour, Newfoundland and Labrador, 14 March 2006.*

Canada's maritime defence commitments are, first, the defence of Canada, followed by the collective defence of North America with the United States, and contributing to international peace and security. The most cursory of glances at a globe will illustrate the vastness of this ocean area of responsibility, which ranges from frigid Arctic waters to turbulent open ocean coasts on the north Atlantic and Pacific to warm waters of the Caribbean to transoceanic deployments.

A future Canadian submarine capability must be able to operate in Canada's area of responsibility. This means there is a need for an open ocean capability for the Atlantic and Pacific, as well as an ability to work near the ice-edge, to deny access to the Arctic archipelago to a potential adversary. This is a factor created by *geography*.

Credit: Marine nationale/Tonard Jacques

*SNA **Émeraude** (S 604) travels by Saint-Mandrier-sur-Mer in 2006. She is the fourth of the **Rubis** series, a class Canada was considering in the late 1980s.*

Furthermore, a Canadian submarine capability must be affordable to procure and support. It must also provide future Canadian governments with options from which to respond to international crises by being able to operate at great distances from Canada, for prolonged periods, in some of the most unforgiving waters in the world. This factor relates to *national will*.

Any discussion of a submarine capability that is able to operate in the diverse Canadian areas of responsibility, and at the great distances they demand, naturally raises the issue of propulsion. Before proceeding further it is worthwhile clarifying that, at this time, there is only one proven power source that is capable of prolonged operations under the Arctic ice-cap – a nuclear reactor. Therefore, a non-nuclear-propelled submarine capability would be restricted to operating on or near the ice-edge.

Technologically there is no reason why a country of Canada's means could not field a force of nuclear-propelled

Credit: Wikimedia Commons

*In the 1980s USS **Nautilus** was permanently docked at the US Submarine Force Museum and Library, Groton, Connecticut. Photo taken October 2008.*

submarines to meet this challenge. However, the resources associated with building the infrastructure are seen as cost-prohibitive when compared against historic Canadian defence spending levels. The last foray into nuclear propulsion for Canadian submarines, which occurred in the late 1980s, also brought home the sensitivity of Canadians to all things 'nuclear' in matters of defence. Notwithstanding the extensive public outreach program of the time and Canada's experience in generating civilian nuclear power, Canadians were apprehensive over the total cost of procuring and operating a fleet of 10-12 nuclear-propelled submarines. The national psyche has not changed over the last quarter century and I think it reasonable to deduce that any future Canadian submarine capability would not have nuclear power as a propulsion source because it would not be in keeping with the *national will*.

A non-nuclear-propelled, or conventional, oceangoing submarine will require a substantial alternative power generation capability. As well, to avoid detection, it will need to reduce the sound of noisy diesel generators to an absolute minimum. This leads to the topic of non-nuclear Air Independent Propulsion (AIP) systems. In exploring non-nuclear AIP systems that are in development, or in service today, it is important to remember that none of them offer the capability of prolonged under-ice operations.

AIP is a power source that does not require access to the surface atmosphere to generate power. Conventional submarines have historically used diesel engines to generate electricity that is stored in large batteries which are then used to power propulsion motor(s), as well as weapons and crew life-support systems. To date, the accepted battery technology has been lead-acid batteries, however, advances in technology and the rising cost of lead are causing Zebra and lithium-ion batteries to be seriously considered for submarine propulsion. These, however, remain very expensive, and do not provide substantially increased power.

Regardless of how high-tech the energy storage devices become, a submarine will need a way of recharging its batteries and cleaning its atmosphere while submerged. In conventional submarines this involves running the diesel generators, which requires the submarine to be at periscope depth with a snorkel, or snort, mast raised. This exposes the submarine to detection by opposition anti-submarine forces, thereby negating a submarine's primary asset – stealth. It also completely rules out under-ice operations, as the submarine must have the ability to come up to periscope depth in ice-free waters to snort.

Credit: naval-technology.com

*The French **Agosta** 90B-class attack submarine.*

Credit: Wikipedia

German Type 212 submarine at the dock at HDW/Kiel, Germany. Type 212 is the first submarine series equipped with a fuel cell propulsion system.

In response to the challenges of propulsion for submarines, in the late 1940s, the US government started the development of an AIP system to allow US submarines to become independent of the surface atmosphere. The United States expended massive resources to develop this technology. In 1955 the American submarine USS *Nautilus* became the world's first ship to be powered by a true AIP system, a nuclear reactor, which subsequently became the power source for all US submarines.

While most submarine manufacturers offer different non-nuclear AIP systems, and several are currently in service, none can offer the range of benefits of nuclear propulsion. That said, the non-nuclear versions do allow a submarine to generate power without having to snort for limited periods of time.

These non-nuclear AIP systems can be broken down into four main types,[1] all of which require liquid oxygen (LOX) to operate:

- *Closed Cycle Steam Turbines*: this is the French *Module d'Energie Sous-Marin Autonome* (MESMA) system which is basically a submarine nuclear propulsion plant with heat being generated by ethanol and oxygen, instead of nuclear fission. While this plant has the potential to deliver the highest output power, it is inherently inefficient and has the highest rate of oxygen consumption of the four types of AIP. It is in service with the Pakistani Navy as an export version of an updated French *Agosta*-class conventional submarine design. The French Navy, similar to the US and British Navies, no longer operates conventional submarines.
- *Closed Cycle Diesel Engines*: these engines allow a submarine to run a diesel engine underwater using an oxidant (normally LOX) diluted with exhaust gases. Endurance is limited to the onboard storage capacity of the oxidant and it is relatively easy to retro-fit into existing submarines. Work on this form of propulsion for submarines started before the Second World War and has continued. The noise generated when operating a diesel engine, however, significantly increases the risk of being detected acoustically, which tends to negate stealth. This system is being overtaken by other forms of non-nuclear AIP and is not yet – indeed, may never be – compatible with covert submarine operations.
- *Fuel Cells*: the *Proton Exchange Membrane Fuel Cell* (PEMFC), which was initially developed by Ballard systems in Canada, is in service in the German Navy in its Type 212 submarines and available in the export variants of this class of submarine. Because the system has no moving parts, it is virtually noiseless, which is inherently stealthy and attractive to submarine designers and operators. However, in addition to LOX, PEMFC systems require highly-flammable hydrogen, which is required to be stored in tanks – the Germans choose to store it as metal hydride, which is very heavy – and the technology to improve hydrogen storage (such as carbon nanofibres) is immature at this time. Moreover, the option of creating hydrogen onboard through methanol reformation, in lieu of onboard storage, creates byproducts that must be discharged, again risking detection of the submarine. Finally, PEMFC is the most expensive of the four types to run and endurance is limited to onboard holdings of hydrogen and oxygen, which can be problematic for long-distance deployments.[2]

- *Stirling Cycle Engines*: this system is derived from a 19th century external combustion engine. The Swedish Navy decided to re-engineer the engine as an additional generator for its submarines, and the result was quieter and more reliable than internal combustion engines. Stirling engines are not as responsive as internal combustion engines and they are best used as a constant speed engine with a constant lower power output. Stirling beta engines are in service in the Swedish Navy's submarines and available in the export variants. Additionally, Japan has acquired Swedish Stirling engine technology for its future submarines, and the Australians are reported to be interested in acquiring the technology as well.[3]

In reviewing existing non-nuclear AIP it is useful to clarify some popular misconceptions that have developed about these systems. Regrettably, it is all too common for manufacturers to quote optimistic performance figures for speed, endurance and atmosphere, often out of context with practical considerations of submarine operations. Here are some clarifications of the capabilities of AIP systems:

- *Speed*: an AIP-configured conventional submarine may be able to achieve speeds in excess of 20 knots, but it can only do it for very short periods, usually measured in minutes. AIP does *not* deliver the continuous and virtually limitless high speed sustainable by a nuclear-propelled submarine.
- *Endurance*: non-nuclear AIP systems are limited by the fuel they need to operate (all use LOX as a minimum) and what can be carried onboard the submarine. Judicious operation of the AIP system will be required to avoid quickly exhausting fuel supplies before having to return to conventional diesel engines to generate power.
- *Atmosphere*: currently conventional submarines clear the internal atmosphere when they snort. By carrying LOX onboard, it is possible to regenerate oxygen supplies without snorting, but there is little capability to cope with a fire while submerged. It is for this reason alone that prolonged under-ice operations are impractical in a non-nuclear-propelled submarine.

None of the non-nuclear AIP systems currently in production can match the performance of nuclear power and all four feature significant capability compromises. It is important to note that all are hybrid systems whereby diesel engines are the primary power generation source – for endurance – with a smaller AIP system for limited periods of stealth operation. With the exception of the relatively large 4,200-tonne Japanese *Soryu*-class submarine which has a Swedish Kokums-designed Stirling engine, all four types of AIP have been developed by European states that produce smaller submarines, typically less than 2,000 tons. As well, they are designed for national operations, usually in waters close to supporting infrastructure. In short, assuming nuclear propulsion is not an option, existing non-nuclear AIP systems and technology do not yet meet the demands of Canadian geography.

Although propulsion is arguably the most important design consideration as it defines the subsequent operational and support activities, the design of a submarine is more than selecting a propulsion system. There are other important factors to consider, as the definition of what constitutes a conventional oceangoing submarine is driven by national perspective. In exploring what a future Canadian submarine capability would look like, it is necessary to address some of the less obvious factors involved in running a fleet of submarines.

It is important to understand that submarine support infrastructure is more comparable to an aircraft than it is to a surface ship, as there are limits to what can be done onboard the submarine by ship's staff. This demands capabilities that are necessarily different from the surface fleet to support equipment maintenance, crew accommodations ashore, simulator training for crews, etc. As with all major weapons platforms, a reliable supply chain that will support Canadian equipment throughout its in-service life is critical to ensuring uninterrupted operational employment.

Regardless of the size and complexity of the submarine itself, there are the inevitable infrastructure issues which are relatively unique to Canada. Specifically, Canada would likely operate these submarines from two coasts geographically separated by 4,500 km between supporting bases – Halifax and Esquimalt. These distances demand a duplication of effort that is not experienced by most states, notably the Europeans who represent the largest group of submarine manufacturers. It is, however, an issue faced by two of Canada's close allies: the United States and Australia. The Americans have a much greater infrastructure base and the Australians have chosen to base all submarines from one base on the west coast of Australia.

Personnel issues are a significant consideration when operating submarines, particularly for states operating small submarine forces. A duplication of training resources on both coasts of Canada may seem extravagant to the uninformed observer but it is necessary – family

separation while at sea is understood, having to be separated again to train on the opposite coast for protracted periods, is not. Habitability and crew comfort issues are of concern in submarines, and conditions can exacerbate recruiting, training and crewing. There must be a balance, otherwise technical availability will be trumped by personnel unavailability.

Clearly personnel issues are not restricted to submarines and occur in the surface fleet as well, particularly in countries with multiple coasts. Challenging, but certainly not insurmountable, these issues need to be factored into any submarine capability consideration. While small crews are very attractive to planners, it is important to remember that virtually everyone onboard has specialist qualifications that cannot be catered to by overall numbers in crew size. Submariners pride themselves on knowing their submarine, but crew members are not interchangeable – the equipment is highly sophisticated and the training for each position is extensive. It is no longer acceptable to think anyone on the submarine can fix a defective piece of equipment or stand in for a highly trained operator on a sensitive sensor or weapon.

This latter point illustrates the need to develop a critical mass of trained personnel available to support submarine operations, at sea and ashore, on both coasts. Historically, Canada's commitment to reducing military personnel to the bare minimum has meant that submarine personnel issues lurch from one crisis to another, resulting in perpetual crewing and retention issues. Having a sufficiently large base of trained expertise to support submarine operations, available on each coast, is essential to maximize submarine availability.

This raises the question of what constitutes a 'critical mass' of submarines for Canada. Fiscal considerations, coupled with trade-offs in determining the optimal mix of ships and submarines, will dominate any discussion. Canada should not be constrained by the current size of its submarine fleet. Any decision to retain a multi-coast basing option for submarines must also address the optimal number required to meet operational requirements. It is worth noting that Canadian studies conducted during the 1980s (in consultation with allies), regarding the size of a submarine fleet, determined that economies of scale started at a force size of six submarines based together in one area.[4]

It is to be expected that future Canadian sailors will demand Canadian standards of habitability and safety, including in submarines. While submarine life will likely remain somewhat austere in comparison to the surface fleet, lifestyle demands must be addressed if adequate personnel are to be retained throughout the service life of the capability. This need not be opulent, but it will likely contribute to a larger displacement submarine design.

There is also the ever-present issue of support, particularly logistics support. The ability to support any fleet effectively is underpinned by robust supply-chain management that can reliably meet the demands of the fleet, most likely through the use of an independent in-service support contractor. While an entirely national supply chain is unreasonable, the importance of being able to source and supply unique items, throughout the in-service life of the submarines, cannot be overstated. Canada's experience operating the *Oberon*-class submarines, which were in service in five navies at the time, graphically illustrated how difficult this can be. In fact, Canada resorted to purchasing retired British submarines to source spare parts.

While all of these factors may seem both daunting and prohibitively expensive, it is no different in concept to the training and support infrastructure available to the surface fleet on both coasts. In fact, because of their smaller crews, a submarine capability with sufficient support flexibility,

Credit: Photographer's Mate 1st Class Michael Moriatis, USN

HSwMS ***Gotland*** *transits through San Diego Harbor with the* ***Nimitz****-class aircraft carrier USS* ***Ronald Reagan*** *(CVN 76) in the background during the Sea and Air Parade held as part of Fleet Week San Diego 2005.*

Credit: Christy Hagen, U.S. Navy

Japan Maritime Self-Defence Force (JMSDF) submarine ***Hakuryu*** *(SS-503) arrives at Joint Base Pearl Harbor-Hickam for a port visit, 6 February 2013.*

especially personnel, can be a cost-effective alternative to larger surface ships in a balanced force mix. This is not to say that they can replace the surface navy, but rather that an appropriate balance of numbers of surface and subsurface assets can achieve disproportionate results within fiscal limitations.

In summary, Canada is a G7 state that has the financial, intellectual and labour force capacity to undertake great national projects. It does not, however, have the ability to do everything it would potentially desire. In reviewing the challenging operating environments, it is logical to deduce that *geography* alone would demand nuclear propulsion in a future Canadian submarine capability, as it alone can give virtually limitless endurance. The *will* of the populace, however, would seem to preclude that option.

There are non-nuclear AIP options available for a future Canadian submarine capability, but it is important to remember that the current technology has been developed by states with different requirements than Canada. A non-nuclear AIP system that can provide power comparable to a nuclear power plant has yet to be developed. This is not to say it *cannot* be done, just that it has not yet materialized. Further extensive development into AIP is required with a commensurate investment in research and development.

As always, financial resources will ultimately determine the ability of Canada, possibly in concert with other like-minded allies, to develop non-nuclear AIP technology for large oceangoing submarines. This need not be prohibitively expensive as balanced maritime forces, underpinned by a solid supporting infrastructure reflecting national requirements, can be both affordable and operationally effective over the life of the capability.

Finally, whatever submarine design is chosen, it will remain vitally important to ensure an appropriate Canadian support infrastructure is included. While a long-term supply chain is critical to a long in-service life, the personnel issues associated with operating a fleet of submarines will ultimately define the true Canadian capability. A critical mass of expertise, in both submarines and personnel, may appear expensive but like any solid investment it will pay off over the life of the capability in cost-effectiveness as well as unforeseen opportunities.

Taking all these factors into consideration, a submarine capability begins to define itself in the Canadian context. Any future Canadian capability would likely be based on a conventional submarine, which would need to operate at great distances from support, in an open ocean environment, for extended periods of time. It would need to be supported and crewed by Canadians, and designed to meet Canadian requirements. Acquisition of a submarine capability that diverges from these factors will likely prove to be very expensive indeed.

Notes

1. See Edward Whitman, "Air-Independent Propulsion: AIP Technology Creates a New Undersea Threat," *Undersea Warfare*, Fall 2001, available at www.navy.mil/navydata/cno/n87/usw/issue_13/propulsion.htm.
2. J.B. Lakeman and D.J. Brown, "The Role of Fuel Cells in the Supply of Silent Power for Operations in Littoral Waters," NATO, 2002, available at www.dtic.mil/dtic/tr/fulltext/u2/a428713.pdf.
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Enhancing Maritime Law Enforcement in the Pacific

Stanley Byron Weeks

Credit: Reuters/Kyodo

A Japan Coast Guard patrol ship, fishing boats from Taiwan and a Taiwan Coast Guard vessel sail near the disputed islands in the East China Sea, known as Senkaku in Japan, Diaoyu in China and Tiaoyutai in Taiwan, 25 September 2012.

Both maritime cooperation and security in the seas of the Asia-Pacific region can be improved by enhancing cooperation mechanisms for Coast Guard-type maritime forces. Of course navies also often serve in constabulary roles – indeed for many smaller navies, such roles comprise the majority of their missions. But here, in view of the many previous discussions focused on constabulary duties of navies, I will focus on Coast Guards. Crimes at sea, including piracy, smuggling (of people, drugs and arms), fisheries crimes, etc., remain a serious concern for all the states in the inherently maritime Asia-Pacific region. Coast Guard-type maritime forces have an important role to play in countering these crimes at sea, but effective results in the adjacent and often overlapping seas of this region often require more than just national-level efforts. Although capacity-building of national Coast Guard-type forces is a key requirement, bilateral, multilateral, sub-regional and even region-wide mechanisms for enhancing cooperation of these forces, complemented and enabled by improving shared maritime domain awareness, are key to combating crimes at sea.

This article examines significant recent initiatives of bilateral and multilateral cooperation mechanisms, particularly within Association of Southeast Asian Nations (ASEAN) bodies and in the North Pacific Coast Guard Forum (and the new Arctic Coast Guard Forum), and the Heads of Asian Coast Guard Agencies meetings. These initiatives and mechanisms can be further utilized and enhanced to improve regional maritime cooperation and effectiveness in combating crimes at sea.

The Challenges of Crimes at Sea

In the past two decades, volumes have been written about the challenges of 'non-traditional' threats at sea.[1] Countering crimes at sea is more important than ever in the globalized world today, the economy of which depends on seaborne trade. Much recent attention has been devoted to the resurgence of maritime piracy/sea robbery, particularly in the Western Indian Ocean, the Gulf of Guinea, and in the critical Malacca/Singapore Straits areas in the heart of the Asia-Pacific sea lanes. In these straits and southeast Asia, despite notable progress in counter-piracy efforts over the past decade, concerns have been raised again recently due to trends of hijacking of numerous small oil/gas tankers and rising incidents of sea robbery.[2] That said, we should not over-state the current risks of piracy, and focus on the need for more

Credit: U.S. Coast Guard

*USCG Cutter **Morgenthau** and China Coast Guard Vessel 2102 steam alongside each other during an operation to seize the vessel **Yin Yuan** caught fishing illegally in the north Pacific Ocean, 3 June 2014. The ships were patrolling in support of **Operation North Pacific Guard**. A Canadian maritime patrol aircraft with a Department of Fisheries and Oceans enforcement official aboard spotted **Yin Yuan**.*

effective inter-agency coordination among regional forces to deal with hijackings.

Although infrequent, maritime terrorism and maritime transport of weapons of mass destruction and their delivery systems nonetheless are of great concern due to their potential danger. The classic crimes at sea of smuggling and trafficking (of arms, drugs and people) are perhaps the greatest routine challenge for maritime policing. As well, illegal, unreported and unregulated (IUU) fishing is the focus of numerous global and regional/sub-regional action plans, but the fishing industry is also susceptible to the less-defined 'fisheries crime,' where transnational organized crime groups use fishing vessels for a host of trafficking and other crimes. To these crimes must also be added the problem of maritime pollution, which is threatening traditional sea resources. Together, the challenges of these crimes at sea should be of serious concern for all states, especially in the inherently maritime Asia-Pacific region.

A Lead Role?

Though we may speak in general of the lead role of Coast Guard-type maritime forces in countering crimes at sea, each country's organizational structure for maritime policing is different. This fact of life often complicates international cooperation mechanisms on combating crimes at sea, with inter-agency coordination needed on both the national and international level. An additional complication, as suggested by Geoffrey Till, is the relationship (and national orientation) of navies regarding maritime policing. Some countries' navies are oriented toward traditional defence and combat roles, while many other countries (especially smaller states) have navies that focus on Coast Guard-type missions or even (as was the case in Albania, where this author was the senior naval advisor in 2004-2005) are a combined Navy/Coast Guard maritime force. Other countries have a separate Coast Guard, and in many cases also separate organizations of marine police, fishing enforcement, etc.

The US Coast Guard (USCG) has developed over more than 200 years as a law enforcement force which also has a status as one of the country's armed forces. The USCG has 11 missions assigned in law: ports, waterways and coastal security; drug interdiction; aids to navigation; search and rescue (SAR); conservation of living marine resources; marine safety; migrant interdiction; marine environmental protection; ice operations; other law enforcement operations; and defence readiness.[3]

Many countries have used the American 'all-in-one' maritime law enforcement force as a model in developing their own Coast Guards – for example, Japan Coast

Guard, Philippine Coast Guard, Vietnam Coast Guard, Malaysian Maritime Enforcement Agency (MMEA), the Republic of Korea (ROK) Coast Guard (from 1953 until its May 2014 disestablishment), and the Taiwan Coast Guard Administration. The Taiwan Coast Guard Administration was formed in 2000 by combining the Defence Ministry's Coast Guard Command, the Interior Ministry's Marine Police Bureau, and various customs cutters. In similar fashion, in 2013 China merged four maritime safety, security and law enforcement agencies to form the China Coast Guard.

From this brief examination of Coast Guard-type forces in combating crimes at sea, two common themes emerge. First, with the UN Convention on the Law of the Sea (UNCLOS) extending national jurisdictions for resources into the broader Exclusive Economic Zones, and the increased need for sea lanes to be safe and secure to serve as the shipping routes for the global economy, there has arisen the need for expanded maritime law enforcement. Second, there is increasing recognition of the value of Coast Guard-type forces – dealing with transnational threats and crimes at sea – for peaceful and routine engagement at sea with counterpart maritime forces from other states. Indeed, Lieutenant-Commander (USCG) Craig Allen, in a 2014 article in the US Naval Institute *Proceedings*, spoke of a "great white fleet for cooperative sea power."[4] Another recent analysis concluded that the US Coast Guard was the largest partner that the US Pacific Command has to shape events in the region.[5]

Cooperation Mechanisms to Combat Crimes at Sea

The Asia-Pacific region has many sub-regional, region-wide and multilateral organizations able to serve as cooperation mechanisms to combat crimes at sea. The organizations I discuss here are by no means the only ones – for example, there are at least 11 bodies in ASEAN alone dealing with maritime security issues – but they seem to be the most significant current cooperative mechanisms.

The first organization I want to discuss is the North Pacific Coast Guard Agencies Forum (NPCGF). Initiated in 2000, the NPCGF is composed of six large member states – China, Japan, the United States, Russia, Canada and the ROK. This organization's emphasis is on multilateral cooperation through information-sharing and exchange of best practices on operations, illegal drug trafficking, maritime security, fisheries enforcement, illegal migration and maritime domain awareness (MDA). The NPCGF conducts at-sea operations and exercises, and has established a web-based information exchange system. As a successful example of regional Coast Guard cooperation, this forum has been the model for the subsequent establishment of a North Atlantic Coast Guard Forum and the new Arctic Coast Guard Forum (ACGF), which consists of the eight Arctic countries, and held its first executive-level meeting to approve its terms of reference in fall 2014. In summary, the NPCGF is perhaps the current gold standard for multilateral cooperation of Coast Guard-type forces.

Credit: U.S. Coast Guard photo by Lt. Cmdr Steven Youde

*USCG Cutter **Waesche** (WMSL 751) departs to begin the at-sea phase of RIMPAC 2014. The world's largest international maritime exercise, with 22 states involved, RIMPAC provides a training opportunity that helps foster cooperative relationships that are critical to ensuring the safety of sea lanes and security on the ocean.*

Credit: Internet

The ninth Heads of Asian Coast Guards Agencies Meeting (HACGAM) at Pattaya, Thailand, 29-30 October 2013.

The second organization is the Heads of Asian Coast Guard Agencies Meetings (HACGAM). The HACGAM yearly meetings were initiated in 2004, with an initial focus on combating piracy. Members include the 10 ASEAN states, plus China, Japan, India, ROK, Pakistan, Sri Lanka and Bangladesh. The current cooperation areas include search and rescue (SAR), environmental protection, natural disasters, preventing/controlling unlawful acts at sea and capacity building.[6] The HACGAM provides the broadest region-wide forum (though with the significant omission of the United States, Canada, Australia and New Zealand) for Coast Guards to pursue cooperation to combat crimes at sea in the Indo-Pacific region. The HACGAM is noteworthy for bringing together Coast Guards including Indian Ocean states, but to date its accomplishments have been limited, although there are some rumours about plans to energize this organization.

The third body is the Asian Coastguard Forum. This is a new venue, associated with the biennial LIMA security trade show in Langkawi, Malaysia, which is the largest event dedicated to the maritime and aerospace defence industry in the Asia-Pacific region. At the first meeting in March 2013, discussion centred on issues of enforcement of maritime laws at sea and maritime SAR. It is unclear whether this new and relatively secondary forum will in the future develop into a significant meeting venue for multinational Coast Guard leaders.

The fourth organization I want to discuss is ASEAN and its maritime-related bodies. As noted above, there are now at least 11 such bodies. Although coordination of these bodies and mechanisms is a recognized challenge, the five bodies discussed here seem to be the most significant in their potential to enhance cooperation in combating crimes at sea.[7] They are region-wide venues, including not just ASEAN countries but also cooperation partners, for multilateral cooperation. Currently it appears that the most significant of these are the ARF ISM on Maritime Security, the ADMM-Plus EWG on Maritime Security, and the Expanded ASEAN Maritime Forum (EAMF) – although all of these bodies are recent and are still evolving.

1. ASEAN Regional Forum (ARF) Inter-Sessional Meetings (ISM) on Maritime Security (MS). The ARF ISM on Maritime Security is the annual forum for ARF participants (27 states) to exchange views and best practices on maritime security, with the goal of contributing to greater transparency and confidence. The initial 2011 Work Plan (extended in 2014) has three priority areas: information exchange and sharing of best practices; maritime confidence-building measures; and capacity building of maritime law enforcement agencies. Regional Coast Guard-type agencies participate with others in these meetings. The sixth ARF ISM on Maritime Security was held in May 2014 in Bali.
2. ASEAN Defence Ministers Meeting (ADMM)-Plus, Expert Working Group (EWG) on Maritime Security. This EWG is one of six expert working groups established in 2011. To date, it has organized various tabletop exercises and, in 2013, the first multi-ship Field Training Exercise. The EWG also established the ADMM-Plus Maritime Security Information-Sharing Portal (AMSCIP). ADMM-Plus EWG members are now also invited to attend the ARF ISM on Maritime Security meetings. Although this EWG was initially oriented to naval forces, the May 2014 ARF ISM on Maritime Security suggested that the EWG consider participation of maritime law enforcement agencies in future initiatives.[8]
3. ASEAN Chiefs of Navy Meetings. This body first met in 2001, and since 2011 meets annually. Exercises to date include tabletop exercises (on humanitarian assistance/disaster relief, military medicine, etc.), and the 2012 ASEAN Maritime Security Information-Sharing Exercise (using the AMS Information-Sharing Portal noted above). Although composed of naval leaders, the priorities of these meetings – maritime cooperation, SAR, piracy and terrorism – have obvious overlap and implications for cooperation in combating crimes at sea.
4. ASEAN Maritime Forum (AMF). Established in 2010, the fifth meeting was held in Da Nang, Vietnam, August 2014. AMF focus is on maritime cooperation in sectors including piracy, environment, fisheries and trafficking. The 2013 AMF meeting acknowledged the issue of duplication of efforts by ASEAN maritime-related bodies, with a goal to identify gaps and overlaps.[9]
5. Expanded ASEAN Maritime Forum (EAMF). The EAMF consists of the ASEAN Maritime Forum members plus eight dialogue partners. This body first

Credit: Singapore Press/AP

*In a demonstration to senior officers from the Indonesian and Singapore military and law enforcement agencies, Indonesian Navy Kopaska troops storm the 'hijacked' vessel MT **Promise** off Batam island while it was cordoned by vessels from Republic of Singapore Navy, the Indonesian Navy, the Singapore Police Coast Guard and the Indonesian National Police.*

met in October 2012, and the third EAMF was held in August 2014 in Da Nang, Vietnam, after the AMF meetings held there. With its broader membership beyond ASEAN, the focus of the EAMF is on region-wide maritime cooperation, including in maritime law enforcement.

Key Bilateral and Multilateral Cooperation Mechanisms

Given the major and growing role of China and of China-US relations in the Pacific, it useful to give a brief outline of how these countries are cooperating to combat crimes at sea. As major maritime actors, cooperation between the United States and China is extremely important, and both states have been participating in bilateral and multilateral fora relating to maritime security. For both countries, the multilateral North Pacific Coast Guard Agencies Forum has played a key role in cooperation for combating crimes at sea, including cooperation in operational training exercises, fisheries patrols and personnel exchanges. As PRC Premier Li Keqiang recently stated, "[w]e will step up communication and cooperation with relevant countries, and improve bilateral and multilateral mechanisms to jointly safeguard navigation freedom and security of shipping lanes, fight piracy and terrorism on the sea and cope with oceanic disasters."[10] From the American perspective, the State Department in July 2012 highlighted how the 2012 ARF ISM on Maritime Security had, for the first time, included regional civil maritime agencies, with an agenda focused on building cooperation among these agencies, and pledged "we will continue to encourage deepening relationships and increased information-sharing among these agencies to build confidence while promoting stability and interoperability."[11]

In the bilateral context, the recent sixth round of the US-PRC Strategic and Economic Dialogue in July 2014 committed "to start coordination for including US Coast Guard and PRC maritime law enforcement agency representatives in the air and maritime rules of behavior working group [and] continue efforts to deepen and strengthen law enforcement cooperation."[12]

Also in July 2014, US Chief of Naval Operations (CNO) Admiral Jonathan Greenert met with his PLA Navy counterpart on a visit to China. Notably, this visit included the first CNO meeting with the PRC's State Oceanic Administration (SOA), China's Coast Guard leaders. Admiral Greenert publicly advocated that China's Coast Guard also adopt the Code for Unalerted Encounters at Sea

Credit: VOV

The fifth ASEAN Maritime Forum, Da Nang Vietnam, 26-27 August 2014.

(CUES) approved in April 2014 for naval forces by the 21 states of the Western Pacific Naval Symposium (WPNS).[13]

A final special multilateral mechanism initiated by Australia is worth highlighting as an example of how a regional state can contribute to multilateral cooperation in countering crimes at sea. This is the Pacific Patrol Boat (PPB) Program. This Australian program is an exemplary cooperation mechanism for building maritime law enforcement capacity in 12 Pacific island states. The PPB Program began in 1987 and has provided a total of 22 patrol boats and support. In June 2014, Australia announced a new $2B PPB Program to replace all the ageing existing patrol boats with new boats (and added Timor-Leste as a participating state).[14]

There have been many recent examples of bilateral initiatives to assist states in the region to build their capacity for maritime law enforcement. Among the most noted, particularly by a wary China, are US and Japanese assistance in providing patrol boats for the Philippines, Vietnam and other Asian states.[15] Additionally, the United States has assisted Indonesia and the Philippines with coastal radars and centres for maritime domain awareness coordination. China also has a multi-million dollar initiative for maritime aid to ASEAN countries.

Conclusions

Combating crimes at sea is a serious common task for regional maritime law enforcement forces, requiring cooperation among all the affected states. Navies often serve in constabulary roles but this article has focused on Coast Guards. As we have seen, many cooperative mechanisms for Coast Guard-type forces already exist, region-wide, sub-regional, bilateral, multilateral and especially with ASEAN bodies. Key potential areas for enhancement include better coordinating among the various ASEAN maritime-related bodies – especially the three region-wide bodies of the ARF ISM on Maritime Security, the ADMM-Plus EWG on Maritime Security and the Expanded ASEAN Maritime Forum.

Also, if it is to have a more productive future, the Heads of Asian Coast Guards Agencies Meetings should be expanded to include the United States, Canada, Australia and New Zealand, and should coordinate with the key region-wide ASEAN maritime-related bodies. There is an overarching need to recognize and enhance maritime domain awareness and information-sharing, which are vital to combating crimes at sea. Finally, there is a need to highlight and emphasize the cooperative potential of Coast Guard-type forces instead of their confrontational uses.

US Chief of Naval Operations Admiral Jonathan Greenert and Chief of Navy of the People's Liberation Army (Navy) Admiral Wu Shengli share greetings at a reception hosted by the PLA (Navy) for members of the 14th Western Pacific Naval Symposium (WPNS), 21 April 2014.

Notes

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2. See, for example, The Maritime Executive (MAREX), "IMB Worried About Small Tanker Hijacks," 24 July 2014; "Petro-Pirates Plague Busy Shipping Lanes," 9 July 2014; and ICC International Maritime Bureau (London) Media Release, 24 July 2014, "IMB Reports Worrying Trend of Small Tanker Hijacks in Southeast Asian Waters."
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7. For a more extensive review of ASEAN bodies and maritime security, see Carlyle A. Thayer, particularly "Maritime Security and the 2014 ASEAN Agenda," Talking Points for Presentation to Public Forum on ASEAN's Role in Providing Maritime Security, CNAS Maritime Security Project, Center for a New American Security, Washington, DC, 13 February 2014; and "Beyond Territoriality: Managing the Maritime Commons in the South China Sea," 28th Asia-Pacific Roundtable, 2-4 June 2014, Kuala Lumpur, Malaysia.
8. Co-Chairs' Summary Report, "The Sixth ARF Inter-Sessional Meeting on Maritime Security," Bali, Indonesia, 22-23 May 2014, para. 8.
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Making Waves

A Polar Ice Operation: What It Takes

Captain David (Duke) Snider

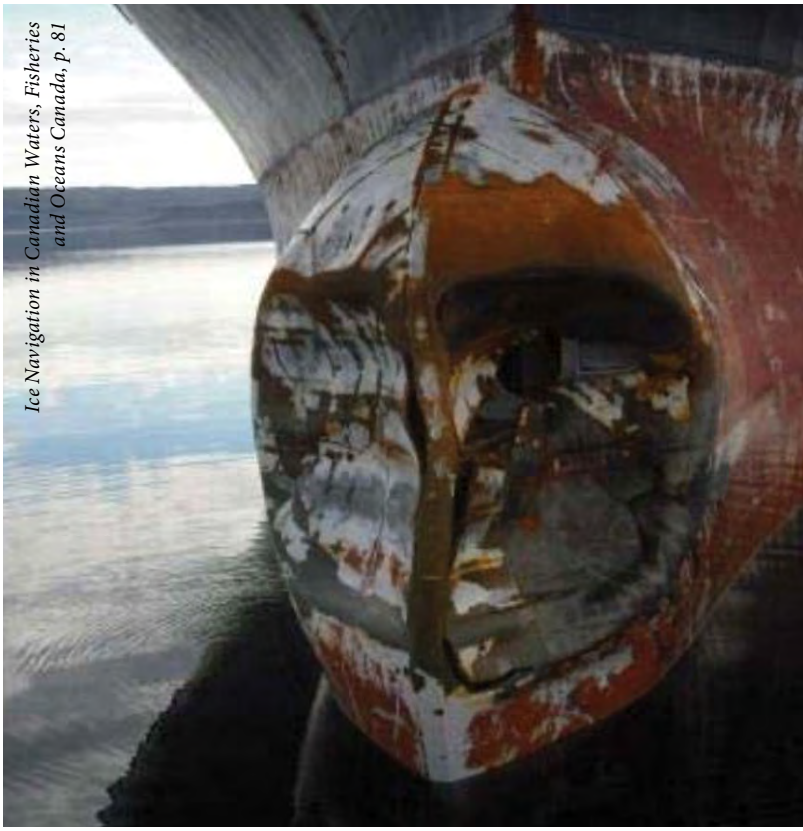
In 1820, renowned Arctic whaler and Ice Master William Scoresby wrote in his book *An Account of the Arctic Regions and the Northern Whale Fishery*, that "[t]he navigation of the Polar seas, which is peculiar, requires in a particular manner, an extensive knowledge of the nature, properties and usual motions of the ice, and it can only be performed to the best advantage by those who have long experience with working a ship in icy conditions."

Scoresby's words were based on his many years of Arctic sailing experience and observations. It soon became common practice, even in the Royal Navy, to employ Ice Masters to complement the regular command team for voyages into the ice. Scoresby's words are still taken seriously today, and Swedish shipping company Stena Bulk CEO, Ulf Ryder, commented in an article in *Fairplay* magazine, "[i]t takes as long to train an Ice Master as it does a brain surgeon."

Operating vessels efficiently and safely in *any* ice regime takes more than theory. It takes understanding of ice physics, growth and degradation, and movement combined with a full understanding of one's own vessel's capability in ice. Hard-earned experience and competence must be combined with careful planning and executing ice passages, and all this must be overlaid on theoretical knowledge. Time and time again, operators without experience and competence have taken on the ice, particularly polar ice with the added danger of harder old and multi-year ice, and found their voyage either slowed considerably or failed completely.

As the RCN looks to a future of increased Arctic operations, this hard-earned wisdom must be taken into consideration in developing manning and training.

Globally, there are a variety of coastal state regulations, codes and guidelines that relate to the requirement for experience in ice in addition to the theory learned through numerous training methods as prerequisites to becoming an Ice Navigator (what was once called an Ice Master). Along the Northern Sea Route and in the Baltic Sea when ice conditions warrant, experienced ice advisors are required to be onboard ships that are operating in ice. The International Maritime Organization's (IMO) draft Polar Code, presently under discussion in advance of planned adoption in 2016, will undoubtedly require proof of experience and competency for Masters or embarked Ice Navigators.



Ice Navigation in Canadian Waters, Fisheries and Oceans Canada, p. 81

Bow of a cargo vessel with a Lloyd's 100 A1 Ice Class 1A rating damaged through excessive speed in ice en route to Iqaluit, Nunavut, July 2012.

This is also the case in Canadian waters. Arctic Pollution Prevention Regulations (APPR) and the Joint Industry-Government Guidelines for the Control of Oil Tankers and Bulk Chemical Carriers in Ice Control Zones of Eastern Canada (JIGS) both recognize that ice operations are beyond the abilities of many mariners and that theoretical training does not replace the development of competency in ice operations. Simulator training is not yet sufficiently advanced to provide real ship/ice interaction. Both of these Canadian regulations stipulate that mariners with specified ice experience be onboard vessels; neither relies simply on training.

In February 2015, the second meeting of the IMO's Sub-Committee on Human Element, Watchkeeping and Training (HTW) confirmed its recommendations for amendments to the Convention on Safety, Training, Certification and Watchkeeping (STCW) to cover seafarer training for Deck Officer and Masters in voyages onboard ships in polar waters. The sub-committee recommends that senior officers, those managing and directing vessel operations such as Masters and Ice Navigators, *must* have at least two months sea service in polar waters before being issued certificates of proficiency.

The best evidence of this need is onboard the ships of operators that are very well experienced in ice operations. The attitude of Stena Bulk's CEO has already been described. This opinion is mirrored by major vessel operators such as Canada's Fednav bulk shipping company, Russia's SOVCOMFLOT and the Canadian Coast Guard, all of which have developed in-house onboard training and mentoring to develop bridge officers' skills in ice operations. Wise ship owners will employ licensed and experienced Ice Navigators to provide the necessary competence onboard their vessels when the usual bridge team cannot develop sufficient competency due to infrequent voyages into ice or recurrent changes of senior bridge teams. As a Canadian example, on its ships that less frequently operate in ice, Fednav has employed Ice Navigators for decades in the Canadian Arctic and the East Coast of Canada (and into the Red Dog facility in Alaska when ice conditions prevail) recognizing that with changing crews and command teams, this is the only certain way to ensure competence onboard.

Credit: Ice Navigation in Canadian Waters, Fisheries and Oceans Canada, p 128

Even in first-year ice, shown here, navigating in ice is difficult and requires both knowledge and experience.

Those with real experience operating ships in polar ice are unanimous that any qualification for command of vessels intended to operate in the polar regions must require extensive in-area ice experience. That experience must be consolidated over many years of ice operations. If that is not achievable, then the fallback is the same as that utilized already in the Canadian Arctic whereby Ice Navigators with the appropriate experience and qualifications are brought onboard to aid the Commanding Officer as part of the navigational team. In the modern RCN, where at-sea posting rotations and a limited number of command opportunities exist, building the onboard experience to enter and operate in ice routinely will be challenging. The only safe alternative may be the utilization of Ice Navigators when ice operations are expected.

In the context of RCN area operations, if utilizing the services of civilian Ice Navigators introduces security concerns, then an agreement to provide that expertise from the relatively large pool of Canadian Coast Guard (CCG) officers should be reached. In most, if not all cases, the CCG officers likely to have the required qualifications have already met necessary security clearances.

The bottom line is that those companies and operators with experience operating in ice, and polar ice in particular, recognize that the skills necessary to navigate safely in these regions are more complex than those required in other operating areas. Simply providing a course and ejecting mariners into the field with insufficient experience is likely to end if not in disaster at least in inconvenience and delay, or mission failure. The RCN is well advised to take heed of advice from experienced Ice Navigators if it is to do more than play around the edges of the ice in the Canadian Arctic.

*Better is the Enemy of Good Enough**

Stephen Knowles

During its Annual General Meeting in Ottawa last October, the Naval Association of Canada (NAC) commemorated the centennial of Canada's first submarine acquisition. NAC assembled a stellar roster of submarine supporters and operators past and present for a day-long conference entitled "Canada and Submarines: Past and Present." The furtive manner in which Canada's first submarines were acquired by the government of British Columbia on the eve of the outbreak of the First World War set the pattern for the subsequent submarine procurement and operation after the Second World War. From Canadians serving with distinction in Royal Navy (RN) submarines in both wars and into the Cold War, to the acquisition of Canada's own submarines from the Americans and British in the 1960s, and two aborted efforts to acquire nuclear attack submarines, the story is fascinating and one that deserves to be better known. Or should it?

Credit: Lt. Ed Early, USN

*HMCS **Victoria** (SSK 876) arrives at US Naval Base Kitsap-Bangor for a port call and routine maintenance, 12 December 2011.*

Submarines initially never quite fit into the vision of a workable little fleet that was to guide Canada's post-war navy. The public and the navy were ambivalent about submarines. After all they symbolized the *enemy*. It took until the late 1950s with the agreement to have two RN submarines based in Halifax for anti-submarine warfare training in exchange for a significant number of Canadians serving in British submarines and the loan of one US boat for the West Coast before a clearer picture began to emerge. The arrival of the *Oberons*, probably one of the few good decisions taken during the time of Paul Hellyer as Minister of Defence in the mid-1960s, allowed the navy to take genuine ownership of submarines and to develop the appropriate doctrines going from clockwork mouse for surface ships and aircraft to hunt to Cold War strategic assets.

Still the debate continues. Media fascination with every detail of the complexities and costs of acquiring and refitting the four British 2400 to Canadian standards, even with three boats now operational, has sustained the scepticism of many, amplified by the characteristic Canadian ambivalence toward issues of defence and security. It is more difficult to show a submarine doing useful work than other platforms. Their strength is their invisibility – not their availability to show the flag or engage in massive relief or rescue operations! One speaker at the NAC conference argued that the *Victoria*-class is still value for money, particularly when the crew size compared to a frigate is taken into account. This view was countered by another speaker whose calculation was that the cost of the *Victoria*-class in national procurement terms was very close to that of a frigate. And Canada cannot compare its experience with the submarines to that of other countries – with regard to the *Victoria*-class we are alone. For the first time Canada has no partners who operate the same class of submarines.

The public has the right to question the *Victoria*-class acquisition and the 'Canadianization' process which, objectively speaking, has not been a smooth one for a variety of well-publicized reasons. However, the efforts of those in uniform who urged the government in the teeth of the severe fiscal climate of the 1990s to obtain the Type 2400s now looks like more foresight than they may have imagined. We are faced with defence estimates shrinking to 1% of GNP and the disappearance of the two supply/replenishment ships (AORS) and the *Tribal*-class destroyers in the near future. This means that the *Victoria*-class submarines, which were better than anything else we could get for the available funding at the time, will soon constitute a quarter of all Canada's major modernized naval assets, a revolutionary development indeed.

Notes

* Attributed to Admiral Sergei Gorshkov, father of the Soviet Navy.

Submarines, Love Them or Hate Them

Peter T. Haydon

Regardless who one talks to in the Canadian defence community, most have an opinion on the logic of the Royal Canadian Navy (RCN) operating submarines. As one might expect, those opinions are largely polarized between supporters and opponents with a very small number of undecided – mainly those without adequate knowledge to form an opinion and the honesty to say so.

Those who oppose the RCN's continuing use of submarines do so for many reasons that can be summarized into two beliefs:

- they are too expensive and divert scarce funds from other national defence and/or social programs; and
- submarines have no useful role in supporting government initiatives at sea and represent predominantly 'offensive' capabilities and are thus inconsistent with Canada's 'defensive' security policy.

As seen during the public debate that followed the controversial 1987 Defence White Paper, the plan to add

nuclear-powered submarines (SSNs) into the Canadian fleet introduced several new factors into the debate. Some were based on an incomplete understanding of modern submarines while others focused on issues such as non-proliferation, the dangers of undertaking new strategic roles, and concerns over the necessary technology transfers and related infringements of Canadian sovereignty.

That these issues became publicly volatile can be attributed in part to a poor DND public relations policy on the submarine acquisition program. Simply, the concept of operations and the acquisition process were not adequately transparent. As a result the public debate became a virtual garden of myth and misinformation the flowers of which remained to be plucked at will for use in subsequent public debates on submarines – with or without nuclear propulsion.

The 1987-89 Canadian SSN program was one of those situations where the military solution to a new security challenge was out of step with the political and public perceptions of sensible and affordable defence policy. Nevertheless, the government let the RCN press ahead with the planning for a fleet of 10-12 SSNs. It was during this process that it became clear that not only had the government misjudged the cost and technical complexity of acquiring and operating the vessels but also that some key political and bureaucratic support was absent. The program was eventually cancelled for 'financial reasons.'

Twenty years earlier, when the RCN embarked on another ambitious program to acquire modern submarines for defensive operations within NATO, the Minister of National Defence, George Pearkes, required that the navy write a paper explaining in simple terms the strategic need for submarines and the general concept of operations. There is no proof that this public relations initiative made a significant difference, but when the government eventually placed an order for three new submarines to be built in Britain there was no major public outcry. Their primary purpose, it was explained, was to support anti-submarine warfare (ASW) training for both the RCN and Royal Canadian Air Force (RCAF). Their assignment to NATO for ASW patrols in wartime was not made widely known for obvious security reasons. There was virtually no public opposition to the acquisition.

Plans to replace the three British *Oberons* were already underway when the Cold War ended in 1989 with the fall of the Berlin Wall (and the collapse of the Soviet Union itself in 1991). Idealist expectations of a 'peace dividend' after 40 or so years of what was seen as needlessly high defence spending were soon introduced into the submarine debate. Interestingly, opposition to the replacement program came as much from politicians as from the traditional sceptics. Eventually, after what seemed like years of haggling, the government reluctantly agreed to buy four mothballed submarines from Britain. The resulting controversy over their real cost coupled with problems in 'Canadianizing' them and the unfortunate accident in HMCS *Chicoutimi* in transit from England to Canada turned the submarines into lightning rods for the media and other naysayers. Despite many attempts by the navy and the naval community at large, a satisfactory rationale for those vessels has never been universally accepted.

*Royal Navy **Trafalgar**-class submarine HMS **Triumph** silhouetted against the Middle Eastern sun, 19 January 2012. Canada considered a purchase from this class in the late 1980s.*

So, what is wrong with the explanations already provided? Only a mind-reader could possibly answer that question. A primary reason for saying this is that the submarine opponents have never countered the navy's stated rationale for Canada operating submarines. All they have done is challenge the financing of the four ex-British *Upholders*, argue that submarines are unaffordable, and cling to the ancient argument that submarines are 'offensive' and therefore have no real purpose in Canadian maritime strategy. The basic problem with these arguments is that not only do they show a lack of understanding of the modern submarine and the diversity of tasks it can carry out but also a distinct lack of understanding of Canadian maritime strategy.

As those who have studied the convoluted history of Canadian maritime strategy have found, that strategy is, correctly, politically driven and achieved by a careful balancing of desired capabilities and available funds. The

The Canadian submarine HMCS ***Corner Brook*** *(SSK 878) pulls out of her berthing at Submarine Base New London, May 2009.*

RCN seldom gets what it asks for. In the present unsettled and uncertain world, national security frequently has to be protected at long range. Force flexibility rather than specialization thus becomes necessary. A single-purpose submarine, like those of WWII or the missile-firing submarines of the Cold War, obviously do not fit into the modern fleet structure of countries like Canada. With or without nuclear propulsion, the 21st century submarine is truly flexible. In fact, it is as technologically complex and advanced as a space vehicle, and thus the focus of scientific and technological innovation. The modern submarine is infinitely more than a weapons platform, it has become a multi-purpose warship with several important advantages over surface ships.

Does Canada need a such a capability? I'll put the nuclear propulsion debate aside for now, but if we are serious about looking into the future of Canadian submarines that debate needs to be held. Current thinking on Canada's maritime strategy holds that the navy has two main tasks.

1. The protection of Canadian waters and remote coastal areas in conjunction with other services and government agencies as well as with forces of the United States under agreed circumstances.
2. To act as an instrument of Canadian foreign and security policies around the world as directed by government.

Modern submarines contribute to these tasks by exploiting three inherent capabilities.

Stealth. The inherent ability to operate unseen and with low risk of detection makes submarines ideal platforms from which to conduct surveillance and provide security for high-value surface formations operating in contested waters. Adding autonomous vehicles and electronic intercept equipment to the submarine's inventory gives a submarine an enormous advantage over any other surveillance platform.

Endurance. The average modern, non-nuclear-powered submarine can remain at sea without replenishment for six to eight weeks including transit time to and from the patrol area. At the moment, Air Independent Propulsion (AIP) can extend the time on a largely stationary patrol, but cannot charge the batteries and does not provide enough power for high speeds. Surface vessels do not have this degree of endurance even using a dedicated replenishment vessel, and a multi-ship surface formation has no stealth capability at all.

Flexibility. Unlike their predecessors in WWII and the Cold War, modern submarines are able to carry out a wide range of tasks. For instance, a submarine on a surveillance task can be re-tasked to undertake defensive tasks or even to move to another surveillance area with different priorities. Once deployed, a submarine can be a completely flexible strategic resource.

Swedish submarine HSwMS ***Gotland*** *was transported to Naval Base Coronado in San Diego to begin a one-year bilateral training effort with the US Navy's anti-submarine warfare forces, 27 June 2005.*

Simply, the strategic and operational value of a submarine today increases proportionally to the new technologies incorporated and retrofitted into the design. One can conclude that the public and private sector dichotomy over the requirement for Canadian submarines is hampered by a general lack of understanding of what a modern submarine is and what it can do. Much of the present debate focuses on the question, can Canada afford to operate submarines? This in fact is the wrong question for the 21st century. The better question for debate is can Canada afford *not* to operate submarines?

Love them or hate them, intelligent debate must begin from a thorough understanding of modern submarines.

A View from the West:

Indonesia at a Maritime Crossroads

Brett Witthoeft

Credit: Reuters/Darren Whiteside

*President Joko Widodo shouts **Merdeka**, or Freedom, at the end of his speech, during his inauguration at the House of Representatives building in Jakarta, 20 October 2014.*

The election of President Joko Widodo, popularly known as Jokowi, in September 2014 heralded a shift in Indonesia's political landscape as he became the country's first leader to have come from outside the political establishment. The policy change of most interest to *Canadian Naval Review* readers is his announcement of the new Maritime Axis doctrine in November 2014 which appears to be a shift towards a domestically-oriented, tough-line maritime policy. The announcement of such a high-profile maritime policy is appropriate: the Indonesian archipelago is comprised of some 17,000 islands; has the world's sixth-largest Exclusive Economic Zone (EEZ), at over six million square kilometres; and sits astride some of the most critical sea lanes in the world, including the Strait of Malacca.

The Maritime Axis is built on five pillars: rebuilding Indonesia's maritime culture; managing maritime resources, particularly through the development of the fishing sector; prioritizing the development of maritime infrastructure, such as deep sea ports; engaging in greater international maritime diplomacy to address issues such as territorial disputes, piracy and illegal fishing; and developing Indonesia's maritime security capabilities.[1] One of the major developments to come out of the Maritime Axis thus far is the intent to create an independent coast guard under the jurisdiction of the Transportation Ministry by the end of 2015, with personnel and vessels to be drawn initially from the navy.[2] Given its significant maritime responsibilities, it is surprising that Indonesia does not already have a coast guard, but previous efforts to create one have succumbed to political wrangling. Legislation was passed in 2008 but agencies with overlapping maritime duties stymied the bill's implementation to protect their political territory.

Jokowi's Maritime Axis is both a significant shift from the maritime policy of the previous administration of President Susilo Bambang Yudhoyono, and a case of the political establishment aligning with the forward-leaning military. The Indonesian Navy and Air Force have been vocal on regional security issues over the past couple of years, particularly those in the South China Sea (SCS). A year before Exercise Komodo, a humanitarian assistance and disaster response exercise in summer 2014, a naval commodore explained that Komodo, which was

held in the Riau Islands in the SCS, would also serve as a platform to reaffirm Indonesia's sovereignty over the island group in response to China's competing claims in the area.[3] (The commodore specifically cited the issue of the Sipadan and Ligitan Islands which Indonesia lost to Malaysia in a 2002 International Court of Justice ruling due to Malaysia's effective control of the islands, and Indonesia's lack of protest at Malaysia's activities there.[4]) The head of the Indonesian military stated that the military would increase its forces in the Riau Islands to act as an "early warning system,"[5] including the dispatch of eight new Apache attack helicopters there. An air force commodore working for the Political, Legal and Security Affairs Minister complained that Chinese maps include one of the Riau Islands within the area covered by the nine-dash line (again, likely prompted by Indonesia's Sipadan-Ligitan experience).[6]

In contrast, the Yudhoyono government downplayed such concerns and actions, and prioritized restraint and dialogue. Specifically in response to the Apache helicopter deployment news, Foreign Minister Marty Natalegawa stated that the helicopters were merely part of procurement initiative to create a minimum essential force, and not a response to a regional arms build-up.[7] More broadly, Natalegawa emphasized that there was no territorial dispute with China over the Riau Islands and that Indonesia was not a part of larger SCS disputes.[8] This position continued one that Indonesia had taken since the 1990s. However, the number of top Indonesian military officials voicing concerns in recent years, as China increased its assertiveness in the SCS, suggests that an internal policy debate was underway and has been concluded with the announcement of the Maritime Axis doctrine.

Thus far, government activity supporting the second pillar of the Maritime Axis – managing maritime resources – has been the most robust. The fishing industry employs millions of Indonesians, but the country exports less fish than Thailand, despite having a vastly larger EEZ. Jokowi blames this disparity on illegal fishing – in an interview in December 2014, he said that almost 4,900 fishing boats operate illegally in Indonesian waters every day.[9] This illegal activity costs Indonesia over USD $20 billion a year in lost catches, which prompted Jakarta to take a tough line against poachers. The navy has begun sinking foreign boats that fish illegally in Indonesia's EEZ, with boats from Malaysia, Thailand, the Philippines and Vietnam being scuttled thus far (with little protest from their governments).[10]

However, the execution of the second policy pillar conflicts with the fourth – promoting international maritime diplomacy – and could have repercussions with Indonesia's neighbours. To date, the sunken boats are from countries in the Association of Southeast Asian Nations (ASEAN), an association of which China is not a member. Eight Chinese junks were seized in December but have not been sunk, as Jakarta is taking the 'persuasive route' instead. The limited enforcement of Jokowi's strict policy is an example of *realpolitik* – Indonesia does not have sufficient ships to patrol its EEZ, and Jakarta has already

Credit: Economist 3 January 2015

The Indonesian archipelago consists of approximately 17,000 islands.

Credit: Indonesian Navy

A pair of Papua New Guinea-registered ships are destroyed by the Indonesian Navy after they were caught poaching fish in Indonesian waters. Indonesia is cracking down hard on illegal fishing and has destroyed a number of ships so far.

experienced the power China brings to bear in fishing disputes[11] – but it comes as ASEAN is divided over maritime issues, particularly in the SCS. Illegal fishing is not unique to Indonesia and a united ASEAN will be more difficult to achieve if the organization's largest member is inequitably sinking ships. Indeed, the Jokowi government has stated several times that it is prioritizing its national interests, and that it is taking a foreign policy view beyond ASEAN, traditionally the cornerstone of Indonesian foreign policy.[12]

Although it is early in Jokowi's term, his government is clearly plotting a muscular course forward, as highlighted by the Maritime Axis doctrine. This course is rooted in the advancement of domestic issues, which is to be expected since as a political outsider Jokowi needs national-level support, but the doctrine also has regional implications. Several key questions arise. Will Jokowi be able to deliver effective maritime agencies, such as a coast guard? Will the tough execution of the Maritime Axis result in the unification or further division of ASEAN? And if ASEAN comes together, will it challenge China's assertiveness in the SCS? And, perhaps most importantly, does the Maritime Axis herald a regional sea change?

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Dollars and Sense:
Improving Defence Procurement*

Dave Perry

Credit: Halifax Shipping News

*HMCS **Montreal** on post-modernization sea trials, May 2014. **Montreal** is the 3rd ship to go through the **Halifax**-class Modernization/Frigate Life Extension process.*

If all goes according to plan, 2015 will be a seminal year in the naval recapitalization program. In January, a contract was inked to build the Arctic/Offshore Patrol Ships which means steel should be cut this fall. That same month, the *Halifax*-class Modernization/Frigate Life Extension program hit Initial Operating Capability, on schedule. These milestones provide hope that defence procurement might finally be getting on track and offer some good news amidst a sea of negative headlines.

Some optimism is needed given the track record of difficulty on this file. While procuring complex military platforms has never been easily accomplished, in Canada or elsewhere, recently the problem has taken a unique turn. Historically, a major problem for the Canadian forces was a lack of funds to buy new kit. In recent years though, a much different problem has emerged. Since 2007/2008 an average of 23% of the Vote 5 Capital funds made available to the Department of National Defence (DND) by Parliament have gone unused in the year they were provided. In contrast, between 1973/1974 and 2006/2007 the average under-spending of the Capital Vote was only 2%. This dramatic change after 2007/2008 suggests that procurement difficulties reflected in the headlines of late represent a uniquely challenging set of procurement issues that differ from those experienced in the past. Similarly, the impact of the inability to spend the funds available is having a more serious impact than it did previously. Even when the funds are made available to DND (and much of the funding is through accounting methods such as re-profiling or carry-forwards), because they are not adjusted to account for inflation, the purchasing power of those procurement dollars is reduced.

The causes of this unprecedented problem are multi-faceted, but can be grouped into five main areas: an increased workload; a capacity shortfall; budgeting problems; difficulties generating and communicating military requirements; and a breakdown of trust in the procurement system. In 2005, Prime Minister Paul Martin launched the recapitalization of the Canadian military with the Defence Policy Statement and that year's budget provided multi-year funding to pay for it. When the Harper government came into office in 2006, it left those capital plans intact, and added to them. As a result, the number of Major Crown projects reported by DND increased almost threefold between 2000 and 2011 and there are now 13 projects valued at over a billion dollars.

More difficult to capture is the significant increase in complexity associated with many projects, particularly those that fall under the National Shipbuilding Procurement Strategy (NSPS). Beyond the increase in actual projects, the workload required has increased dramatically because of a litany of new approval steps and increased documentation which have added additional processes to move files. On its own, the additional workload would have been a problem, but it has been compounded by the decimation of the acquisition workforce in the 1990s. At this time, Industry Canada, Public Works and Government Services Canada (PWGSC) and DND all shed acquisition officials, and that downsizing has for the most part never been reversed. As a consequence, there are fewer procurement officials in the system and those who remain have comparatively little experience with complex procurements due to the paucity of major acquisitions since the 1990s. The Materiel Group at DND alone is dealing with a twofold increase in workload over the last two decades.

In addition to the mismatch between workload and workforce there is a similar mismatch between the funding available and what DND is trying to accomplish. There are simply too many potential projects for the defence budget to deliver. Furthermore, many projects have been hampered by project budgeting practices in which early rough estimates morph into firm caps on expenditures. The change in the early 2000s to incorporating all forecasted

inflation into these estimates based on the expected duration of a project has meant that any delay which creates a deviation from that schedule erodes the accuracy of these early estimates as purchasing power is lost over time. As a consequence, because of fixed budgets, as time progressed the capability and quantity of kit procured was reduced to stay within the project budget. The $400 million increase to the AOPS project budget in January is an exception to this trend, notable for its uniqueness.

Beyond the budget dollars, there have been significant concerns about the way that military requirements have been generated. The best example of such concerns is the move by PWGSC to have the National Research Council (NRC) review the Statement of Operational Requirement (SOR) for the fixed-wing search and rescue aircraft. Having the NRC review the air force's requirements document was a clear indication of a lack of confidence that the work had been undertaken in a satisfactory manner. That move is also indicative of a wider problem, the loss of trust among actors in the procurement system. While the erosion of trust has multiple causes, the series of problems related to the project to acquire the F35 worsened already strained relationships. The controversy over the fighter revealed serious concerns about the way a major procurement was unfolding and again raised concerns about how the RCAF developed its SOR.

Improving on this state of affairs will require concerted action to address the first four problem areas mentioned earlier. Action to rationalize the current mismatch between workload and capacity would be a first step towards improving those outcomes. This should begin with the much-awaited renewal of the Canada First Defence Strategy (CFDS). A new CFDS should be completed forthwith with a view to: (1) establishing strategic priorities that can guide future procurements; (2) resolving the mismatch between funding and planned capabilities; and (3) prioritizing planned purchases. This needs to be matched by efforts to increase the capacity of the acquisition workforce, both by increasing its size, with particular focus on the Major Project Delivery organizations in the Materiel Group, but also Industry Canada's Industrial and Technological Benefits branch, and the shipbuilding and defence procurement secretariats at PWGSC. Officials working in these areas need to be provided greater access to training and the frequent rotations that are current practice should be switched to a posting cycle which is oriented around the achievement of major project milestones. Consideration should also be given to establishing dedicated non-command career paths to develop greater procurement expertise in the Canadian military.

Credit: Wikimedia Commons

A 442 Transport and Rescue Squadron CC-115 ***Buffalo*** *at Rockcliffe Airport in Ottawa, on 1 July 2004.*

The process of generating and communicating requirements could benefit from three moves: (1) increasing efforts by DND to familiarize the central agencies and other bureaucratic actors with the defence program; (2) continuing industry engagement sessions, with a focus on facilitating honest, two-way dialogue; and (3) extending efforts to improve communications, both inside government and between government and the public, through increased use of technical briefings. Additional efforts could be made to improve costing practices by instituting a pan-government approach to life-cycle costing, including assigning adequate project contingencies to account for losses of purchasing power. This should include building flexibility into DND's investment plan to account for cost escalation, delay and new priorities, and factoring in any additional costs related to the changed offset policy under the Defence Procurement Strategy (DPS). Finally, the changes of the DPS should be implemented as a total package to ensure that the DPS effort, ostensibly balanced between improving economic outcomes and improving the delivery of military equipment, proceeds as intended. Improvements across these four areas will serve to restore trust in the procurement system.

While procuring complex systems will always be difficult, enacting these suggested changes should improve the delivery of military equipment. For the RCN, improving the entire procurement system for military goods is required to get the shipbuilding program on track. Naval projects must compete for time and attention with other projects that are clogging up the system, and are being judged through the lens of recent difficulties encountered by the air force in particular. Significant effort is therefore needed to improve procurement overall to make sure the RCN gets what it needs.

Notes

* This article draws on David Perry, "Putting the 'Armed' Back into the Canadian Armed Forces," Vimy Paper, CDA institute and Macdonald-Laurier Institute, January 2015.

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Warship Developments:

Why Such Delays and Prognostication?

Doug Thomas

Like the never-ending winter that all but West Coasters are enduring, I am getting very tired of delays in replacing naval equipment, including shipborne helicopters. I hope to live long enough to see the Cyclone helicopter deployed at sea, but there are still 50-year old Sea Kings in the skies over CFB Shearwater. I am currently in good health, but will I see the new AORs? Hopefully. Will I live to see the Canadian Surface Combatant (CSC) that is intended to replace our current destroyers and frigates? That may be a stretch based on the experience of the past few decades!

It is hard to understand why HMCS *Harry DeWolf*, the first Arctic Offshore Patrol Ship (AOPS), will not commence sea trials until at least 2018. The initiative to build these vessels for the navy was announced by Prime Minister Stephen Harper in July 2007. It was understood at the time that the AOPS design would be heavily based on the Norwegian Coast Guard vessel KV *Svalbard* – an uncomplicated and relatively inexpensive ship (about US$100 million in 2002). The Canadian vessels will be considerably more expensive yet smaller and slower than *Svalbard*, but will have improved capabilities in surveillance, supporting other government initiatives in the Arctic, improved habitability and improved ability to support operations ashore. Nevertheless, why didn't we buy or lease a *Svalbard* or similar vessel, and gain experience during the years needed to build our own? We would have established a presence in the North much earlier, and gained experience operating in northern waters which could have been applied to operating the new ships.

I appreciate that the National Shipbuilding Procurement Strategy (NSPS) should help with future naval programs but meanwhile the *Tribal*-class destroyers and Replenishment Ships *Protecteur* and *Preserver* have been condemned to the scrapyard and their replacements are a distant promise. These ships served Canada well, and for considerably longer than expected when they were built. They were allowed to wear out in service to the point of decrepit old age, when cracks and breakdowns became commonplace. In the future, one hopes that procurement necessary to meet agreed DND requirements will be implemented in a more timely manner rather than be the subject of perpetual political infighting or departmental inaction.

Looking back, the government decision in August 2008 not to proceed with building Joint Support Ships (JSS), due to cost estimates of the two consortia bidding on the contract, was a bad one – there was barely enough

Credit: Internet

The Norwegian Coast Guard icebreaker and offshore patrol vessel KV ***Svalbard*** *(W303).*

available funding ($2.9 billion) to build two ships rather than the required three. So what has happened? We have finally agreed that we will build only two ships, they will be an Improved *Berlin*-class as operated by the German Navy, and we may have them operational in about 2020 – six years after withdrawing *Protecteur* and *Preserver* from service. The continuing delay with this project means an increase in the cost of raw materials at the same time as there has been a considerable drop in the value of the Canadian dollar. This will inevitably mean an increase in the cost of JSS, the end of any possibility of adding a third ship, and possible further dilution in capability to reduce cost. Let me see: World War II lasted for about six years, and we will go that long before re-acquiring a

Credit: Mass Communication Specialist Petty Officer 2nd Class Erica R. Gardner, USN

The Canadian Navy auxiliary oiler HMCS ***Preserver*** *(AOR 510) participates in the Parade of Ships during New York City Fleet Week, 20 May 2009.*

capability to operate a Canadian task group with its own underway replenishment capability. What is wrong with this picture?

Our former four *Tribal*-class destroyers have been whittled down to one: HMCS *Athabaskan*. However her retention is for a few years at best and at a reduced state of readiness. I shudder to think of the commentary by the chattering classes regarding the much more expensive Canadian Surface Combatant Project, which will first replace the navy's area air defence and command and control capability resident in the *Tribals*, and later the general purpose capability of our current frigates.

Like so many recent procurement programs – many of them naval it seems – 'sticker shock' seems to be part of the problem. It is rather like trading-in an elderly family car: you step into a dealer's showroom with the aim of buying a safe, fuel efficient and reliable vehicle. You sit down with a salesman to price out something that meets your requirements, only to find that costs have skyrocketed. What do you do? If you need a new car to meet your transportation requirements, you bite the bullet and pay what it costs because you realize that you are not going to get a new car for the same price that you paid for your old car 10 years ago.

Recently CBC television aired what should have been a good news story about HMC Submarine *Victoria*. *Victoria* took observers to sea to demonstrate that she had assumed high-readiness and was ready to deploy anywhere the Canadian government might need her. The coverage concentrated on costs and delays, accidents, that these boats are 25 years old and that only *Victoria* was high-readiness, that two others were at a lower state of readiness, and the fourth in refit. The inference for the viewer was that there was a problem in that only one submarine was fully operational. There was no explanation of what was meant by tiered readiness, whereby ships and submarines rotate through various stages of readiness and availability based on a cycle of refits, work-ups and the need to conduct deployments to more dangerous areas of the world.

Then, to balance what the navy was saying, CBC invited comment from a certain professor from the University of British Columbia who has been a bitter foe of the *Victoria*-class and other naval programs, and who – not surprisingly – repeated his litany of complaints. There was no mention that the four ex-British submarines were laid up in reserve for a number of years after completion, due to the Royal Navy switching to an all-nuclear submarine force, or that the Chretien government dithered for four years after expressing an interest in acquiring these

Credit: Jacek Szymanski, Navy Public Affairs

*HMCS **Victoria** transits near Esquimalt during sea training trials and exercises, 20 February 2012.*

submarines, or that the purchase price for all four was about the cost of one new submarine. And, finally, there was no mention of the reality that *if* these second-hand vessels had not been acquired, Canada would have lost its submarine capability as the government was unwilling to pay the cost of new submarines, and that the delay in achieving high-readiness is due to a serious lack of funding rather than an inherent problem with the design.

Surely our national governments – of whatever political stripe – should be able to decide what defence capabilities are needed, and budget for that well into the future. Forward planning should require broad agreement by the major parties as to defence requirements, so that there are no fundamental arguments against a previously agreed capability every time we need to replace a class of ships or an aircraft. If the project seems excessively priced, it is understandable that there will be discussion, but it seems to me that the recent policy of including cost of future maintenance, fuel, personnel, eventual disposal, etc., simply inflames the rhetoric from individuals who don`t agree with spending *any* money on defence. It seems that there is always a nasty argument against whatever big-ticket item is the topic of the day.

I would posit that this large G-7 country needs certain defence capabilities. For example, it needs a national general purpose naval task group, deployable anywhere in the world to safeguard national interests and able to operate with Canadian allies. In order to do this we need to equip that task group with suitable area air defence, surface and anti-submarine warfare capabilities, command and control facilities that can be integrated with those of our major allies, and an underway replenishment ship carrying supplies, spares, ammunition and helicopter repair facilities for our ships and their Cyclone helicopters. Such a capability is described in the Defence White Paper of 1994 and, presumably, is still in effect.

Book Reviews

"A" Force: The Origins of British Deception During the Second World War, by Whitney T. Bendeck, Annapolis, Maryland: Naval Institute Press, 2013, 259 pages, (Hardcover) US$32.95, ISBN 978-1-61251-234-1 (ePub)

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

Whitney T. Bendeck, a historian and assistant instructor in the International Affairs Program at Florida State University, has written a revealing book about the use of deception by the British Army in North Africa during the Second World War. Her interest in deception apparently came about after she visited Normandy in 1988.

Bendeck traces the origin and development of deception as a tool of the British Army from the time of its inception following the declaration of war by Italy on the United Kingdom on 10 June 1940 through the defeat of the German and Italian military forces in North Africa on 13 May 1943. This book has copious end notes and an extensive bibliography.

The key proponent for the development and use of deceptive strategies and tactics was General Archibald Wavell, the Commander-in-Chief of the British Army, Middle East. The General knew that he required an innovative and intelligent officer to head up the development and implementation of deception strategies, plans and operations. His choice was Lieutenant Colonel Dudley Clarke who arrived at the General's headquarters on 19 December 1940 with the title Personal Intelligence Officer (Special Duties). This enigmatic title was cover for his real duties that included deception and gathering intelligence from British prisoners of war in the region, as well as assisting in their escape activities.

It was quickly realized that intelligence staff could not develop deception strategies and plans as well as conduct the field operations. This lead to the creation of the unique Advanced Headquarters "A" Force in the Middle East on 28 March 1941, at a time when this was the only real land war being mounted by the British. The book chronicles the activities of Colonel Clarke and "A" Force in the Africa and Middle East theatres, with a focus on the battles in Egypt, Libya and Tunisia until the defeat of Field Marshall Erwin Rommel's AfrikaKorps and Italian allies in May 1943.

There was no template or history upon which "A" Force could draw. The strategies and plans were largely the creation of Clarke and the handful of people in his new organization. The name of Advanced Headquarters "A" Force was an act of deception itself – it suggested an advanced headquarters for an airborne formation. With but three officers, 10 other ranks and its office in a converted bathroom in a building in Cairo, it was hardly a platoon let alone a formation. The headquarters at least had a clean sheet of paper on which to write its mandate, and the support of the Commander-in-Chief as well as the army leadership back in London and Prime Minister Winston Churchill. From this beginning the organization grew by 1943 to 41 officers, 76 non-commissioned officers and three company-size visual deception sub-units. It was also assigned the resources of various army formations as required to conduct deception operations. In reality it had become an additional combat arm.

The story of actual operations is best left to Professor Bendeck to tell. It is sufficient to say that the defeat of the AfrikaKorps and Italian Army would have been much more difficult and protracted if the "A" Force had not existed. It was so successful that the deception activities for the invasion of Normandy in June 1944 were patterned on the North African campaign.

To keep the Germans in the dark about the real British intent, Clarke employed visual effects, spurious communications, loudspeakers, double agents, and a host of other techniques. In the end they proved the statement of Sun Tzu in *The Art of Warfare*, written more than 2,000 years ago, to be correct. Sun Tzu said that "warfare is the art (tao) of deceit. Therefore, when able, seem to be unable; when ready, seem unready; when nearby, seem far away; and when far away, seem near. If the enemy seeks some advantage, entice him with it."

This dictum remains as true today as it was in the Second World War and the times of Sun Tzu. This book is a good start in learning the art and skills of deception in warfare.

Lost Beneath the Ice, by Andrew Cohen, Toronto: Dundurn, November 2013, 152 pages, 89 colour illustrations (Images selected by Parks Canada), ISBN 978-1-45971-949-1

Reviewed by Gwynne Allanford

Lost Beneath the Ice is a visceral account of Captain Robert McClure and his crew's haphazard discovery of the first waterways that are part of the Canadian Arctic's Northwest Passage. More specifically, though, Andrew Cohen's narrative focuses on the ship's merciless servitude to

Mercy Bay in the Northwest Territories of Canada. From the year 1851 to 1853, HMS *Investigator* along with her captain and 65 crewmen were stuck in the unforgiving polar ice at Mercy Bay finding themselves without food, resources or any means of external communication.

HMS *Investigator*, a Scottish merchant vessel purchased in 1848 by the British Admiralty, initially embarked in 1850 as one of many ships appointed by the Royal Navy on a mission in search of the missing Sir John Franklin, who had led an expedition to the Arctic in 1845. Cohen's account illustrates the heroism of *Investigator*'s crew, since after years lost at sea they were both survivors and solvers of a long-puzzling mystery. They did not locate the missing Franklin expedition but they did contribute to mapping out the Northwest Passage, specifically the route that would come to be known as the McClure Strait.

Through this historic chronicle, Cohen pieces together the dynamics of a disorderly crew and an implacable captain in harrowing conditions and brings forth an archive of discovery, struggle and extraordinary circumstance. Today, with a warmer planet and less Arctic ice, the Northwest Passage finally promises to yield real economic bounty, connecting the Arctic, Atlantic and Pacific Oceans.

Through uncovered blueprints of the ship's construction and layout, as well as the authentic and often eerie illustrations provided by Lieutenant Gurney Cresswell of *Investigator*, the reader is provided with both a practical understanding of the events and a close awareness of the terrible isolation at Mercy Bay so many years ago. The exploration of the wreck of HMS *Investigator*, which was located in 2010, provides the occasion for revisiting a paramount exploration in Canadian cartography. Cohen's account is both factual and engrossing as a beautifully historic narrative.

The Liberty Incident Revealed: The Definitive Account of the 1967 Israeli Attack on the US Navy Spy Ship, by A. Jay Cristol, Annapolis, Maryland: Naval Institute Press, 2013, 392 pages, photographs/maps, ISBN 978-1-61251-340-9

Reviewed by Major Chris Buckham

On 8 June 1967, during the height of the Arab-Israeli Six Day War, units of the Israeli Air Force and Navy attacked the US intelligence-gathering vessel *Liberty*, torpedoing and strafing the ship multiple times. The result was significant damage to the ship, 34 dead and 171 wounded. Given that the ship was in international waters (12-14 nautical miles off of the Sinai Peninsula), the attack was deliberate and the fact that she was openly identifying herself as an American ship meant significant controversy resulted that has continued to play out over the succeeding years over the reasoning behind Israel's actions.

This most recent edition of Cristol's book expands upon his original copy by incorporating additional material that has been declassified in the intervening years (his original book was published in 2002). The author makes it clear at the outset that his position is that the attack was made in honest error by the Israelis as a result of a series of internal communication and command and control failures. These errors were compounded by concurrent failures within the US naval communications system. The tragedy was made all the more poignant by the fact that *Liberty* was exactly where she had been ordered to be and undertaking activities that she had been directed to perform.

Cristol has included verbatim texts from the flight recorders between Israeli air controllers and pilots as well as for Israeli naval assets as they track on to target. It is very clear that there was significant confusion amongst Israeli commanders regarding the nationality of the ship – potential identification went from Egyptian to Soviet to American. Working back from this, the author describes in detail not only the operational deficiencies within the US and Israeli command systems but also the subjective factors that influenced decision-making.

For example, he notes that the Israeli Navy was the poor stepchild of the Israeli military with the Army and Air Force consistently receiving the lion's share of funding and public recognition. Further exacerbating this, inter-service relations between the Air Force and Navy were very poor; thus naval commanders were actively looking for an opportunity to grab some of the glory from the war before it was too late.

Cristol's investigation of this aspect of the incident is fascinating as it reinforces the impact of the 'human factor' and the 'fog of war' on the derailment of the effective execution of operations. Furthermore, it illustrates the potential escalation as a result of misunderstanding. Thus, this crisis threatened to spin into a global conflagration between the United States and the Soviet Union as the United States suspected that it was a Soviet submarine that had attacked *Liberty*.

The book is very well written with a logical and well-founded thesis. The author acknowledges the arguments of those who feel that the attack was in fact deliberate on the part of the Israelis and refutes their points through

studied and well-structured argument. His inclusion of copies of the official reports as well as the transcripts of the communication logs between the naval and air assets of the Israeli forces and their command centre provides excellent insight for the reader into the confusion and dysfunction existing within both the US and Israeli militaries. This book provides good value, and it is an excellent read about a side incident often overlooked in the histories of the Six Day War.

Failures and Fiascos: Atlantic Canada's Biggest Boondoggles, by Dan Soucoup, Halifax: Nimbus Publishing, September 2013, 176 pages, $17.95, ISBN 1-77108-042-6

Reviewed by Rebecca Steele

The problems with economic development that Canada's East Coast maritime region faces today are longstanding. Over the years, governments and independent investors have tried various strategies to improve the region's economy, security and to integrate the three Maritime provinces (New Brunswick, Nova Scotia and Prince Edward Island) with the rest of the country – and some have proven more effective than others. *Failures and Fiascos* is Dan Soucoup's take on the stories of the less successful initiatives. In 25 short vignettes, Soucoup details the more dramatic and in some cases disastrous failed investments in the Maritimes.

Failures and Fiascos spans the last 200 years, and includes photographs and contemporary quotes in each chapter to situate the reader. By the end of the book, a theme has emerged: a lack of sustainable funding prohibits the completion of attempts to bring industry to the Atlantic provinces, creating a net loss and perpetuating a negative feedback loop. Initiatives range from efforts to connect the Maritimes to the rest of Canada using railways to an attempt at growing hydroponic cucumbers. Soucoup analyzes and ridicules this diverse group of incidents with varying degrees of success.

His exploration of some of the well-intentioned but doomed projects, like the Chignecto Ship Railway, is insightful. However, his analysis on maritime security falls short. His section, The Boats that Wouldn't Float, details the Canadian acquisition of retired British *Upholder*-class submarines (renamed *Victoria*-class). Soucoup is highly critical, and suggests that the total number of days the four vessels have spent in the water qualifies the purchase as a 'fiasco.' He condemns Canada's decision to continue to invest in repairing the submarines, suggesting that it would be prudent to abandon the fleet altogether before more money is wasted.

What Soucoup fails to recognize or acknowledge is that although the submarines were problematic, they were the only way to keep the Canadian submarine program afloat. Making frequent references to nuclear submarines, Soucoup seems to imply that this would have been a superior purchase. He would be hardpressed to find anyone who would disagree – however, with a limited budget, this more advanced equipment was simply not an option for Canada at the time. The British submarines were a better option for Canada than abandoning submarines altogether. It is also important to note that many of the incidents that kept the boats out of the water were operational failures rather than mechanical ones. Although the submarines have required more time and money than initially expected, Canada could still get returns on its investment – for example, there is talk of using HMCS *Chicoutimi*, one of the four submarines, for anti-piracy patrols in the Horn of Africa.

This tendency to sensationalize the issues Soucoup addresses is found in other chapters as well, where he favours scandal and excitement over the facts that were available at the time of the decision. While this has allowed Soucoup to write a quick and fun read, his brevity has cost him – the 25 stories on which he focuses are often more complex than can be explored in the few pages he allots to each.

To Crown the Waves: The Great Navies of the First World War, edited by Vincent P. O'Hara, W. David Dickson and Richard Worth, Annapolis, Maryland: Naval Institute Press, 2013, 360 pages, US$37.95 (hardcover), ISBN 978-1-61251-082-8

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

To Crown the Waves is a most interesting source of information for those who are fascinated by the major navies that participated in the deep sea and littoral engagements of the First World War. This work is a comparative analysis of seven major participants (Austria-Hungary, France, Germany, Great Britain, Italy, Russia, the United States) and two peripheral navies. The analysis is organized into a standard format, in the case of the seven major participants, that comprises four components: back story; organization; the ways of war; and war experience and evolution. The last section includes a summary and assessment of the navies' performance in the conflict. Thus, it is an analysis that should interest political students and military historians.

Credit: RCN

Canadian and allied ships performing manoeuvres while on a task group exercise off the Atlantic Coast on 11 August 2014.

This book will not answer all the questions that a reader may have about the organization, ships, equipment and activities of each navy but it will provide a good base for further investigation by those interested in exploring particular issues or events. The naval strategy of each country, to the extent such existed, is discussed. However, the relationship of the war at sea with the war ashore is minimally explained. Since this book is an overview, this is acceptable.

From the perspective of the Commonwealth navies, there is only passing mention of Canada and Australia. Neither were major naval participants and thus the editors may be excused of this oversight. However, the Royal Navy relied on the Dominions to help secure important trade ports and routes, while providing for their own local naval defence. This was part of the maritime strategy of the Royal Navy at the time, and should be mentioned. The omission was acknowledged by Vincent O'Hara in his endorsement of a 2013 publication authored by Phillip G. Pattee, entitled *At War in Distant Waters: British Colonial Defense in the Great War.*

In conclusion, despite this omission, I recommend this book as a useful starting point for more serious inquiry into the strategy, role and activities of the seven major navies involved in the First World War.

Pushing the Limits: The Remarkable Life and Times of Vice Admiral Allan Rockwell McCann, USN, by Carl Lavo, Annapolis: Naval Institute Press, 2013, 256 pages, $37.12 (hardcover), ISBN 978-1-59114-485-4

Reviewed by Colonel P.J. Williams

Even before the writing of this book, Admiral McCann's enduring legacy in naval lore, indeed within maritime history in general, is assured. For sailors in a submarine trapped below the surface, knowing that a capsule shaped like a wine bottle cork with the word 'McCann' emblazoned on its shell is on its way down from above, is enough for them to know that deliverance is at hand. This book tells the story of the man behind the development of this lifesaving system, still in use after its initial development almost a century ago. American author Carl Lavo has already written several books on various aspects of the US submarine service, and is thus highly qualified to write on this sailor whose battles were of a rather different kind than what one usually encounters in naval biography. In writing the book, Lavo consulted and researched widely. Although this story often deals with highly technical matters, I found Lavo's style made the book a pleasure to read.

McCann followed what was pretty much a conventional naval officer's career, securing an appointment to the US Naval Academy prior to World War 1, and serving out the conflict on a battleship based in home waters. Leveraging his engineering expertise, and understanding that command of a warship was most rapidly achieved in the undersea service, he volunteered for submarines at war's end. Like aviation in its early days, the service in submarines was not without high risk and accidents were commonplace.

McCann soon achieved his goal of submarine command and by 1922 was serving as commander of a small flotilla of subs charged with defence of the Panama Canal. During this period, one of his boats, O-5, was sunk as a result of a collision and, although a rescue was mounted in what was only about 30 feet of water, three of the crew members were lost. Perhaps more than anything else, this tragedy prompted McCann to do all that he could to develop a better system to rescue submariners in distress. After a series of other accidents at sea, his efforts were finally rewarded when the navy in 1927 posted him to the Bureau of Construction and Repair to develop the capsule that eventually bore his name. His hard work came to the world's attention most notably when he employed his capsule in the rescue of 33 crew members from USS *Squalus*, a submarine which sank in May 1939 – 26 members of the company died. In describing these events, the author relied heavily on firsthand accounts of participants and one gets a true sense of what it must have felt like for both rescuer and those trapped below. In homage to McCann, the grateful *Squalus* crew composed "A Toast to Commander Allan R. McCann, USN, Developer of the Rescue Bell," which is reproduced at the start of the book.

The story of Admiral McCann could have ended with this unprecedented event alone, but the accomplishments of this unique sailor were seemingly endless. While he was developing the rescue bell, he was also involved in early attempts to sail submarines under the Arctic ice pack. With the onset of the Second World War he commanded US submarines in the Pacific and was subsequently chief of staff of the 10th Fleet, with responsibility for the US anti-submarine effort on the east coast of the United States. While so engaged he was responsible for coordinating the destruction of five of seven German U-boats which were purported to be armed with missiles to be launched against North America.

McCann's reputation for getting things done followed him after the war, when he was eventually appointed as Inspector-General (IG) of the Navy. The post-WW II years and the advent of the nuclear age were times of great tension within the US defence community. Thinking that missiles would be the weapon of choice put the US Navy (and its carrier program in particular) at odds with the US Air Force, putting the sea service's entire raison d'être into question. As Navy Inspector-General, McCann's duties involved investigating allegations that top-ranking officers had abused their authority as part of inter-service disputes.

McCann left the navy in 1950. He passed away in 1978 and his ashes were spread at sea, appropriately from a submarine. Apart from a letter of commendation from President Franklin Delano Roosevelt for the *Squalus* rescue, Admiral McCann never received any high honours or awards for his accomplishments and, indeed, he rarely discussed the key events in his career which are recounted in this work. However, for those looking for a tale of someone who was able to identify a problem and apply himself to solve it, this book is a highly worthwhile account and is strongly recommended.

Announcing the 2015 Canadian Naval Memorial Trust Essay Competition

Canadian Naval Review is holding its annual essay competition again in 2015. There will be a prize of $1,000 for the best 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);
- 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 2015 *CNR* essay competition must be received at naval.review@dal.ca by Monday, **22 June 2015**.
- 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.

Russian *Yasen*-class, fourth generation, nuclear-powered attack submarine *Severodvinsk* in active service since 2014.

Credit: Internet