Nuclear Disarmament and Russian Perceptions of US Conventional Superiority

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The United States at once seeks to achieve a nuclear-free world while it also sharpens its already robust conventional force advantages vis-à-vis peer competitors. US planners view improvements in missile defences and advanced conventional strike as reassuring to allies and friends who depend on American security guarantees. Yet, Russia and China both view the US pursuit of advanced conventional capabilities as destabilizing. This article explores Russian perceptions of strategic instability as brought about by advances in American conventional capabilities. An effort is made to stipulate which of these Russian fears are real or imagined before turning to various policy options that might allay these concerns.[1]

If any concept dominated the crafting of the Obama administration's 2010 *Nuclear Posture Review* (*NPR*), it had to be the notion of "strategic stability". The term appeared no fewer than 29 times, but its frequent employment obviously had little to do with the Cold War concern about the destabilising possibility of the Soviet Union developing first-strike nuclear capabilities to upset the strategic balance. Rather, the table has turned dramatically to where—from the perspective of at least Russia and China—the United States is the potential source of instability, particularly due to its overwhelming superiority in advanced conventional weapons. Indeed, the Obama administration's 2010 *NPR* readily admits that it can afford to diminish the role of nuclear weapons in satisfying its fundamental security requirements due to "the growth of unrivalled US conventional military capabilities, major improvements in missile defences, and the easing of Cold War rivalries."[2] The 2010 *NPR* also makes clear that the United States must reinforce regional security commitments not only by means of its remaining, if diminished, nuclear deterrent but also by means of increasing reliance on improved missile defences and conventional military capabilities. Both are viewed as essential to convincing America's allies and partners that they do not require nuclear weapons of their own. Thus, the American conundrum: how can the United States at once reassure its allies and partners by

[1] This article is adapted and updated from an earlier and longer treatment of the subject, entitled 'The Path to Deep Nuclear Reductions: Dealing with American Conventional Superiority', *Proliferation Papers* No. 29 (Paris: Institut français des relations internationales, 2009), <www.ifri.org/downloads/pp29gormley1.pdf>. Another adaptation will appear as a chapter—'American Conventional Superiority: The Balancing Act'—in Catherine M. Kelleher and Judith V. Reppy, (eds), *Getting to Zero* (Stanford: Stanford University Press, forthcoming).

[2] *Nuclear Posture Review Report* (Washington, D.C.: US Department of Defense, April 2010), <http://www.defense.gov/npr/>.

demonstrating the potency of its unrivalled conventional superiority without upsetting the very strategic stability it avers is so central to achieving the goal of a nuclear-free world?

Not only does this fundamental question pertain to former strategic foes with substantial nuclear potential, but also to regional competitions in Northeast Asia, South Asia, and the Middle East. Although the Obama *NPR* expended an appropriate amount of ink on the subject of achieving strategic stability—largely through increased transparency and bilateral talks with Russia and China—it seems safe to say that its treatment has hardly allayed Russian and Chinese concerns about the instability neither along the path toward nuclear zero or once such a goal were achieved.

This article explores Russian perceptions of strategic instability as brought about by advances in American conventional capabilities. An effort is made to stipulate which of these Russian fears are real or imagined before turning to various policy options that might allay these concerns.

Russian Perceptions of US Advanced Conventional Systems

American advances in precision global strike capabilities coupled with a seemingly unfettered ability to exploit missile defence technologies in the absence of any treaty constraints provides a challenging backdrop to obtaining deep reductions in Russian and American nuclear arsenals. The cavalier way in which the Bush administration unilaterally opened negotiations with Poland and the Czech Republic on stationing mid-course interceptors and radars, respectively, on these nations' territories catapulted the missile defence issue to centre stage. But equally worrisome to Russia are developments in precision conventional strike weapons that are seen as capable of destroying strategic targets. Russia sees the combination of conventional offense and defence as leaving it at a decided and uncomfortable disadvantage vis-à-vis the United States in the aftermath of deep nuclear reductions, no less a world without nuclear weapons.

The Bush administration's discussions with the Poles and Czechs occurred against the backdrop of NATO's inchoate plans for a missile defence system of its own, including one that could conceivably include Russia at some future point. In January 2008, with Germany as the host nation, NATO's Theater Missile Defense Ad Hoc Working Group—operating under the aegis of the NATO-Russia Council—conducted the fourth in a series of theatre missile defence exercises, with eleven NATO nations joining Russia in a command and control exercise of missile defence forces. Some might forgive Russians for believing that the US rush to deploy its own missile defence system in Europe represents a way of edging Russia out of any future NATO missile defence system.

Russia might also be excused for worrying about the open-ended US approach toward determining when to deploy new missile defence components as well as the opaque nature of what the US notion of global missile defences truly means. Missile defence opacity reflects the diametrically opposed acquisition strategies for missile defence practiced before and after the terrorist attacks of 11 September 2001. Before 9/11, particularly in regard to Democratic administrations, support for any complex military system occurred only after the threat had been amply explicated and then the system was subjected to thorough testing—a "fly-before-you-buy" practice in which any particular missile defence system undergoes enough operational tests to determine its reliability and performance effectiveness.[3] The administration of George W. Bush introduced the notion of capabilities-based planning, which overturned the need for a thorough vetting of the threat and instead sought to develop a full range of capabilities needed to cope with likely future contingencies. The logic for capabilities-based planning was laid out in the 2001 Quadrennial Defense Review.[4] It was predicated on the belief that, since one cannot know with enough confidence precisely what threats will emanate from either nations or terrorist groups, defence planners must identify specific capabilities needed to dissuade enemies from pursuing threatening options, deter them by deploying forces for rapid use, and defeat them if deterrence fails. With such a broad writ in hand, the chief lesson of 9/11 for the Bush administration was that a determined adversary would stop at nothing—including even acquiring ballistic missiles—in order to attack the United States.[5] With longstanding metrics for measuring performance no longer applicable, the Bush administration abjured relying on extensive flight tests to determine system reliability and performance. Deployment decisions were based instead on simulations that integrated limited real-world test results with conceptual components reproduced in a model. Moreover, no longer did the Missile Defense Agency specify an overall system architecture. Whatever components passed the muster of this admittedly risky approach were deployed immediately in two-year block intervals, leaving critics aghast at such a something-is-better-than-nothing approach to deployment. But to observers in Russia, such opacity produced confusion and uncertainty with respect to future US missile defence plans and capabilities.[6]

[3] For an illustration of this position from a practitioner, see 'What are the Prospects, What are the Costs? Oversight of Ballistic Missile Defense (Part 2)', Testimony of Philip E. Coyle, III, Senior Advisor, World Security Institute, before the House Committee on Oversight and Government Reform, Subcommittee on National Security and Foreign Affairs, 18 April 2008.
[4] *Quadrennial Defense Review Report*, 30 September 2001, <http://www.defenselink.mil/pubs/pdfs/qdr2001.pdf> [Accessed 7 December 2010].
[5] For this author's analysis of 9/11's lessons, see Dennis M. Gormley, 'Enriching Expectations: 11 September's Lessons for Missile Defence', *Survival*, vol. 44 (Summer 2002), pp. 19–35.
[6] Maj. Gen. Vladimir Dvorkin (retired), observed that "there is no telling how far the United States will go with its missile defense deployment plans." See his 'Reducing Russia's Reliance on Nuclear Weapons in Security Policies', in Christina Hansell and William C. Potter (eds),

Although long-term Russian concerns about US missile defences remain to be seen, Moscow's more immediate consternation about the Bush administration's plans for interceptors in Poland has subsided. With its decision to scrap the Bush plan to protect Europe and America from Iranian intercontinental-range missiles, the Obama administration quite sensibly has chosen to focus initially on defending against missiles that could threaten American troops in Europe and our European allies: Iranian short- and medium-range ballistic missiles. These missiles are numerous and threatening and to that extent substantially more interceptors than the Bush plan's ten will be needed to deal with this near-term threat. Thus, the Obama plan's missile defence architecture will depend on proven sea-based interceptors—SM-3—deployed initially on ships but later also on land. One Aegis cruiser alone carries 100 SM-3 interceptors. The Obama plan banks on the expectation that Iran will not produce a truly intercontinental missile threat until at least 2020, by which time modified versions of SM-3 interceptors are expected to be capable of intercepting potential future intercontinental-range ballistic missiles (ICBMs).[7] Still, absent legal constraints on future American missile defence plans, Russian fears, however relaxed today, are likely to re-emerge.

What animates Russian officials most is that with the US deployment of highly powerful ground- or sea-based X-band radars and spaced-based infrared sensors (known as the Spaced-Based Infrared System, or SBIRS-Low), America will have a break-out potential in place for a thick, global system of missile defence.[8] Compared with the poor discrimination performance of earlier warning radars, X-band systems have a resolution of 10-15cm, good enough to discriminate between real warheads and decoys. More ominously, once they are deployed globally, not only will midcourse ground-based interceptors be able to take advantage of their improved resolution, but so too will a growing network of sea-based interceptors on Aegis cruisers/destroyers and land-based upper-tier THAAD interceptors. Of course, X-band, and especially SBIRS-Low, may not prove to be as effective as promised, but this does not lessen the concern of Russian defence planners who see uncontrolled expansion of American global missile defences as a potential threat to their diminishing nuclear deterrent.

Prospective missile defence advances represent only the most visible impediment to progress in nuclear arms control. Lurking just behind are concerns about US advanced conventional weapons. In the US debate,

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Engaging China and Russia on Nuclear Disarmament, Occasional Paper No. 15 (Monterey, CA: James Martin Center for Nonproliferation Studies, April 2009), p. 95.

[7] 'Fact Sheet on U.S. Missile Defense Policy: A "Phased, Adaptive" Approach for Missile Defense in Europe', The White House Office of the Press Secretary, 17 September 2009.

[8] This was a concern even before the US withdrawal from the ABM treaty in 2002. See Jack Mendelsohn, 'The Impact of NMD on the ABM Treaty', in Joseph Cirincione, et al., *White Paper on National Missile Defense* (Washington, DC: Lawyers Alliance for World Security, 2000).

much has been made of Russia's fear of US nuclear primacy.[9] But Russian strategic analysts have begun to write in some detail about the prospects that future advanced conventional weapons—together with improved missile defences—could place Russia in a position of unacceptable vulnerability.[10] This perception is not merely the product of wild speculation by non-specialists in the Russian press. The well-respected Major General Vladimir Dvorkin (Ret.), who formerly directed fundamental research in mathematical modelling in nuclear planning, and then participated in virtually every major US-Soviet strategic arms control negotiation, reflects the broad concern now existing in Moscow that conventional weapons imbalances represent a key roadblock to deep nuclear reductions. As Dvorkin notes:

> [A Russian] concern is the possibility that high-precision conventional weapons could be used to destroy strategic targets. Precision-guided munitions (PGMs) pose a threat to all branches of the strategic nuclear triad, including the silo and mobile launchers of the Strategic Rocket Force (SRF), strategic submarines in bases, and strategic bombers. The types of PGMs to be used against each of these components, the vulnerability of these components, the vulnerability of assets, and operation requirements would require … study.[11]

US plans to arm Trident D-5 missiles with conventional payloads as part of its plans for prompt global strike has already raised concerns—in the United States and Russia alike—about missile warning ambiguity and inadvertent retaliatory actions. These developments are of sufficient concern to Russian planners that Moscow arms officials have proposed—and the United States has acceded to—including strategic conventional ballistic missiles for limits in strategic weapons treaties with the United States, including the New START treaty currently being considered for ratification in Washington and Moscow.

If US strategic conventional denial capabilities are just emerging today, Russian military planners must also worry about where such programs might be in a decade or two. The US Strategic Command's initial complement of forces comprising the Global Strike mission included the US Air Force's F-22

[9] See Keir A. Lieber and Daryl G. Press, 'The Rise of U.S. Nuclear Primacy', *Foreign Affairs* (March/April 2006). For reactions, see 'Nuclear Exchange: Does Washington Really Have (or Want) Nuclear Primacy?', *Foreign Affairs*, September/October 2006.

[10] See, for example, 'U.S. Can Attack Russia in 2012-2015', *Moscow Agentstvo Voyennykh Novostey* (internet in English), 26 February 2008 [Foreign Broadcasting Information Service].

[11] Dvorkin, 'Reducing Russia's Reliance on Nuclear Weapons in Security Policies', p. 100 (see n. 34). For its part, Russia would prefer to proceed along the conventional-oriented path that the United States has pursued since 1991. Russia's National Security Concept, published in 2000, notes that reliance on nuclear weapons is a temporary phenomenon. Once current plans to develop new air- and sea-launched cruise missiles and PGMs come to fruition by 2020, Russia will no longer need to rely predominantly on nuclear weapons for deterrence purposes. See Nikolai N. Sokov, Jing-dong Yuan, William C. Potter, and Cristina Hansell, 'Chinese and Russian Perspectives on Achieving Nuclear Zero', in Hansell and Potter (eds), *Engaging China and Russia on Nuclear Disarmament*, p. 4 (see. n. 6).

fighter providing penetration corridors for B-52, B-1 and B-2 bombers loaded with conventional precision strike weapons.[12]

The US Navy has converted four of its 18 Trident Ohio-class submarines to each carry 154 Tomahawk land-attack cruise missiles, the latest version of which features a two-way satellite data link that permits the missile to attack one of 16 preprogrammed targets or take new GPS coordinates to attack a fleeting target of opportunity. Assuming it has reserve fuel, the missile can also loiter in the area for hours awaiting a more important target, as well as pass information from its own TV camera on battle damage. Instead of filling each of the four Trident submarines with its full complement of 154 Tomahawks, a few missiles can be traded of for special-operations mini-subs or small reconnaissance Unmanned Aerial Vehicles (UAVs). The Pentagon has also sought, without success thus far, to spend US$503 million to outfit a small number of the Trident D-5 nuclear missiles on the remaining 14 Ohio-class Trident submarines with conventional warheads (either small diameter bombs or bunker-buster penetrating warheads). Even more robust global strike systems could emerge from current research and development programs, including small launch boosters capable of launching highly manoeuverable hypersonic glide vehicles armed with a 500 kilogram conventional payload over international distances and reusable unmanned hypersonic cruise vehicles capable of carrying 5,500 kilogram payloads over 14,500 kilometres within two hours.[13]

The US Conventional Strategic Threat to Russia: Separating Fact from Fiction

Any American president—Barack Obama included—wishing to wean the United States from its longstanding reliance on nuclear weapons would find it difficult not to pursue a robust conventionally oriented denial strategy. Indeed, President Obama has publicly referred to the concept of prompt global conventional strike as an effort "to move towards less emphasis on nuclear weapons" while making certain that "our conventional weapons capability is an effective deterrent in all but the most extreme circumstances".[14] Yet, the challenge facing the United States is to make more transparent precisely where current advanced conventional and missile defence programs stand today, and what restrictions or operational constraints the United States might be willing to accept, beyond existing

[12] It should be noted that when the Global Strike mission was first constituted, it counted nuclear weapons among its constituent components.
[13] These programs are joint US Air Force/DARPA efforts conducted under the rubric, 'Force Application and Launch from CONUS [continental United States]' or FALCON program. See <http://www.darpa.mil/tto/programs/Falcon.htm> for a brief outline of the FALCON program and *Alternatives for Long-Range Ground-Attack Systems* (Washington, DC: Congressional Budget Office, March 2006), at <http://www.cbo.gov/ftpdocs/71xx/doc7112/03-31-StrikeForce.pdf>.
[14] David E. Sanger and Thom Shanker, 'US Faces Choice on New Weapons for Fast Strikes', *New York Times*, 22 April 2010, p. 1.

counting rules for conventional ballistic missiles, on their development or operation to accelerate the path toward nuclear abolition.

If the US decision to arm a small number of Trident D-5 missiles with conventional warheads is any indication, virtually no thought went into how such plans would be viewed in Moscow or Beijing, or indeed, even in the US Congress. The impervious nature of conventional strategic strike programs is less a matter of intention and more related to the fact that programs are mired in vagueness with differing interpretations of missile requirements and capabilities existing within various bureaucratic stake holders. Programs are diffused across the entire Department of Defense, including the Defense Advanced Research Project Agency and the military services. And rather than being driven by any well-conceived concept of operation dictating how these various programs will transform military operations—the bellwether of truly revolutionary change—these efforts are propelled for the most part by raw technological momentum. The opaque nature of US global missile defence ambitions in the Bush administration largely emanated from the imperative to deploy systems as quickly as possible to meet political, if not threat-driven, needs. Global strike capabilities, on the other hand, have the advantage today and in the future of appearing to transform deterrence-oriented nuclear ballistic missiles that no one ever wishes to be used into denial-oriented counterforce systems possessing an array of future mission possibilities—a factor that surely animates the interest of all three military services. But Global Strike's exclusive affiliation with advanced conventional strike is today more promise than reality. However much the US Air Force may have envisioned the Prompt Global Strike mission as a decidedly conventional one, its initial implementation proved otherwise, not least because of the dearth of truly global conventional capabilities.[15] In fact, Global Strike's June 2004 implementation as an approved operational plan mirrored the Bush administration's 2001 *NPR* conflation of nuclear and conventional capabilities.

President Bush's elevation of preemption (actually, prevention) from military option to national doctrine in 2002 gave real impetus to making the Global Strike concept operational. Grave concern over the toxic mix of weapons of mass destruction and the presumed nexus between so-called "rogue" states and a new brand of apocalyptic terrorism led to specific guidance to the US military to integrate selected bombers, ICBMs, ballistic-missile submarines, and cyber-warfare assets into a strike force capable of promptly attacking high-value targets associated with specific regional contingencies. Some advanced conventional capability figured into the original Global Strike operational implementation, probably consisting of joint direct attack

[15] For a pre-9/11 view of US Air Force plans, see Matt Bille and Maj. Rusty Lorenz, 'Requirement for a Conventional Prompt Global Strike Capability', briefing presented to the National Defense Industrial Association's Missile and Rockets Symposium and Exhibition, May 2001.

munitions (JDAMs) launched by B-2 bombers and Tomahawk cruise missiles launched from submarines and surface vessels. But Global Strike as a purely conventional capability was overtaken not only by limited capabilities but also by the Bush administration's desire to make nuclear strike options more credible and tailored to the post-Cold War requirements reflected in its 2001 *NPR*.[16]

Where does Prompt Global Strike stand today in the aftermath of Barack Obama's election? The Next-Generation Bomber, originally slated for deployment by 2018, has been shelved for cost reasons while the air force seeks a cheaper bomber solution that a stand-alone penetrating bomber.[17] The Obama administration's 2010 Quadrennial Defense Review promotes the expansion of long-range conventional strike capabilities, including experimenting with new Prompt Global Strike prototypes, perhaps even ones that would avoid, unlike the Bush administration's plans for Trident conventional conversion, intermingling nuclear and conventional warheads together.[18]

One might argue, of course, and the Russians do, that the requirement for converting Trident might be resurrected in the future. They surely observed that an independent study panel of the bipartisan National Research Council (NRC) had endorsed a limited application for the conventionally armed Trident before the 2008 election. The NRC panel only gave its support for the mission of a time-critical strike against a fleeting target of opportunity (e.g., counter-terrorist target or rogue state activity), which would involve no more than one to four weapons. The US Navy had pressed for funding to convert two Trident missiles on each of twelve deployed Trident submarines for a total of twenty-four conventionally armed Tridents. Importantly, the NRC panel drew a distinction between the more limited mission and conventional Trident's broader application. The limited use would not carry the same stiff operational and political demands as a larger use of conventional Trident would in providing leading edge attacks in support of major combat operations. In the latter regard, Trident would probably join substantial numbers of Tomahawks and other PGMs on bombers as part of a counterforce strike at the outset of a major regional contingency. The NRC panel properly noted that in contrast to using one to four Tridents alone, any large-scale prompt conventional strike would present much stiffer operational

[16] For an incisive appraisal of the operational implementation of Global Strike, including the creation of its organizational components to direct planning and execution, see Hans M. Kristensen, 'US Strategic War Planning After 9/11', *Nonproliferation Review*, vol. 14 (July 2007), pp. 373–90.

[17] The air force seems inclined to seek a cheaper bomber that requires support from stealthy F-22 and F-35 fighters, or is compensated for by dependence on Minuteman or Trident conventionally armed ballistic missiles. See Bruce Rolfsen, 'Leader says future bomber won't go solo', *Air Force Times,* 13 July 2010, at <http://www.airforcetimes.com/news/2010/07/airforce_long_range_071010w/>.

[18] See Department of Defense Quadrennial Defense Review Report, February 2010, <http://www.defense.gov/QDR/images/QDR_as_of_12Feb10_1000.pdf>.

demands related to intelligence support and command and control, as well as drastically different political implications with regard to warning ambiguity. Whether the contingency involves using one or many conventional Tridents, as the NRC panel observed, "the ambiguity between nuclear and conventional payloads can never be totally resolved".[19] Yet, the larger the Trident salvo of conventional missiles, the higher will be the prospects for misinterpretation and inadvertent responses. At the same time, because Russian early-warning systems are incomplete, even smaller numbers may be wrongly interpreted as a larger-than-actual salvo or incoming missiles. Concerns about ambiguity leading to inadvertent nuclear war—rightly or wrongly conceived—largely explain the congressional decision not to support conventional Trident's funding.

Arming Trident or any other long-range ballistic missile with a conventional warhead is not the only way to deal with fleeting terrorist targets. The combination of US Special Forces on the ground and armed Predator UAVs in the air represents a potent and now broadly used new capability to deal with fleeting targets. The NRC panel noted the importance of UAVs and special forces as sources of intelligence supporting conventional Trident strikes, which begs the question: why can't less provocative capabilities—if perhaps less effective under some circumstances—obviate the need for conventional Trident in regard to this limited mission?[20] Another option to evaluate would be a new missile altogether, rather than one with a nuclear legacy, like the US Navy's concept of a "Sea-Launched Global Strike Missile", or even the Navy's effort to develop a supersonic version of the Tomahawk cruise missile.[21] For the time being, the Obama Pentagon and Congress seem inclined to focus on an advanced technology alternative to Trident, consisting of a hypersonic glide vehicle mounted on a ballistic missile based, initially at least, at Vandenberg air force base in California. After launch, the hypersonic vehicle itself would remain in the atmosphere, while taking advantage of a significant cross-range manoeuvring capability to optimise its route to the intended target. Although plans call for a prototype by 2014 or 2015, under optimistic conditions the complete system would not

[19] 'Conventional Prompt Global Strike Capability', Letter Report of the National Research Council's Committee on Conventional Prompt Global Strike Capability, dated 11 May 2007, <http://www.nap.edu/catalog/11951.html>.

[20] A point made by Joshua Pollack in 'Evaluating conventional prompt global strike', *Bulletin of the Atomic Scientists*, vol. 65 (January/February 2009), pp. 13–20. The less effective circumstances would entail Predator's problematic survival against sophisticated and thick air defences, which would be less likely to be the case in the limited counter-terrorist scenario and more likely in major combat operations against a regional adversary.

[21] The Seal-Launched Global Strike Missile is mentioned in 'Conventional Prompt Global Strike Capability', see note, while a related (if not precisely the same) concept for a Submarine-Launched Intermediate-Range Ballistic Missile is discussed in detail at <http://www.globalsecurity.org/wmd/systems/slirbm.htm>. On the supersonic Tomahawk, see Dennis M. Gormley, *Missile Contagion: Cruise Missile Proliferation and the Threat to International Security* (Westport, CT: Praeger, 2008), p. 54.

be deployed until 2017 to 2020, assuming it meets its stiff technical demands and is seen as affordable.[22]

Research and development programs attempting to achieve technological breakthroughs in global strike capabilities by 2025 are, frankly speaking, problematic at best. These include the hypersonic cruise vehicle that could take off and land from a US runway and be anywhere in the world in one to two hours. The idea for such a space plane has been around since the 1950s.[23] President Ronald Reagan accelerated the push in his 1986 State of the Union Address, yet his director of the Strategic Defense Initiative (Star Wars), Henry Cooper, told a congressional panel in 2001 that after the expenditure of some US$4 billion on the development of the space plane concept from the early 1970s to the end of the 1990s (discounting various programs in the 1950s and 1960s, as well as the space shuttle investment), the only thing produced was "one crashed vehicle, a hangar queen, some drop-test articles and static displays."[24] Current Pentagon hypersonic programs face, among many, the difficult challenge of developing lightweight and durable high-temperature materials and thermal management techniques needed to cope with hypersonic speeds. This is because hypersonic vehicles require a thermal protection system capable of preventing their payloads from melting at re-entry speeds of up to Mach 25 (or 25 times the speed of sound). The quest to master and deploy hypersonic systems will not come easily, not only because of the huge technical challenges associated with these systems but also because the strategic environment is so uncertain. No defence agency would likely be willing to bet on any one solution to the global-strike requirement under such circumstances. However, the US Congress appears to have chosen to continue down the risky and potentially costly path of pursuing hypersonic delivery vehicles. If nothing else, this course removes the nearer-term solutions like conventional Trident from becoming any kind of impediment to progress in strategic arms control negotiations.

If converting Trident to deliver non-nuclear payloads and more futuristic advanced conventional programs represent non-existent threats to Russia today, that is not the case in regard to hundreds of Tomahawk cruise missiles (616 maximum, if UAVs or special forces are not fitted out in some launch tubes) that comprise the four Ohio-class Trident submarines converted from nuclear ballistic missile submarines (SSBNs) to guided-

[22] Sanger and Thom, 'US Faces Choice', see n. 14.
[23] The first publicly acknowledged program, in 1957, was the US Air X-20 Dyna-Soar, which was supposed to be launched vertically off the ground and then glided back to earth for landing. The current hypersonic cruise vehicle would be expected to operate at between 30 to 50 kilometres altitude.
[24] Testimony by Henry F. Cooper to the House Subcommittee on Space and Aeronautics Committee on Science, 11 October 2001, <http://www.tgv-rockets.com/press/cooper_testimony.htm>. Cooper largely placed blame on Pentagon management inefficiencies for the program's poor performance.

missile (i.e., cruise missile) submarines between 2002 and 2008. In worrying about this threat, Russian analysts take particular note of the precision accuracy and re-targeting capability of the latest generation Tomahawk cruise missile. This, it is asserted, means that highly accurate Tomahawks could threaten Russian silo-based intercontinental ballistic missiles, while the fact that they possess their own means of reconnaissance, can loiter in the target area, and can be retargeted after launch, suggests they can find and destroy mobile missiles like the new Topol-Ms about to begin deployment in December 2009. Such a preemptive strike of this sort could, by 2012-2015, destroy between 70 and 80 percent of Russian's nuclear forces. The remaining missiles, it is asserted, could then be readily intercepted by the US global missile defence system.[25]

Granting that the current state of Russian strategic missile forces is today substantially below its Cold War form and that they are likely to suffer funding shortfalls over the next decade, the expectation that US conventionally-armed Tomahawks, even ones with high accuracy and retargeting capability, could, on their own, accomplish such successful results is—kindly put—the height of excessive imagination. Observing US advances in precision conventional strike linked to advanced reconnaissance systems, Soviet-era military theoreticians did indeed become fascinated with the prospect that "automated search and destroy complexes" could one day come close to approximating the effectiveness of at least tactical nuclear weapons.[26] But a closer look at what Soviet-era planners truly had in mind had nothing to do with anticipating that missiles alone could dominate a major military campaign. Instead, their role was seen as leveraging the effectiveness of a multiplicity of other strike elements (aircraft, bombers, electronic jamming, airborne assault and heliborne forces, etc.) in a major combined arms campaign. Tomahawk cruise missiles are surely accurate enough to hit on or very near to a Russian missile silo, but their warhead carries only 450 kilograms of either blast fragmentation or combined-effects submunitions. The former is a mere pinprick vis-à-vis hardened missile silos; the latter is only relevant against soft targets. Indeed, even a Trident missile armed with a conventional penetrator would require Herculean accuracy and absolutely perfect targeting conditions to have any chance whatsoever of threatening silo-based missiles.[27]

[25] 'US Can Attack Russia in 2012-2015', *Moscow Agentstvo Voyennykh Novostey* (Internet in English), 26 February 2008 [Foreign Broadcasting Information Service].
[26] Most notably, see N. V. Ogarkov, *Krasnaya Zvezda* (9 May 1984) (BBC Monitoring Service translation [SU/7/639/C/10]).
[27] Russian concrete silo covers are dome-shaped and approximately 20 feet in diameter and 5 feet high in the centre. This means that they have a radius of curvature of about 12.5 feet. Employing the targeting requirement of approaching the target at less than 2 degrees from the vertical, the penetrator would have to impact less than 5 inches from the absolute centre of the silo cover, or within a 10-inch diameter circle whose centre is at the apex of the dome. My thanks to Dr. Gregory DeSantis, a former US Department of Defense scientist, for making these calculations based on the penetrator design discussed in Nancy F. Swinford and Dean A.

What about advanced Tomahawk's reputed new capabilities against mobile missiles? The US Air Force in particular has accomplished major improvements in counterforce targeting against fleeting targets, largely as a by-product of nearly continuous combat operations in Afghanistan and Iraq over the last eight years. Nevertheless, it is critical to distinguish between what piloted aircraft can accomplish against a rogue state's mobile missiles compared with autonomous missiles equipped with a data link and TV camera facing arguably the most skilled nation there ever has been when it comes to operating intermediate- and strategic-range mobile missiles.[28] It is one thing to track, detect, and successfully attack fleeting groups of Taliban or al Qaeda fighters in Afghanistan or Iraq, or Iraqi mobile missile units who believed they are impervious to ubiquitous battlefield reconnaissance systems while being otherwise overwhelmingly dominated (in the case of Iraq in 2003) by large numbers of American conventional forces, and quite another to expect 600 or so conventionally-armed Tomahawks to do decisive damage to 180 Russian nuclear-armed mobile missiles proficient in the practice of employing camouflage, cover, and concealment methods once they have moved from their peacetime bases. Moreover, there is the stiff challenge of operating impervious to Russia's advanced air and missile defences. US counterforce targeting against mobile missiles has indeed improved greatly since coming up completely short in the 1991 Persian Gulf War, but even in Iraq in 2003, only anecdotal evidence suggests that more success was achieved against a greatly diminished Iraq missile force compared to its 1991 holdings. Success did not mean halting the admittedly low launch rate over the 21-day war, nor did it mean that Iraq's entire missile stores were eliminated via either counterforce or missile defences by the war's conclusion. For example, thirty-three Iraqi cruise missiles—a threat that had surprised American missile defenders and contributed to friendly-fire losses—were found intact on the Faw peninsula after the war.[29] Simply put, we fall prey to a fallacy of division to think that because tactical counterforce operations using advanced aircraft and cruise missiles have improved remarkably during the last eight years, cruise missiles alone can also succeed in strategic counterforce operations where even nuclear strike systems were expected at best to provide only problematic results due to inevitable target location uncertainties.[30] Finally, there is the stark reality that

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Kudlick, 'A Hard and Deeply Buried Target Defeat Concept', Defense Technical Information Center document no. 19961213 060 (Sunnyvale, CA: Lockheed Martin Missiles & Space, 1996) at <http://www.stormingmedia.us/86/8678/A867813.html>.

[28] The Soviet Union first deployed intermediate-range ballistic missiles on truly mobile launchers in 1976 (the SS-20).

[29] Dennis M. Gormley, 'Missile Defence Myopia: Lessons from the Iraq War: Lessons from the Iraq War', *Survival*, vol. 45 (Winter 2003/04), p. 71.

[30] The Russian supposition that American intelligence, surveillance, and reconnaissance capabilities are so ubiquitous that anything that moves will be detected and instantly killed flows from the exaggerated expectations of such books as Harlan Ullman and James P. Wade, Jr, *Shock and Awe: Achieving Rapid Dominance* (Washington, DC: National Defense University,

the inevitable failure to locate and destroy all of Russia's strategic nuclear weapons would expose the United States to a devastating nuclear riposte.

An important caveat is needed when comparing nuclear and precision conventional weapons—surely an apples versus oranges proposition. The sheer scale of a nuclear explosion, even a low-yield one, dwarfs the energy potential of today's advanced conventional weapons. To that extent, the huge scale of the damage created by a nuclear explosion compensates greatly for any weaknesses in accuracy of delivery or targeting uncertainty (i.e., knowing precisely where the target is located and its attendant vulnerabilities). On the other hand, precision conventional weapons depend critically on a huge supporting cast of players and functions: highly accurate intelligence collection, analysis, and dissemination; rigorous mission planning; knowledge of the target's vulnerabilities to permit selection of precise aimpoints; post-attack damage assessment capabilities to determine how best to exploit the first attack's true effects; and perhaps most important of all, an agile command and control system networked together seamlessly to make rapid-fire decisions needed to achieve near-simultaneous waves of precision conventional strikes. Thus, while nuclear weapons are forgiving due to their broad effects, precision conventional systems cannot afford to see a breakdown in the performance of its critically important supporting cast if they are to succeed as desired.

The open-ended nature of the US missile defence system raises perhaps the most legitimate area of concern from a Russian perspective, although the Obama administration's decision to cap ground-based mid-course interceptors at thirty ought to allay such concerns. Vladimir Dvorkin has written that Russia has little to worry about from American missile defences until roughly 2015. Until then, Russian offensive missiles have adequate "defence suppression systems" to require as many as ten US ground-based interceptors to destroy one warhead. Even the addition of the third site in Poland would not have changed these circumstances. But as time passes, and if the United States were to deploy space-based laser and kinetic-kill weapons "on a massive scale", Russia's nuclear deterrent could conceivably be seen to be at risk.[31] Given the stance of the Obama administration thus far, notably its insistence on demonstrating missile defence performance and system cost effectiveness before deployment decisions are taken, the likelihood of the United States taking the path that worries Russians most is doubtful in the near-term future. Yet, without the constraints once associated with the 1972 Anti-Ballistic Missile Treaty, from which the United States unilaterally withdrew in 2002, nothing legally bars a future US

1996). For a more grounded treatment, see Barry Watts, *Clausewitzian Friction and Future War* (Darby, PA: Diane Publishing Co., 2004).

[31] Vladimir Dvorkin, 'Threats Posed by the US Missile Shield', *Russia in Global Affairs*, vol. 2 (April-June 2007), <http://eng.globalaffairs.ru/numbers/19/>.

administration from pursuing such an open-ended course of action. This stark reality no doubt explains Russian insistence on including, in the text of the "new" START treaty, signed in Prague on 8 April 2010 by Presidents Obama and Medvedev, a clause noting the interrelationship between strategic offense and defence, and its growing importance as offensive systems are further reduced.[32]

Cooperative Engagement with Russia: Options for Consideration

SEEK CONSENSUS ON MISSILE THREATS TO NATO AND RUSSIA

The first step in achieving real and lasting cooperation in missile defense is for Russia and the United States, through the NATO-Russia Council, to reach consensus on the pace and scope of Iran's ballistic and cruise missile threat to the whole of NATO. Extant threat assessments facing the NATO region focus in the main on ballistic missile systems. The debates focus less on Iran's ballistic missile capacity than on the pace of Tehran's success in weaponising a suitably compact nuclear reentry vehicle that could survive the rigors of reentry, as well as how quickly their solid-fuel missile developments will mature. Far less attention is given to the growing cruise missile threat on the periphery of Europe. Iran is among a rapidly growing number of countries that have begun pursuing land-attack cruise missile programs. According to a 2004 NATO Parliamentary Committee report, Iran was converting some 300 Chinese anti-ship cruise missiles into land-attack systems by fitting them with turbojet engines and new guidance systems. Such designs have been demonstrated as capable of achieving around 1,000 kilometres range and could be readily launched from merchant ships to target substantial portions of Europe. Even more worrisome over the longer-term was the 2005 disclosure that Russian and Ukrainian arms dealers had collaborated with the head of Ukraine's export control agency in the illegal sale of twelve to twenty Ukrainian/Russian Kh-55 strategic (and nuclear capable) cruise missiles to China and Iran. The Kh-55's range is 3,000 kilometres. Even though the illegal transfer of at least six Kh-55s to Iran also included a ground support system for testing, initialising, and programming the missiles, such a small number of cruise missiles was probably acquired primarily for purposes of examination and reverse engineering, leading eventually to the development of Iran's own long-range cruise missile program.[33] A common view of the threat of both ballistic and cruise missiles offers opportunities for broader cooperation beyond just ballistic missile defence to include warning, detection, and defeat of airborne threats. To begin to dissuade states from acquiring not just ballistic but also

[32] Text of the 'Treaty Between the United States of America and the Russian Federation on Measures For the Further Reduction and Limitation of Strategic Offensive Arms', p. 2. The text also takes note of the impact of conventionally armed ICBMs and submarine-launched ballistic missiles (SLBMs) on strategic stability.

[33] Gormley, *Missile Contagion*, chapters 3 and 4 (see n. 21).

cruise missiles will require a much more evenhanded way of not only assessing but also funding respective ballistic and cruise missile defence programs than ever before.

ENGAGE RUSSIA ON BALLISTIC MISSILE DEFENCE

There is already broad support in Washington for engaging Russia in a manner substantially different from the Bush administration's efforts in early 2008 by both Secretaries Gates and Rice. While the Moscow-Washington agenda on strategic arms control will surely dominate the two states' bilateral relationship over next several months, perhaps the easiest way to jump-start missile defence cooperation would be to move toward implementing the Joint Data Exchange Center (JDEC) in Moscow. Russia and the United States first agreed on a joint warning concept involving notifications of ballistic missile flights to each side in 1998, which was formalised in a June 2000 meeting between Presidents Clinton and Yeltsin, who agreed to establish the centre in Moscow. Legal and tax issues have prevented the centre from becoming operational. All of the operational details have been worked out already, so movement toward implementation should be comparatively straightforward. It would also be appropriate to examine more closely Russian President Putin's 2007 proposal to establish a second data exchange centre in Brussels.

US officials have already signalled their willingness to examine the use of Russian low-frequency warning radars at Gabala in Azerbaijan and Armavir in Russia's Krasnodar Region as part of the US-led global missile defence system.[34] As nongovernmental radar specialists have noted, there is the chance that combining an X-band radar deployed either in Azerbaijan or Turkey with the Armavir radar could possibly offer three to four more minutes of additional warning than could the X-band radar operating on its own from the Czech Republic.[35] At the very least, American radar specialists need to investigate precisely how these two radars might contribute not only to improved missile defence performance but also partnerships with Russia in areas where Russian technological prowess might complement American and European missile defence skills.

If cooperation in missile defence warning is not difficult enough, it is even more so when it comes to cooperation in interceptors. Security and intellectual property rights issues have always stood in the way of achieving much progress. Assuming, however, that US-Russian relations improve in the aftermath of successful strategic arms control treaties, it would make good sense to explore avenues toward cooperation in missile defence

[34] Ellen Barry, 'US Negotiator Signals Flexibility Toward Moscow Over New Round of Arms Talks', *New York Times*, 5 May 2009; and 'U.S. is Ready to Discuss Proposal on Using Gabala Radar as Part of Global Missile Shield—U.S. Ambassador', *Moscow Interfax*, 27 April 2009.
[35] See, for example, Theodore Postol, 'A Ring Around Iran', *New York Times*, 11 July 2007, <http://www.nytimes.com/2007/07/11/opinion/11postol.html>.

interceptors. One competitive advantage that Russia once had is in directed energy technologies. In the early 1990s, US and Russian technical cooperation exchanges disclosed that Russia then led the world in carbon dioxide and high-power solid-state lasers. Again, in the 1990s at least, there was significant cooperation between US and Russian scientific and academic organisations, including in the area of solid-state lasers for non-military applications.[36]

The purest form of reassurance would resurrect formal arms control constraints designed to allay Russian concerns about the open-ended nature of US global missile defence program. Foremost on Russian minds are US intentions to deploy interceptors in space, which could perform double duty as both ballistic missile interceptors, with potentially significant capabilities against Russian offensive forces in the aftermath of deep reductions, and anti-satellite weapons to maintain or extend American dominance in space. The American pursuit of such options would be foolhardy, in the first case because no conceivable rogue-state threat would merit such an expansion, and in the latter case, because American dependence on space to sustain its conventional superiority would potentially suffer were such a decision to trigger an arms race in anti-satellite weapon capabilities. A preferred alternative would be for the United States to examine what it might be willing to accept in limits on mid-course and upper-tier interceptors, which could be incorporated in a new legally binding treaty with Russia. At the same time, the United States should take the lead with Russia and China to negotiate "rules of the road" for space operations akin to ones that govern air, ground, and naval operations on earth.

EXPAND THE COOPERATIVE AIRSPACE INITIATIVE (CAI)

Launched within the NATO-Russia Council in 2002, the Cooperative Airspace Initiative's (CAI) goal is to achieve a system of air traffic information exchange along the borders of Russia and NATO member countries. Four sites each currently exist in Russia and NATO countries—from the far north in Russia (Murmansk) and Norway (Bodø) to Turkey (Ankara) and Russia (Rostov-on-Don) in the south. Poland hosts a NATO coordination centre in Warsaw, while the companion Russian centre is located in Moscow. Besides forming a basis for NATO and Russia to establish greater confidence in working together, the CAI has focused especially on aircraft that might be under the control of terrorists or a rogue state. CAI is complemented as well by a functionally equivalent system of Air Sovereignty Operation Centers (ASOC) that the United States funded in former Warsaw Pact states beginning in 1997. Although the CAI information exchange system had successfully passed joint testing qualifications in July 2008, it along with other bilateral NATO-Russia initiatives were suspended in August

[36] K. Scott McMahon, *Pursuit of the Shield: The U.S. Quest for Limited Ballistic Missile Defense* (Lanham, MD: University Press of America, 1997), pp. 251–2.

2008 in protest for Russia's intervention in Georgia. CAI only recently resumed in March 2009.[37]

CAI, working in possible cooperation with the ASOCs, could form the basis for investigating an expansion of air monitoring capabilities to the domain of cruise missile warning and defence. Russia initially baulked at the formation of ASOCs, arguing that they together could create a common airspace picture useful for tracking and providing guidance against threats. But to the extent CAI starts taking on the character of ASOCs, the closer it gets to becoming a useful NATO-wide and Russian vehicle for starting collaboration on defending against cruise missiles. About US$6.5 million has been invested in CAI thus far, with financial support coming from 12 countries, including Russia and the United States.[38] The virtue of engaging Russia's participation in an expanded CAI concept—including its role in cruise missile defence—goes much beyond trust building and improved air safety and security. Rather, an expanded CAI offers Russia the chance to become a full participant in an inchoate but potentially constructive endeavour to kick-start the lesser-included dimension of missile defence. Russia's longstanding prowess in developing effective air defence systems, including the S-400, which boasts capability to intercept ballistic and cruise missiles as well as aircraft, could fit nicely into a broad-area concept for European cruise missile defence. Directing Moscow's export energies away from S-300 and S-400 transfers to countries like Syria and Iran and toward the prospect of a more effective collaborative working environment within the NATO-Russia Council is worthy of serious evaluation.

ASSUAGING RUSSIAN CONCERNS OVER AMERICAN CONVENTIONAL SUPERIORITY

This area is perhaps the most intractable, not least because of the Russian tendency to exaggerate US military capabilities. There is little doubt that America possesses greatly superior conventional military forces capable of being projected anywhere around the globe. Russia is today investing in its conventional forces and plans, by 2020, to be in a much better state than it is today. But even the most optimistic estimates suggest that Russia will remain significantly inferior across the board vis-à-vis the United States. From this vantage point Russia is less concerned about the reasons why current US conventional capabilities, such as conventionally-armed Trident missiles or hundreds of highly accurate Tomahawk cruise missiles launched from Trident submarines, are incapable of threatening Russia's strategic

[37] Brooks Tigner, 'NATO and Russia Near Air Traffic Information Exchange', *International Defence Review*, 29 April 2009, <http://idr.janes.com/public/idr/index.shtml>. See also Press Release of the Russian Mission to NATO, <http://natomission.ru/en/societ/article/society/artnews/40/>.

[38] The other sources of financial support include Canada, France, Greece, Hungary, Italy, Luxembourg, Norway, Poland, Turkey, and the United Kingdom. See ibid.

deterrent. They are concerned about future possibilities, however "fanciful".[39]

If there is a solution to the conventional superiority issue, it lies less in trying to convince Russia that current or prospective US advanced conventional strike systems are incapable of achieving what they fear, and more in conceiving of options that might allay those concerns over the longer run. That said, as much transparency as is possible should nonetheless take place. On possible constraints in regard to future US ambitions to restart the conventional arming of Trident for a prompt global strike task, or a broader mission to engage significantly in regional military campaigns, the only solution may lie in counting such strategic conventional delivery vehicles as if they were nuclear armed, which will be the case for ICBMs and SLBMs under the "new" START regime signed in April 2010. The same may have to apply as well to future hypersonic cruise vehicles of to future Unmanned Combat Air Systems (UCAVs), not least because in fact they would be theoretically capable of delivering nuclear payloads.

Some Final Thoughts

As US and Russian planners look toward the challenges and pitfalls of achieving deep reductions in nuclear arsenals, they should begin systematically to appraise additional novel ways of achieving stability as arsenals drop to less than 500 warheads and then fall further. The recent turn by many states toward adopting preemptive strike doctrines employing advanced conventional weapons does not augur well for achieving a stable world. However difficult it surely will be for states to shed this predilection toward preemption—or prevention—through prompt action, if history tells us anything, it is that while such practices may succeed in achieving some initial battlefield success, they do so at the grave cost of war and its inevitable political and financial consequences. Witness America's eight-year tragedy in Iraq. Preemptive strike doctrines employing conventional weapons are clearly unacceptably dangerous in a nuclear-armed world. But they will also be dangerous in a world devoid of all nuclear weapons, particularly as they may be destabilising during regional or international crises. One way is to tone down, if not entirely eliminate, the preemption option now. It is needlessly reckless to elevate such a military choice—assessed as absolutely critical under dangerously threatening circumstances—to a national doctrine, as the Bush administration did after 9/11.

Another is to undertake a fresh examination of Ronald Reagan's dream of eliminating offensive ballistic missiles, attempted unsuccessfully at the

[39] A word used by Ambassador Linton Brooks to describe a practice employed by Soviet-era arms control negotiators, and apparently no less today. Brooks notes that a senior Russian official once noted that Russia was concerned over the possibility of US use of special forces to blow up strategic missile silos. See his comments at an Arms Control Association meeting in Washington, DC on 27 April 2009, at <http://www.armscontrol.org/node/3632>.

Reykjavik summit with Mikhail Gorbachev, in 1986. However fanciful such an endeavour may appear today, it may begin to become far more meritorious as the world sheds its nuclear allergy. Land-attack cruise missiles, which today have already become the conventional weapon of choice around which preemptive strike doctrines are being wrapped, also merit much more attention than they have received to date. Besides more effective controls within supply-side mechanisms like the Missile Technology Control Regime, and incorporation of cruise missiles into the Hague Code of Conduct's normative treatment of missile proliferation,[40] all advanced conventional system transfers will merit much closer attention than ever before, perhaps along the lines of global arms trade treaty, a concept that has already been examined closely at the UN. Common international standards, accompanied by greatly improved transparency and verification procedures attending the transfer of all advanced conventional systems, are matters that cannot await the outcome of contemporary efforts to achieve nuclear abolition. They deserve attention on their own merits no matter the outcome of the quest to achieve the abolition of nuclear weapons.

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[40] For reasons why adopting changes in the Hague Code of Conduct make sense, see Dennis M. Gormley, "Making the Hague Code of Conduct Relevant," Issue Brief, 20 July 2009, at <http://nti.org/e_research/e3_hague_conduct_relevant.html>.