



DISARMING ARCTIC SECURITY

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Arctic Maritime Domain Awareness: A domestic and strategic imperative

Domain awareness is the ability to know with some detail and assurance what is happening within a state's territory and areas of responsibility. In the Canadian Arctic that capability becomes progressively more important as activity in the region expands, and its importance is linked much more directly to public safety than to sovereignty or national security concerns. The point, of course, is not simply to enhance awareness, but to thereby facilitate more effective emergency response capacity, support for law enforcement, and measures to ensure compliance with environmental, shipping, and other standards and regulations in the region. The focus in what follows, however, is on the former – on maritime domain “awareness” rather than domain “control.” While surveillance and monitoring capabilities are by most accounts far from adequate, the capability gaps are not entirely dire and the responsibility for closing them does not rest exclusively or even primarily with the defence department.

If, by way of example, a large luxury motor yacht, over 20 meters in length and with a gross weight in excess of 300 tons (we'll call it the *Wayland*), were to embark on a summer journey from St. John's to Prudhoe Bay, heading north through the Labrador Sea, up Davis Strait to enter Parry Channel and ultimately emerge from Amundsen Gulf and the Northwest Passage into the Beaufort Sea, what are the means by which authorities would detect and monitor its journey? Within the short-term, the next decade or so, the summer time voyage of a private luxury yacht through the Northwest Passage will remain an unusual event, but certainly not unheard of. Traffic transiting through the passage will remain exceptional, according to a 2013 study by Defence Research and Development Canada.¹ The Northwest Passage will not become a viable commercial route in the short-term, the study concludes, “due to seasonality, ice conditions, a complex archipelago, draft restrictions, chokepoints, lack of adequate charts, insurance limitations and other costs.” It is not likely to soon become a well-travelled route between the Pacific and Atlantic Oceans (although no one seems to have told the owners of the *Nordic Orion*, which hauled coal from Vancouver to Finland through the Northwest Passage in 2013, who are making plans to do it regularly²). That same study, however, does suggest that marine traffic to re-supply northern communities will grow, primarily due to population growth, and that tourism traffic, like the journey of the *Wayland*, will likely continue a pattern of modest but variable growth influenced by ice and economic conditions.

Whatever the level of traffic might now be or become, maritime “domain awareness” is essential, not so much for national defence reasons as for public safety and law enforcement reasons. The former Chief of Defence Staff, General Walter Natynczyk, was unambiguous on this: “The North is about all the things that are not military in the sense that it is about search and rescue, the environment, its criminality and all of those other aspects that are in the domains of others. The

Canadian Forces has an important role to play in supporting the success of others.”³ Thus domain awareness engages multiple departments and agencies of government, and the relative prominence of the Department of National Defence (DND) in the Arctic does not mean that Arctic surveillance and control are therefore primarily national defence or national security missions, instead it owes to the basic reality that civilian departments and agencies with front-line public safety and emergency response responsibilities in the Arctic must rely, in the vast and challenging geography of the region, on the trained personnel and equipment that DND has available on a standby basis. The role of DND in the Arctic is therefore most prominently to aid civilian authorities.

Maritime Surveillance Mechanisms

Satisfactory domain awareness in the more closely watched southern Canadian waters is itself far from fully realized, according to a background brief prepared for the Canadian Senate. The brief argues that while the maritime picture assembled by Canada’s Navy is well advanced in its ability to combine data from multiple agencies and departments, Canada still needs to do more to properly cover its full area of responsibility and to improve timeliness in its data collection.⁴ That shortfall is of course much more severe in the high Arctic, and efforts to reduce or overcome it are necessarily increasing – although there will continue to be debates over the pace and focus of, and levels of urgency applied to, such efforts. In 2010 Canadian Vice-Admiral Dean McFadden described the primary DND imperatives for the north as “a need to improve our ability to (a) monitor what’s happening in the Arctic maritime domain from the seabed to near-space, and (b) exert a controlling presence where and when needed, in support of other Government departments.”⁵ Maritime domain awareness addresses the first of those requirements, but, of course, an improved capacity to know what is happening within Canadian territory and jurisdiction is also the key pre-requisite to mounting a controlling presence. Indeed, the greater the awareness of the marine environment, the greater the opportunity to show physical presence and enforcement capacity in areas where there is marine activity and where security and public safety concerns are the greatest.

Vice-Admiral McFadden makes the point that “fundamentally, the Arctic is a maritime theatre – there will not likely be an explosion of road and rail connections to drive and sustain development, as was the case with the great western movement of settlers across North America. Northern communities, as they develop, will be connected by air and sea,”⁶ the proposed year-round highway from Inuvik to Tuktoyaktuk notwithstanding. The challenge, therefore, is to develop maritime surveillance coverage that is comprehensive and continuous with information becoming available in real time. No one system can offer that kind of reliable coverage of ships like the *Wayland*, hence a multi-layered system has emerged. Mechanisms available to Canadian authorities include global self-reporting instruments on ships, monitoring by civilian and military aircraft, satellite surveillance, civilian and military surface patrols, and other forms of official “presence.” The pursuit of maritime domain awareness involves multiple government departments and agencies, including DND, Fisheries and Oceans, Transport Canada, the Coast Guard, Border Services, and the Royal Canadian Mounted Police.⁷ The developing system addresses civilian marine safety and regulatory issues, as well as national security and sovereignty concerns, and the challenge is to bring all of the data together into a single maritime picture that informs operations and policy-making in all of these spheres.

Self-reporting identification

With the *Wayland* moving northward in the Labrador Sea, it would obviously be advantageous for Canadian authorities to know as far in advance as possible of the presence, identity and route of the vessel. Under the current international regulations of the International Marine Organization (IMO), all ships over 300 tons and passenger ships of all sizes are required to make that information available at all times through automatic, self-reporting identification systems.⁸ The Long Range Identification and Tracking (LRIT) system⁹ requires all ships from states that are part of the International Convention for the Safety of Life at Sea,¹⁰ to carry transponders in order to transmit data that identifies the ship and its location as part of “a world-wide satellite-based tracking system.” The system’s ability to track vessels, based not on observation or surveillance but on radio signals received from the ships long in advance of their approaches to national waters and ports, not only serves maritime security, but aids search and rescue and environmental control.¹¹

The LRIT signals from ships are received automatically via satellite by national authorities such as the Canadian Coast Guard. In Canada, the Coast Guard operates an LRIT Data Centre, allowing it to follow vessels on all three of Canada’s adjacent oceans and inland lakes and waterways, including vessels in Arctic waters up to 85.5 degrees north, just above the Arctic archipelago. The Coast Guard relies on the LRIT system to provide data on the locations of Canadian flag vessels, on international vessels headed for Canadian ports, and on vessels transiting within 1,000 nautical miles of Canada.¹²

A vessel the size of a substantial yacht, over 300 tons, is required to have an LRIT transponder on board, and so the Canadian Coast Guard would have received information on the identity and location of the yacht immediately, since its entire voyage was well within 1,000nm of a Canadian shore. As the yacht entered and advanced northward in the Davis Strait it would have remained continuously within the 200 mile exclusive economic zone (EEZ) of either Canada or Greenland (an EEZ is still international waters, but over which national authorities have exclusive rights and responsibilities regarding resources and environmental management). Thus, in addition to its IMO mandated LRIT signals, to be received by Greenland as well as Canadian authorities, the *Wayland* would also have been transmitting signals through the Automatic Identification System (AIS). The International Maritime Organization has since 2004 required all ships to also be equipped with transponders which provide the same kind of information about the ship (including its identity, type, position, course, speed, navigational status and other safety-related information) automatically to appropriately equipped shore stations, and other ships and aircraft. The Canadian Coast Guard receives the AIS signals through multiple shore-based stations. There are 19 Marine Communication and Traffic Services centres and another 113 remote sites that are fitted with AIS systems.¹³ The messaging via ship transponders is also available to other ships, helping vessels avoid collision.¹⁴

Currently there is only one AIS shore station in the Canadian Arctic, at Resolute Bay, Nunavut.¹⁵ This means there are obvious major reporting gaps in the North and a senior Defence official says investing in more ground stations in the North is a current Canadian priority. In 2012 the US Corps of Engineers called for improvements in vessel-tracking capability generally, through “increased Automatic Identification System (AIS) carriage on vessels, additional shore sensors, expansion of commercial satellite AIS, and evaluation of use of Iridium-based AIS and Long Range Identification Tracking capabilities.”¹⁶

To make sense of all the data that are available three Maritime Security Operations Centres (MSOCs)¹⁷ – one for the Great Lakes and St. Lawrence Seaway, and one on each coast (at Halifax and Esquimalt) – receive and integrate both LRIT and AIS data. These MSOCs are “whole of government” operations and have staff from all the participating agencies and departments.¹⁸ The Great Lakes centre is managed by the RCMP while the Atlantic and Pacific centres are operated by the Canadian Navy.¹⁹

The Canadian Space Agency is scheduled to launch a technology demonstration satellite in 2014 which will test improvements in space-based reception of AIS signals from vessels and widen the area of coverage.²⁰ The Maritime Monitoring and Messaging Micro-Satellite (M3MSat) will pass over Canadian waters about 10 times per day and will allow the capture of AIS signals over a much larger area than can ground stations.²¹ Of course, the process of moving from demonstration projects to ongoing operational capabilities is, however, likely to be a lengthy one.

An additional self-reporting measure specific to the North comes under the Northern Canada Vessel Traffic Services Zone Regulations (NORDREG)²² and requires that vessels reporting under the LRIT and AIS facilities report a sailing plan prior to entering Canadian northern waters.²³ Vessels are also then required to provide daily position reports throughout their time within the Canadian waters, to report any deviation from the sailing plan, to report upon arrival at a berth within the NORDREG zone, and to report just before exiting the zone.

Aerial monitoring

Maritime domain awareness is also one of the missions of the National Aerial Surveillance Program (NASP), which operates within Transport Canada.²⁴ Its surveillance roles contribute to the enforcement of domestic laws and regulations, to deterring violations of those laws and regulations, to emergency response, and ice reconnaissance. NASP relies on a Dash-8 aircraft based in Moncton and another in Vancouver, and on a Dash-7 in Ottawa that is deployed to Iqaluit for the Arctic sailing season (June to November) to monitor, among other things, ice and pollution. A King Air 200 from Provincial Airlines in Newfoundland/Labrador is available as needed. These NASP aircraft combine remote sensing technologies and real time streaming video capabilities so data collected can be immediately integrated into the Maritime Security Operations Centres. The three NASP aircraft are said to be the only ones of this type in North America.²⁵ In 2010/2011 the aircraft logged 2,506 hours of flight, flew over 12,365 ships and identified 84 instances of pollution. Some 25-30 percent of the flights are conducted at night. That said, NASP aircraft are able to cover only a tiny part of the Canadian Arctic waters, and not only can it take them a very long time to get to areas in response to calls for surveillance assistance, to get there at all they require ideal weather conditions.

Nevertheless, Transport Canada says that its surveillance is working to deter the flouting of regulations – noting, for example, that very few contaminated seabirds have washed ashore since NASP surveillance began. “International shipping and cruise line companies, in particular, know that their vessels are being monitored from above as they move through Canadian waters.”²⁶ As Transport Canada puts it, “the patrol aircraft of the National Aerial Surveillance Program ensure that Canada knows who is in its waters and that Canadian maritime laws are being obeyed.”²⁷ The aircraft

also do reconnaissance for the Canadian Ice Service to help vessels like the *Wayland* avoid ice formations. Says forecaster Trudy Wohlleben, increased Arctic traffic means that “boats are popping up everywhere. In the past, only CCG, supply vessels and Inuit craft plied Arctic waters. Now, sailboats, yachts, and cruise and cargo vessels traverse the region, increasing the risk of pollution from ships.”²⁸

Since anyone sailing a yacht is likely to venture into the high north only during the least threatening months of the Arctic shipping season, the Dash-7 would have been in Iqaluit while the *Wayland* was in the waters of Davis Strait. And had it raised any concern or curiosity, the NASP aircraft then flying out of Iqaluit could have been called for a closer look. The Canadian Forces CP-140 patrol aircraft, with a range of 4,000 nautical miles, could have also been brought from its base at Greenwood, Nova Scotia (the other CP-140 base is at Comox, B.C.) if a closer look was required. Originally an anti-submarine warfare aircraft, the CP-140 roles have now expanded to include investigating illegal fishing, immigration, and drug trafficking, as well as sovereignty patrols – including Arctic patrols. These are aging aircraft and slated for replacement, though no decisions have been made.²⁹ Notably, the data from military surveillance flights take much longer than it takes NASP data to feed into the Maritime Security Operations Centres – not until a few hours after the end of their patrol.³⁰

In the future, uninhabited aerial vehicles (UAVs) promise a major extension of surveillance capacity. An Arctic-based UAV could be capable of continuous surveillance for more than 30 hours and the promoters of the Northrop Grumman Global Hawk³¹ say it could fly the entire Canadian Northwest Passage five or six times in a single mission, and that with three such aircraft the waterway could have continuous surveillance, 24 hours a day and seven days a week.³² In December 2013 a Global Hawk, equipped with a synthetic aperture radar, flew from its California base to Canadian Arctic airspace and back again in a 21 hour flight. Data collected is to be used in a joint Canadian-American scientific study related to topography and ice caps.³³ A 2009 study by Defence Research and Development set out a futuristic scenario in which a formation of multiple UAVs is engaged in response to a hijacked tanker in Arctic waters. The “swarming” UAVs transmit a stream of images to a command centre. They can loiter for several days over the target and can engage in light firing to provide cover for a military or law enforcement boarding party to finally take command of the ship.³⁴ Of course, these are not current deployments. The deployment of armed UAVs to the Arctic would likely be controversial, but the Canadian Chief of Defence Staff, Gen. Tom Lawson, says the Canadian Forces are actively considering acquiring UAVs with “lethal capabilities on board.”³⁵ Unarmed surveillance is the likely role, offering higher resolution imaging than satellites and more frequent coverage, and they can obviously be manipulated and directed in ways that satellites cannot.³⁶

The JUSTAS project (Joint Unmanned Surveillance Target Acquisition System) was begun in 2005. The objective is a fleet of medium-altitude long-endurance UAVs that would be available for Arctic surveillance, Atlantic and Pacific patrols out to 1,000 miles, support SAR, support overseas operations (combat to humanitarian). Arctic patrols are said to be a priority, and thus the UAVs should be able to drop search and rescue packages while on Arctic patrols. These UAVs would be expected to operate in combination with long-range patrol aircraft and satellite surveillance. At one point there were promises of an initial operating capacity in 2011, but in early 2014 DND is still exploring options.³⁷

Space-based radar

Even without automatic identification systems on a ship like the *Wayland*, Canadian authorities would have learned of the yacht's location through land and space based radar. Ground based radar and long-range cameras would kick in at particular choke points, once those systems are actually deployed. Efforts towards those ends are underway at Gascoyne Inlet at the eastern mouth of Barrow Strait, where Parry Channel narrows to about 50kms (see below). But further out in the open waters of Davis Strait, the key technology is now space based radar, specifically RADARSAT 2. It detects the movement of ships by multiple passes over a particular location, and this information can be cross-referenced with data from the AIS and LRIT tracking systems and thus also detect vessels not transmitting their identity as required under international maritime regulations.³⁸ RADARSAT-2, a second generation synthetic aperture radar, was launched in December 2007 with enhanced marine surveillance capabilities, as well as assuming roles in ice monitoring, disaster management, environmental monitoring, resource management and mapping.³⁹ It is especially suited for the north as a polar orbiter satellite system, passing directly over the north and south poles.

The Polar Epsilon project is the Department of National Defence mechanism for processing information from RADARSAT-2, to make it useable and available to Canadian Forces in operations around the world, including the Arctic. It is supported by RADARSAT-2 ground stations at Masstown, Nova Scotia and Aldergrove, BC. These ground stations link to the Marine Security Operations Centres and the near real-time images can then be used to support Canadian Forces operations and the activities of other federal departments and agencies, as well as monitor activity or changes in the Arctic."⁴⁰ It processes RADARSAT's Arctic data, with a focus on ocean approaches to Canadian territorial waters, detecting and tracking vessels.⁴¹

The launch, sometime in 2018,⁴² of a constellation of three additional RADARSAT satellites will further enhance marine traffic monitoring in the north, allowing for many more passes over the Arctic region daily, thus measuring the movement of ships much more precisely. "One satellite can give you a spotty picture of what's going on," says Royal Canadian Air Force Col. Andre Dupuis, the Department of National Defense's director of space requirements, but "three satellites will give us a complete picture every single day of every ship in our area of responsibility, all the way out to about 2,000 nautical miles."⁴³ The RADARSAT Constellation "is a Canadian Space Agency mission that will provide twenty-four-hour-a-day C-Band data to augment and extend the data that RADARSAT-2 users currently rely on. The mission will support maritime surveillance -- ship detection, ice monitoring and oil spill detection -- disaster management and ecosystem monitoring."⁴⁴ Consultations have begun on the development of Polar Epsilon 2, an upgrading to manage the data from the constellation and from the IMO automated identification system. The result, says the Government, will be to "enhance maritime surveillance by providing detection, classification, and identification of seagoing surface vessels."⁴⁵

Environment Canada's Integrated Satellite Tracking of Pollution (ISTOP) program is also used, and available to Transport Canada, to detect illegal discharges at sea, using data from RADARSAT.

Choke point surveillance

Entry into the Northwest Passage from the east funnels vessels through a choke point in Barrow Strait in the vicinity of Gascoyne Inlet, Devon Island, Nunavut. So that is the point at which Defence Research and Development Canada is carrying out its Northern Watch Technology Development Project designed to demonstrate local area or choke point surveillance capabilities.⁴⁶ The sheer vastness of the Arctic waters means, of course, that the focus of undersea surveillance must be on such choke points. The effort at Gascoyne Inlet is geared toward “demonstrat[ing] persistent detection, tracking and identification” of marine traffic.⁴⁷ An underwater surveillance array was installed in Barrow Strait to collect data for about four weeks in 2009.⁴⁸ In 2010 installations included an additional underwater sensor array extending 11 kilometers out to sea, as well as a radar identification device to detect the presence of navigation radars, an optical device to scan the surface, and electronic devices to receive the automatic identification signals from ships and aircraft.⁴⁹ In August 2012 acoustic recording systems were deployed in Barrow Strait; one such Autonomous Multichannel Acoustic Recorder (AMAR) was deployed for two weeks and the other for a year.⁵⁰ Still in the set up stage, the project will, between August 2014 and August 2015, test underwater sensors, a related satellite communications system, and “sonobuoys and bathythermographs / sound velocimeters” – instruments for measuring undersea sounds and shifting water pressure. Underwater “UAV’s,” that is underwater uninhabited surveillance vehicles (UUSV), are also being explored. While underwater surveillance capacity is a particular objective of Northern Watch, the overall point is to integrate sea surface and undersea surveillance with land and air monitoring in the interests of “an effective understanding of activities and events in the North that could affect Canada’s security, safety, economy and environment.”⁵¹ Data from such sensors will be sent via satellite to southern control centres, the Maritime Security Operations Centres, to be correlated and formatted and then passed along to relevant agencies and for elaborating overall maritime domain awareness.⁵² The system is ultimately to become a full-time, continuous surveillance capability at choke points that will include land-based cameras (using laser and infrared imagers), radar-satellite surveillance, and underwater acoustic sensors.⁵³

Maritime presence

Perhaps the most basic mechanism for enhancing domain awareness is being present within it. Remote sensing systems are certainly an important kind of “presence,” but physical presence is at the core of what it means to become thoroughly aware of the region and events there – that is as true of the North as it is of more southerly domains. That obviously means not only national authorities, but the local population. As the Mayor of Resolute put it, “the indigenous Arctic people are the full-time ‘eyes and ears’ of the North. As locals, we are trained to observe our environment. It’s instinctive. Every day, winter or summer, we are always scouring our landscape, whether we are travelling by skidoo, four wheelers, or boat – to see who’s out there. It could be a lost hunter or a tourist.”⁵⁴

By some accounts, the Canadian Navy is largely absent from the Arctic. Rob Huebert, a foremost Canadian specialist on Arctic defence and security, makes the trenchant observation that while “[the Canadian Navy] can deploy and maintain almost all its ships off the coast of Afghanistan for extended periods of time, it has almost no ability to maintain a presence in Canada’s third ocean.”⁵⁵

Of course, the essential counterpoint is that strategic and national security circumstances – the kind of short- or longer-term threats that require a significant naval combat capability – do not warrant more than a symbolic naval presence in the Arctic. The Arctic Ocean has to date not seen, and shows no signs of developing, the kinds of security challenges that national navies are designed to address. That in no way obviates the need for a reliable national maritime presence – which includes the Coast Guard, Fisheries and Oceans, Transport Canada and the RCMP – and inasmuch as it is modern military forces that are routinely given the means to keep major capabilities on standby, the Canadian Navy needs to have the capacity to aid these civilian departments of government when they face emergencies and law enforcement challenges in the Arctic. But the ongoing presence of a combat capable navy is clearly not the primary kind of presence the Arctic needs.

Civilian agencies and departments are the ones with the primary responsibilities. Their presence is key to meeting the responsibilities of sovereignty and to enhancing safety and well-being. And, of course, civilian agencies and departments of government are not entirely without the means to be constructively present in the Arctic. The primary Canadian maritime presence in the Arctic comes via the Canadian Coast Guard. It operates a significant pan-Canadian fleet, but, of course, it also has a lot of ocean and fresh water to cover in the rest of Canada.⁵⁶ None of its ships is home based in the north, and its fleet of icebreakers is aging. Two heavy icebreakers, the Louis S. St-Laurent and the Terry Fox based in Newfoundland, carry out ice-breaking roles in the Arctic in addition to their escort roles on the Atlantic coast and the St. Lawrence seaway. Four medium icebreakers, based in Quebec and St. John's, are similarly deployed and said by the Coast Guard to be capable of "sustained icebreaking and escort operation in the Arctic for 2 seasons." Seven light icebreakers, based on both coasts, but primarily the Atlantic, are classed as "high endurance multi-tasked vessels" capable of summer patrols in the Arctic. Another four offshore patrol vessels are also capable of summer patrols in the Arctic. Each summer six icebreakers deploy to the Arctic (one of them devoted full time to scientific work).⁵⁷ The Coast Guard announced in January 2014 its intention, in cooperation with industry, territorial governments, northern communities, and other government departments, to "identify a number of Arctic sea lanes that will bear the brunt of shipping and other marine transit as the region becomes more accessible."⁵⁸

Other ships also regularly visit, although an Arctic marine study indicates that while traffic volumes have increased since 1991, the number of Canadian Coast Guard voyages during that same period has "remained nearly constant." Interest in greater surveillance in the Arctic due to increased traffic has not translated into a greater Coast Guard presence.⁵⁹ Part of the reason, says the author, may be that despite traffic rising the number of accidents actually declined over the same period – the rate declined, and the absolute numbers also declined. That does not remove the threat of a major accident or the need for relevant preparedness.⁶⁰ The Coast Guard also operates helicopters in the Arctic, as well as remotely operated underwater vehicles.⁶¹ The planned acquisition of two dozen new helicopters for the coast guard has run into what has become a quintessentially Canadian problem in government procurement. Deliveries were to begin in the latter part of 2014 but a lawsuit filed by one of the bidding companies will set delivery dates back indefinitely.⁶²

All of the above hardly rivals the fabled capabilities that Russia deploys in its Arctic, but neither does it exactly equate to absence from the Canadian Arctic. And when the new polar icebreaker is

delivered later this decade, Arctic icebreaking will be expanded to three seasons. Winter in the Arctic is not a maritime season. Winter emergencies do not involve marine responses – that’s when aircraft and airborne response teams and the Rangers take over.

Even though the Canadian Navy is less present in the Arctic, not least because the national security issues that navies are designed to address are not present, naval ships are nevertheless regularly in the north, including Frigates, Coastal Defence Vessels, and, less often, the Victoria class submarines.

It is also worth recalling other forms of military presence in the Canadian Arctic. The Canadian Forces are obviously present in the region through Joint Taskforce North (JTFN) headquartered in Yellowknife with detachments in the Yukon and Nunavut. The signal intelligence Canadian Forces Station is in Alert, the most northerly tip of Canada at the upper end of Ellesmere Island. Military operational presence in the Arctic is organized through a series of named exercises or deployments. QIMMIQ is an ongoing surveillance and presence operation, notably involving Canadian Ranger Patrols; NUNALIVUT is an annual operation to assert sovereignty and demonstrate operational capabilities in the high North; NUNAKPUT advances interdepartmental coordination involving the RCMP and Fisheries and Oceans; NEVUS maintains the data links between Alert and southern Canada; and NANOOK features patrols and surveillance operations. These operations, which in some cases include prominent naval elements, involve the northern-based Canadian Rangers, additional troops on assignment from southern bases, and equipment ranging from snowmobiles and ATVs to the CC-177 Globemaster strategic lift aircraft. Other Canadian aircraft that are regularly in the north include Hercules and Buffalo transport aircraft, Griffon Helicopters, the Yellowknife based Twin Otters and the Aurora long-range patrol and surveillance aircraft. The H model Hercules and the Buffalos are to be replaced with a new fixed-wing search and rescue fleet,⁶³ but like a host of other priority procurement programs, they are well behind schedule. Delivery could begin in 2017.⁶⁴

New long-range patrol aircraft are being pursued through the Canadian Multi-Mission Aircraft (CMA) project. The CP-140 Auroras were acquired in the 1980s, primarily for an anti-submarine warfare role. After the Cold War they were used for land and sea surveillance, airborne command and control platforms, and search and rescue missions.⁶⁵ And since 2008 there has been a declared intention to acquire replacement aircraft, again with multiple roles, but focused on “intelligence, surveillance, and reconnaissance” that would coordinate with UAVs and Radarsat-2.⁶⁶ The project remains in the intention phase, with current thinking being that, in view of the prospects for uninhabited aerial vehicles, it will be possible to meet needs with a smaller fleet of crewed long-range patrol aircraft.⁶⁷

The Canadian Armed Forces sponsor and fund the Civil Air Search and Rescue Association, an organization of volunteers that makes private aircraft and trained volunteer crews available for search and rescue missions. The Air Force reports that two such civilian units have now been established, in Arctic Bay and Pond Inlet, and that the group recently certified 30 civilian search and rescue spotters for those units.⁶⁸

Again, this does not amount to absence. Most of the maritime presence is limited to one or two seasons, but, those are obviously the seasons in which their presence is most relevant. A significant

limitation faced by the Navy and the Coast Guard in the north, in addition to the lack of aircraft and appropriately equipped vessels, is the lack of airports and port facilities – notably the lack of refueling and other support facilities (for example facilities for offloading garbage and waste from vessels and replenishing them with fresh water and other supplies) for those aircraft and vessels that are available. Increased operations in the summer, with the season extended by icebreaker escorts when activities, and thus potential emergencies and law enforcement challenges, are at their height, depend as much on new docking and related services as on new boats. A much-delayed docking and refueling station is under construction at Nanisivik at the upper end of Baffin Island, but that will not alone meet growing needs. Since Canada does not have a deep-water port in the Arctic, the current Government promised to build one, providing a facility for the AOPS to dock, refuel, resupply, and so on. This would enable a naval presence throughout the "navigable season." Subsequently plans for Nanisivik were scaled down: "less fuel stored, no permanent communications facilities installed, no heated accommodations, and delays in improvements to the wharf." Construction is to begin in 2014, but it will not be completed, even in this scaled down version, before 2018⁶⁹ -- and news that the existing wharf is slowly sinking will not hasten the project.⁷⁰

Real presence in the Arctic means the availability of ice-breakers and Arctic patrol vessels (preferably with more ice capability than now available), supported by port and refuelling facilities and forward operating locations. Similarly it means surveillance aircraft with commensurate ground support facilities, including forward operating locations, as well as reconnaissance teams like the Northern Rangers. The kind of presence that keeps a vessel like the *Wayland* appropriately monitored requires initial detection (through self-reporting as well as satellite radar and choke point sensors), aerial observation and monitoring (for example, to detect illegal discharges), and finally patrol ship escort and boarding when warranted. All of these are currently available to some degree, but obviously far from comprehensive.

DND's planned Arctic/Offshore Patrol Ships (A/OPS – six to eight ships to operate in three oceans) are to have multiple roles, but one such role is to add to the naval presence in the Arctic and to help identify, monitor, and control activity in Arctic waters. Their capacity to do this will be confined, like all other Canadian naval vessels, to seasons of minimal ice presence, but, of course, that is precisely when their presence is most relevant. In the heavy ice season, vessels like large yachts or ore transporters like the Nordic Orion don't go there – in other words, northern waterways continue to be protected/defended by ice, weather, and distance for much of the year. In the operational months, the presence of some of the A/OPS would expand escort and control capabilities, although, in the case of a ship like the *Wayland* yacht with a likely top speed of about 25 knots, the A/OPS with its projected top speed of only 17 knots would soon be outrun.⁷¹ Of course, should the *Wayland* decide to go rogue, it would be a classic case of you can run but you can't hide. After the 3,000-plus nautical mile journey from St. John's, the *Wayland* would be low on fuel and really have nowhere to go. Whether the A/OPS are the most suitable option, or needed at all in the Arctic, is a hotly debated question – see especially Michael Byers and Stewart Webb.⁷² Senator Colin Kenny was characteristically blunt on the subject of the A/OPS: "These ships are being built so the Canadian Navy can patrol our Arctic waters. The Navy hasn't patrolled our Arctic waters for more than half a century with good reason – there is no military threat there. Sovereignty issues will be decided

through diplomacy and in the courts. Nobody is going to start a war in the Arctic. The Canadian Coast Guard patrols our Arctic waters, with icebreakers in dire need of replacing.”⁷³

Earlier the Government’s promise of increased presence in the Arctic was focused on ice-breakers – notably three armed heavy icebreakers operated by the Canadian Armed Forces and stationed at Iqaluit. The plan shifted to a single polar-class icebreaker for the Coast Guard and the ice-capable patrol ships -- operate in one meter of ice (but not offering ice-breaking services for other ships), range of 6,800 nautical miles -- for maritime surveillance within EEZ, including in the Arctic, assistance in SAR, and support to other government departments.⁷⁴ In the meantime, the Coast Guard will have to wait still longer for its new Polar-Class icebreaker because the Vancouver SeaSpan Shipyards chosen to build the icebreaker as well as two joint support ships for the Navy cannot do both at the same time – and the Government has decided that the support ships will come first. Instead, the aging icebreaker the *Louis St. Laurent* will get life-extension upgrades, perhaps at a cost of \$55 million.⁷⁵

To acknowledge the obvious importance of physical presence – to enhance both awareness and responsiveness – is not to deny the equally obvious constraints on constantly “being there.” Domain awareness is the chief requirement, the pre-requisite. After that, the aim should be a credible capacity to quickly bring first responders into play, as opposed to having them on constant patrol throughout an area as large and as sparsely inhabited and travelled as is the Arctic.

Cooperative domain awareness as a strategic imperative

The need for full time and reliable awareness of the Arctic maritime domain is not a matter of debate. It is part of the exercise of sovereignty and is central to meeting security and public safety objectives. It is obviously important for a host of environmental, commercial, and economic reasons as well.

The international security dimension of domain awareness is critical, not because of dire or imminent national security threats to the region, but because of the value of ongoing confirmation of the absence of such threats. One of the primary obligations of neighboring states toward one another is to provide credible assurances that they each prohibit and prevent events or activities within their respective jurisdictions that would pose a security threat to their neighbors or the neighborhood generally. For those to be credible assurances, each state obviously needs to know what is happening within its own borders and in particular it needs to be prepared to share such knowledge with appropriate authorities across borders within the region.

That of course means both domain awareness and transparency – demonstrating the technical means of monitoring one’s own territory, along with a reasonable measure of openness to sharing the results of such monitoring in enough detail to generate confidence within the whole region that current events and conditions do not constitute serious threats to security or public safety. Security and stability within any one state and in the region generally are fortified by a sense of mutual confidence in the security policies and practices of all other states within the region. The Commandant of the US Coast Guard made the point in a recent speech to the IMO: “Wherever

human activity thrives, we have a shared responsibility to uphold the rule of law, ensure the safety and security of mariners, passengers and cargo, and ensure environmentally responsible maritime activity. Each sovereign state, working together with the international community as a whole, must uphold these responsibilities to ensure legitimacy of the rule of law in a dynamic and challenging world.”⁷⁶ It is significant that this is a non-Pentagon observation. Hard security concerns in the Arctic, leaving aside for now the particular case of Russian/American strategic relations and their respective strategic nuclear arsenals and counter measures, are not now about competing military forces but about the effective regulation of civilian activity within the region so as to support constructive commerce, minimize environmental impacts that threaten to affect the entire region and beyond, maximize the capacity of states to advance public safety and to respond effectively to local threats and crises, and to convincingly ensure compliance with relevant regulations and laws – with UNCLOS, the Law of the Sea, a critical element of the legal/diplomatic framework that downplays the military role in advancing public safety and the resolution of conflicts.

In the not so distant past, when security concerns were much more directly linked to the geo-strategic competition of the major powers than to local interests, Arctic security was more concerned with military competition and strategic relations – but the focus was not on competition and events within the region. Rather, the preoccupation was with strategic conditions well beyond the region. That point has been made about the Nordic states,⁷⁷ which traditionally assumed their security depended more on their links to and relationships with states outside their region than on relations with states within their region. Norway and Denmark relied on NATO; Finland relied on Russian cooperation and acceptance during the Cold War; Sweden sought a middle path, but always gave priority to strong relations with Europe and NATO. Canada’s northern security policies certainly responded much more to security needs and priorities as perceived in Washington and Brussels than in Tuktoyaktuk.

In the post-Cold war era that formula no longer works. The Arctic’s internal economic and political stability and the interests and safety of the people of the region have become much more directly linked to the quality of relations among states within the Arctic region itself. It is a reality recognized in the announced formation of an Arctic Economic Council and Canadian Environment Minister Leona Aglukkaq’s reported comment that “Canadians living in the Arctic should be looking to their counterparts in Russia or Norway to address their economic problems rather than southern businesses.”⁷⁸ And foundational to ongoing Arctic well-being is the expectation that intra-regional relations will continue to be guided by international law and a mutual interest in a stable region that is capable of sustainable economic development and the equitable and binding resolution of conflict.

The threats to a stable Arctic order, as the *Canadian Naval Review* recently considered them, are of the kind that might be encountered by citizens and governments on any ocean or waterway:

- a ship in distress, perhaps a fire on board, with the potential for widespread environmental damage, in addition to the safety of the crew and passengers (the journey last fall of the Nordic Orion through the Northwest Passage drove home the point that, were things to go wrong, the current response capacity would be rather less than adequate⁷⁹);
- piracy, terrorism, or the movement of contraband;
- deliberate discharges of contaminants.⁸⁰

There are two key, if rather obvious, points to be made about these kinds of threat. First, the job of responding to them is first and foremost that of non-military departments and agencies of government, even while those departments rely on defence personnel and equipment to, as a last resort (which, as one defence official put it, in the Arctic frequently means the first resort), aid civilian authorities. Second, these are not particularly “national security” threats – they are certainly not specifically directed against the state. Instead the threats are to the public safety of individuals and communities, albeit with wider implications inasmuch environmental damage doesn’t remain local and a ship passing through international waters and multiple national waters could cause damage anywhere along its route. Piracy is most connected with the high seas rather than an action against a particular state. The point again is that “maritime security” is less about state security than public safety and engages a military response only to aid civil authorities – and civil authorities depend on that aid because it is primarily the military that has the kinds of stand-by equipment and personnel with the training and skills to operate quickly in the challenging environment of the North.

Nevertheless, effective national responses to such threats to public safety do make a substantial contribution to international security. By managing maritime safety and security within their own areas of sovereignty and jurisdiction, national governments contribute to collective international security and stability. As the Canadian Naval Review concluded: “Most people agree that the best path to effective maritime security is based upon international cooperation, comprehensive surveillance over all waters under national jurisdiction and adjacent to them, and the ability to respond to real and potential threats quickly.”⁸¹

The most immediate and practical element of domain awareness is to be better able to facilitate early awareness of and effective responses to warning signs and potential problems and to full-blown crises when they arise. More broadly, maritime domain is the foundation for more effective enforcement of marine regulations and thereby for the reduction of risks and the incidence of crises, and thus to enhanced public safety. And ultimately, domain awareness achieves the most basic requirement of more traditional national security inasmuch as it is timely situational awareness that makes it possible for neighboring states to provide one another with credible assurances that events within their respective jurisdictions do not pose a threat to the neighbors or the neighborhood generally.

That makes mutually shared domain awareness an acknowledged and essential ingredient of Arctic stability. As such, it represents a core strategic interest of Arctic states.

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