



# ***DISARMING ARCTIC SECURITY***

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## **The Arctic and the Seaborne Nuclear Arms Race**

***Headlines tell of a burgeoning Russian/American naval nuclear arms race<sup>1</sup> and already tens of billions of dollars are being promised and spent in both countries on “modernizing” seaborne strategic nuclear weapons systems. While tactical nuclear weapons have been kept off their attack and general purpose submarines for at least a generation, there are indications they may be finding their way back. In the meantime, there is not yet any international regime or treaty or political will in place or contemplated for the exercise of seaborne nuclear restraint.***

The US now operates<sup>2</sup> 14 nuclear ballistic missile submarines (SSBNs – designated Ohio-class), each capable of carrying 24 inter-continental range ballistic missiles (the Trident II D5). Normally, two of these boats are in overhaul and not considered operational – so the usual count is 12 operational submarines carrying 288 missiles (even though not all 12 are always on patrol, and those on patrol do not necessarily carry the full complement of 24 missiles). Each missile carries three to six warheads, leading to the current count of 1,152 warheads on 12 deployed SSBNs. About 60 percent of the force operates in the Pacific and the rest in the Atlantic.

US nuclear modernization programs for the SSBNs include up to 1600 new warheads (updated versions of existing warheads with enhanced targeting capabilities), to be built by 2019 (some of these are to go to the UK in a slightly modified version). A new “life-extended” version of the D5 Trident missile is also underway. The Pentagon plans to replace the existing SSBNs with 12 new SSBN(X) nuclear weapons submarines and the Congressional Budget Office estimates that development and capital acquisition costs promise to be in excess of \$80 billion in today’s dollars (or about \$7 billion each),<sup>3</sup> and that does not include maintenance and operating costs or the cost of their nuclear weapons. Even the Navy is worried that things may be getting out of hand, with the SSBNs robbing the budget it needs to pay for all the other ships it has planned, so it’s come up with a novel solution – create a special and separate “National Sea-Based Deterrence Fund” so that the Navy’s regular budget won’t have to cover the SSBNs.<sup>4</sup> It’s a sleight of hand attractive to the Navy, but it’s a work in progress inasmuch as there is no sign of how the needed money would get into the National Sea-Based Deterrence Fund – although the money lenders and the tax collectors have a pretty good idea.

But “promise” is still the right word inasmuch as the shipbuilding industry sees great promise in them. An American investment blog explains that for the two prime SSBN contractors, General Dynamics (which Canadians know as the owner of the London, Ontario plant that builds the armoured vehicles being sold to Saudi Arabia) and Huntington Ingalls, it’s all about the impact on their bottom line – for General Dynamics, “the fate of SSBN(X) has the potential to move the needle on revenue in a very big way – up or down,” while for Huntington Ingalls, whose only business is building warships, “calling SSBN(X) a life-or-death program for Huntington might sound like exaggeration – but really, that’s *exactly* what it is.”<sup>5</sup>

Russia now operates<sup>6</sup> 12 nuclear missile SSBNs, three of which are the new “Borei” ballistic missile subs which will eventually replace all the others. Seven of the current 12 SSBNs are based in the Arctic with the Northern Fleet, and five are with the Pacific Fleet. Each is capable of carrying 16 inter-continental range ballistic missiles (the Bulava being the most recent model and deployed on the Borei). Each missile carries three to six warheads, leading analysts to estimate that the Russian SSBN fleet carries close to 800 warheads, although not all 12 of the subs are operational at one time. The Russian SSBN modernization program is focused on bringing a full fleet of eight Borei class subs on stream by the mid-2020s. Hans Kristensen and Robert S. Norris of the authoritative *Nuclear Notebook* note that the future Russian SSBN fleet will be capable of carrying more warheads than does the current fleet, meaning more warheads on fewer platforms. It also means that “the strategic importance of the SSBN’s fleet will increase,”<sup>7</sup> a destabilizing move inasmuch as the fleet could become a more tempting target for a pre-emptive first strike.

### **ASW and Strategic Destabilization**

The US and Russia also have plans for modernizing their attack submarines, promising further destabilization.

The US currently operates<sup>8</sup> 54 nuclear powered attack submarines (SSNs),<sup>9</sup> all armed with tactical range land attack cruise missiles, as well as torpedoes – all with conventional, or non-nuclear, warheads. About 60 percent operate in the Pacific and 40 percent in the Atlantic, with occasional forays into the Arctic. The more recent variants include advanced sonar systems and are certainly capable of operating under ice. In 2015 a Seawolf variant of attack submarine (these are said to be quieter and faster than the other attack subs, but they also proved much more expensive, and thus production ended in the 1990s after only three were built) spent two months submerged under the Arctic ice,<sup>10</sup> and in 2013 another Seawolf travelled from Washington State on the American west coast to Norway via the Arctic Ocean.<sup>11</sup> Included in the total inventory of attack subs are 12 newer versions, the Virginia-Class, of which more are being built. They also engage in intelligence gathering and can also carry “unmanned undersea vehicles.” Another four Ohio-class, or SSBN ballistic missile submarines, have been converted to guided missile submarines (SSGNs) – carrying conventionally armed land-attack cruise missiles.<sup>12</sup> The Pentagon is planning to maintain 4,000 conventionally-armed sea-launched cruise missiles (and these, of course, are in addition air-launched cruise missiles).<sup>13</sup>

Russia currently operates<sup>14</sup> 18 nuclear-powered and 23 diesel-electric attack submarines (SSNs), as well as 9 nuclear powered SSGNs. The diesel-electric subs are regarded as among the world’s quietest subs.

Ever since the US/Soviet 1991 Presidential Nuclear Initiatives,<sup>15</sup> American and Russian attack submarines have not carried tactical nuclear weapons (the strategic nuclear weapons are deployed on the SSBNs). Current attack submarines on both sides are capable of carrying tactical range cruise missiles with nuclear or conventional warheads, and while the assumption is that only conventionally armed cruise missiles are currently deployed, there is some speculation in the arms control community that Russia may have switched to nuclear warheads on some submarine-based cruise missiles.

Non-proliferation expert Jeffrey Lewis has written in *Foreign Policy* that “the evidence is increasingly strong that not only is Moscow routinely sending submarines within an arm’s length of the United States coastline, but that these submarines are deployed with nuclear armed SLCMs” [sea-launched cruise missile].<sup>16</sup> The *New York Times* further reports that Russia is in the process of developing sea drones, which would be launched from the same attack subs, and that would be capable of carrying small nuclear warheads for use against harbours and coastal areas.<sup>17</sup>

These general purpose or attack submarines (SSNs) carry out a variety of functions, depending on the particular equipment on each, and the US Congressional Research Service lists these functions linked to US SSNs: covert intelligence, surveillance, and reconnaissance; covert insertion and recovery of special operations forces; attacks on land targets with cruise missiles; mine warfare; anti-submarine warfare; anti-surface ship warfare.<sup>18</sup>

The bulk of the Russian submarine fleet (ballistic missile as well as general purpose subs) is based in the Arctic and makes up a significant, if largely hidden, part of any Arctic naval presence. The presence of American submarines in the Arctic is much less clear and less substantial. It is generally asserted that American ballistic missile submarines do not patrol in the Arctic, but attack submarines do undertake regular visits. In the 2016 ICEX exercise, a five-week event designed specifically to assess the operational readiness of the submarine force, as well as support research for the Navy’s Arctic Submarine Laboratory,<sup>19</sup> two Los Angeles class SSN submarines participated in the Arctic operations. The United Kingdom also let it be known in 2016 that it is resuming Arctic patrols.<sup>20</sup>

Sending SSNs in pursuit of SSBNs (that is, attack submarines in pursuit of ballistic missile submarines) is a destabilizing enterprise that generates a lot more danger than defence. Threatening strategic launchers is by definition destabilizing, in the sense that it creates incentives to launch them first in a crisis to prevent them from being taken out in a pre-emptive attack (use ‘em or lose ‘em). And it is similarly destabilizing to target an adversary’s sea-based deterrent. The whole point of attack submarines tracking SSBNs is to threaten pre-emptive strike – that is, to demonstrate a capacity, or at least ambition, to destroy an SSBN before it can fire its SLBMs, which in turn generates incentives for the SSBN to fire its missiles early in the context of a severe crisis.

And it is even more dangerous when threats of pre-emptive SSN attacks on SSBN deterrent forces are combined with missile defence shields with a potential capacity to intercept reduced retaliatory forces. In that scenario, the incentive is even more intense to launch the retaliatory forces first to avoid losing them and to ensure that enough weapons are launched to overwhelm any defence shield. Russian and Americans both are building up missile defence forces, but the Americans and NATO are more focused on that objective. And even though it will always be impossible to build an impenetrable shield, the persistent effort to build one is itself destabilizing. From the Russian perspective, a combination of pre-emptive attacks on land and sea-based missiles coordinated with missile defences capable of intercepting a much-reduced retaliatory force is meant to undermine the Russian second-strike deterrent. But the Americans insist that their defences are meant only for rogue state threats. If the US and Russia insist that their missile defence efforts are not intended to undermine the other side’s second strike capability, why would both sides not adhere to that same intention or principle when it comes to attack submarines? If it is destabilizing to erect strategic missile defence shields to undermine strategic second strike forces, why do they not recognize that deploying attack submarines to undermine second strike forces is similarly destabilizing?

## Nuclear Arms Control at Sea

There are currently no treaties, agreements, or arrangements to limit SSBN forces or to control attack submarine numbers or armaments or to restrain their efforts to track and threaten ballistic missile subs. The US/Russia New START Treaty does indirectly place some limits on deployed ballistic missile submarines. The Treaty limits deployed warhead launchers to a combined maximum of 700 missiles and bombers, and limits deployed warheads on those launchers to 1,550. So, with the air, land, and sea triad of launchers, there are obviously going to be limits on the number of missiles set to be deployed on submarines. When New START compliance is reached in 2018, the US is expected to deploy 10 nuclear missile subs (SSBNs) with 24 missiles on each, so that a total of 240 missiles will be configured to deliver 1090 warheads. Another 400 warheads will be on 400 land-based missiles and 60 warheads on 60 bomber aircraft (the bombers can and do carry more than one warhead, but under New START counting rules each bomber is counted as carrying one warhead).<sup>21</sup> Russia's 2018 compliance configuration is not known, but it already deploys fewer launchers than New START allows while it will have to reduce warheads by just over 100. Current deployments of 10-12 SSBNs with 16 missiles each mean a total of about 160 missiles with 700 warheads, plus 300 land-based missiles now carrying about 900 warheads, and 66 bombers counted as 66 warheads.<sup>22</sup>

There are credible and compelling arms control and threat reduction measures available.

### *Attack submarine no-go zones*

In the pantheon of dangerous nuclear weapons, sea-based strategic nuclear weapons have had the "virtue" of being less destabilizing than all the others. They have been largely invulnerable to attack and so the use 'em-or-lose-'em dynamic has not been as present as it is with missiles in fixed silos and aircraft on exposed airfields. And that's the way it should stay – that is, threats to SSBNs should be precluded until disarmament removes the danger altogether, but as already noted, attack submarines threaten that stability.

Anti-submarine warfare (ASW) is not so much of a threat to the strategic sea-based deterrent as long as SSBNs are widely dispersed, but in an era of slightly reduced numbers and of operations in much more confined areas, vulnerability, and certainly the perception of vulnerability, increases. Because the Russian SSBNs are largely operated in its strategic bastions they could be vulnerable to aggressive anti-submarine activity – a heightened danger that could be readily avoided by the US verifiably committing to keeping its attack submarines well away from those Russian strategic bastions. In his 1987 "Murmansk Initiative," Mikhail Gorbachev proposed limits on military naval operations, and especially limits on Western anti-submarine warfare patrols in the Arctic waters that were the traditional operational areas for the Russian Northern and Baltic fleets.<sup>23</sup> With similar restrictions imposed on Russian attack subs, the idea has promise. It would make sense for both the US and Russia to agree not to track, and thus threaten, each other's SSBN's with attack submarines in agreed exclusion or no-go areas for attack submarines.

The Arctic is an obvious candidate for becoming an attack submarine exclusion zone. Such a move would have to address the reality that some Russian attack subs are based in the Kola Peninsula area and need to transit through the region to get to wider patrol zones, but restricting anti-submarine warfare operations in the region commends itself as a significant stabilizing and risk reduction measure.<sup>24</sup>

### *Restricting SSBN deployment areas*

Similarly, both the US and Russia should refrain from deploying their SSBNs close to each other's territories. That's an example of confidence building measures that, among other things, are about reducing surprises and clarifying intentions. Lengthening, rather than shortening warning, times is intended to enhance stability, hence there are proposals for Russia and the US to "refrain from deploying strategic submarines at forward locations that allow their nuclear-armed missiles to reach the territories of Russia and the United States in less than 30 minutes," and to eliminate launch-on-warning procedures from their nuclear launch procedures. Information exchanges become added threat reduction measures – such as proposals for Russia and the US to "notify each other whenever their strategic submarines leave their homeports."<sup>25</sup>

### *De-alerting Nuclear Weapons at Sea*

*Global Zero* has paid particular attention to the importance of extending the launch process and launch times to eliminate the dangers of nuclear launches in response to false warnings. Thus it proposes that Russia and the US "agree to a specific phased plan to decrease the attack readiness of their individual strategic nuclear forces to 24-72 hours." *Global Zero* proposes that Russia and the US set up a joint working group on de-alerting to explore and exchange information on, among other things, specific de-alerting options, verification arrangements related to de-alerting, and share assessments of the risks inherent in current strategic postures.<sup>26</sup>

Bruce Blair, a leading global expert on de-alerting strategic nuclear forces points to "physical de-alerting measures" that would extend alerting times by 24 hours, that are amenable "to a modest degree of verification," and that would produce "a stable nuclear balance that removes sudden first-strike and launch on warning completely from the array of response options available to decision-makers. That [would] all but eliminate the prospect of unauthorized actors, including terrorists, exploiting hair-trigger postures to cause a nuclear incident or actual firing." When ballistic missile submarines leave port, a number of procedures are undertaken to make the missiles launch-ready, like the installation of electric current "inverters" on the launch tubes. If the inverters are not installed, the missiles are not launch ready and they are on moderate rather than full alert.<sup>27</sup> If the US were to verifiably undertake a "de-alerting initiative along these lines, [it] would establish the...clear intention not to pose a first-strike threat to Russia while preserving ample capacity to satisfy reasonable requirements of deterrence."<sup>28</sup>

More extensive measures, adding critically important layers of safety and strategic caution, involve separating warheads from missiles. In the case of submarine-based missiles, by cutting in half the number of missiles deployed on each submarine, there would be space in empty missile tubes to store the warheads separated from the missiles on the boat.<sup>29</sup>

### **Canadian imperatives**

Canada, like any state party to the Nuclear Non-Proliferation Treaty, is in a position to advocate disarmament and threat reduction measures related to seaborne nuclear weapons through international arms control forums and especially through the formal process by which the world's 189 signatory states to the NPT review progress in the implementation of all the broad dimensions of the treaty, including its Article VI disarmament mandate.

Canada is also in a position to enhance surveillance and domain awareness in its part of the Arctic, with regard to both surface and subsurface ocean activity. In mid-2016 the outgoing head of the Canadian Navy warned Canada is vulnerable to threats as diverse as drug trafficking, illegal migration, and military threats, and that we need better maritime domain awareness, including a trusted capacity for underwater surveillance.<sup>30</sup> And for some time now it has been clear that maritime domain awareness, including undersea awareness, is not just about national defence. In the Cold War, undersea domain concerns were addressed by anti-submarine warfare techniques, but as the then official of the Canadian Forces Maritime Warfare Centre in Halifax wrote five years ago, undersea interests now extend to a variety of civilian governmental and commercial institutions, served by processes for marine life monitoring, geophysical monitoring and tsunami warning, exploitation of resources in a marine environment, as well as security and defence monitoring.<sup>31</sup>

So, in 2016 the Federal Government invited proposals for exploring science and technology applications for air and maritime surveillance, especially in the North. The five-year, \$133 million project will identify current and future threats, and surveillance gaps, in the aerospace as well as the surface and undersea maritime environment, and then offer advice on effective responses. For subsurface maritime surveillance, the program is asked to provide “assessment and delivery of advice on the performance and the viability of existing and future surveillance technologies and methodologies for detection, localization, classification and tracking of underwater objects of interest in order to provide improved underwater warning and surveillance capability in both blue water and littoral environments (including chokepoints).”<sup>32</sup>

It's obvious that any agreements to restrict certain naval activities, such as anti-submarine warfare targeted at ballistic missile submarines, would have to include transparency, notification, and verification elements. Canada has an interest in participating in the development of maritime surveillance and detection technology for national purposes, technologies that might also contribute to international arms control regimes.

## Notes

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<sup>1</sup> The focus here is on US and Russia, obviously, the states with the most extensive seaborne systems and the most far-reaching developments. But all eight states with established nuclear arsenals have submarines and the capacity to launch nuclear weapons from them. Pakistan fired a nuclear-capable missile from a submarine for the first time in early January. Israel operates German-built submarines, some of which are assumed to be carrying nuclear-armed cruise missiles. “Pakistan first submarine-launched nuclear-capable missile,” Reuters, 10 January 2017. <http://www.reuters.com>; “Israel Submarine Capabilities,” The Nuclear Threat Initiative. [www.nti.org](http://www.nti.org).

<sup>2</sup> This description of US nuclear armed submarines is taken from: Hans M. Kristensen and Robert S. Norris, “United States nuclear forces, 2016,” *Bulletin of the Atomic Scientists*, 2016, Vol. 72, No. 2, pp. 63-73.

<sup>3</sup> “US Nuclear Modernization Programs,” *Arms Control Association*, December 2016. <http://www.armscontrol.org>.

<sup>4</sup> Aaron Mehta, “Is the Pentagon’s Budget About to be Nuked?” *Defense News*, 05 February 2016. <http://www.defensenews.com>.

<sup>5</sup> Rich Smith, “New Nuclear Submarine Cost Could Torpedo the US Navy’s Budget – and Sink This Company,” *The Motley Fool*, 18 January 2015. <http://www.fool.com>.

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- <sup>6</sup> This description of Russian nuclear armed submarines is taken from: Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2016," *Bulletin of the Atomic Scientists*, 2016, Vol. 72, No. 3, pp. 125-134.
- <sup>7</sup> Hans M. Kristensen and Robert S. Norris, "Russian nuclear forces, 2016," *Bulletin of the Atomic Scientists*, 2016, Vol. 72, No. 3, pp. 125-134.
- <sup>8</sup> The following is taken from the US Department of Defense, Navy, list of currently operational submarines, <http://www.navy.mil/navydata/ships/subs/subs.asp>, and "United States Submarine Capabilities," The Nuclear Threat Initiative, 23 July 2013. <http://www.nti.org>.
- <sup>9</sup> 39 Los Angeles Class, 3 Sea Wolf, 12 Virginia.
- <sup>10</sup> Barbara Starr, "US submarine returns from Arctic mission," CNN, 31 August 2015. <http://www.cnn.com>.
- <sup>11</sup> David Axe, "The 'Secret' Submarines the US Navy Doesn't Want to Talk About (And Russia Fears)," The National Interest, n.d. accessed 24 November 2016. <http://nationalinterest.org>.
- <sup>12</sup> The Congressional Research Service October 25, 2016 report says there were 54 US SSNs in service at the end of FY2015 – 39 Los Angeles, 3 Seawolf, 12 Virginia. Ronald O'Rourke, "Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress." RL32418. [www.crs.gov](http://www.crs.gov)
- <sup>13</sup> Steven Pifer, "Nuclear Arms Control Choices for the Next Administration," Brookings Arms Control and Non-Proliferation Series, Paper 13, October 2016.
- <sup>14</sup> The following is taken from a summary of Russian subs dated 15 December 2016 at <http://russianships.infor/eng/today> and from "Russian Submarine Capabilities," The Nuclear Threat Initiative, 10 June 2014. <http://www.nti.org>.
- <sup>15</sup> In separate unilateral statements in September and October 1991, Presidents George H.W. Bush and Mikhail Gorbachev undertook to stop deploying tactical nuclear weapons on surface ships and attack/all-purpose submarines.
- <sup>16</sup> Jeffrey Lewis, "Led Zeppelin Comes to Washington," *Foreign Policy*, 05 January 2015. <http://foreignpolicy.com/2015/01/05/led-zeppelin-comes-to-washington-russia-nukes-putin-arms-control/>.
- <sup>17</sup> Eric Schmitt, "Russia Bolsters Its Submarine Fleet, and Tensions with the US Rise," *New York Times*, 20 April 2016. <http://www.nytimes.com>.
- <sup>18</sup> Ronald O'Rourke, "Navy Virginia (SSN-774) Class Attack Submarine Procurement: Background and Issues for Congress." RL32418. [www.crs.gov](http://www.crs.gov)
- <sup>19</sup> "Navy Submarines Arrive in Arctic for ICEX 2016," US Navy News Service, 15 March 2016. [www.navy.mil](http://www.navy.mil).
- <sup>20</sup> Carol Adl, "British Submarines set to Resume Arctic Patrols, YourNewsWire.com, 11 April 2016. <http://yournewswire.com>.
- <sup>21</sup> "US Strategic Nuclear Forces under New START," Arms Control Association, Fact Sheet, October 2016. <http://www.armscontrol.or>
- <sup>22</sup> "Russian Strategic Nuclear Forces under New START," Arms Control Association, Fact Sheet, October 2016. <http://www.armscontrol.or>

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<sup>23</sup> Kristian Åtland, "Mikhail Gorbacheve, the Murmansk Initiative, and the Denuclearization of Interstate Relations in the Arctic." *Cooperation and Conflict: Journal of the Nordic International Studies association*, Vol. 43(3), pp. 289-311. NISA 2008 [www.nisanet.org](http://www.nisanet.org).

<sup>24</sup> Anatoli Diakov and Frank Von Hippel, *Challenges and Opportunities for Russia-U.S. Nuclear Arms Control*, A Century Foundation Report, The Century Foundation (New York, Washington, 2009), pp. 15-16.

<sup>25</sup> "De-Alerting and Stabilizing the World's Nuclear Force Postures," Global Zero Commission on Nuclear Risk Reduction," 2015. [www.globalzero.org](http://www.globalzero.org).

<sup>26</sup> "De-Alerting and Stabilizing the World's Nuclear Force Postures," Global Zero Commission on Nuclear Risk Reduction," 2015. [www.globalzero.org](http://www.globalzero.org).

<sup>27</sup> Bruce G. Blair, "De-alerting Strategic Forces," Hoover Press. Drell Goodby hreyk2 ch2 Mp\_25 rev) page 25

<sup>28</sup> Bruce G. Blair, "De-alerting Strategic Forces," Hoover Press. Drell Goodby hreyk2 ch2 Mp\_25 rev) page 25

<sup>29</sup> Bruce G. Blair, "De-alerting Strategic Forces," Hoover Press. Drell Goodby hreyk2 ch2 Mp\_25 rev) page 25

<sup>30</sup> Aly Thomson, "Canada 'vulnerable' to threats, warns outgoing navy commander," Canadian Press, 14 June 2016. <http://globalnews.ca>.

<sup>31</sup> Lieutenant-Commander David Finch, "Comprehensive Undersea Domain Awareness: A Conceptual Model," *Canadian Naval Review*, Vo. 7, No. 3 (Fall 2011).

<sup>32</sup> "All Domain Situational Awareness (ADSA) S&T Program: DRDC Call for Proposals," Defence Research and Development Canada, 19 July 2016. <http://www.drdc-rddc.gc.ca/en/partnerships-partenariats/all-domain-situational-awareness-connaissance-situation-domaines.page>.