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Toward a More Flexible NATO Nuclear Posture

Developing a Response to a Russian Nuclear De-Escalation Strike

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The risk of nuclear war between NATO and Russia may be higher now than at any time since 1989.[1] Indeed, at the 2016 NATO Summit, NATO's leaders expressed concern about Russia's destabilizing behavior in Europe, including Moscow's "irresponsible and aggressive nuclear rhetoric, military concept and underlying posture."[2] To deter Russian nuclear aggression, NATO leaders reaffirmed that "[a]s long as nuclear weapons exist, NATO will remain a nuclear alliance," and vowed to "retain an appropriate mix of nuclear, conventional, and missile defence capabilities."[3] US Secretary of Defense, Ashton Carter, speaking in September at Minot Air Force base, went further to declare that nuclear weapons are "the bedrock of our security."[4]

Unfortunately, after a quarter century of reducing reliance on nuclear weapons, Western strategists are increasingly recognizing that NATO may lack a credible nuclear deterrent for Russia's assertive nuclear strategy, especially Moscow's concept of nuclear "de-escalation" strikes.[5] Some analysts have concluded that an effective deterrent for

The Brent Scowcroft Center's **Transatlantic Security Initiative** brings together top policymakers, government and military officials, business leaders, and experts from Europe and North America to share insights, strengthen cooperation, and develop common approaches to key transatlantic security challenges. This issue brief continues the Transatlantic Security Initiative's work on NATO's strategies and military capabilities in the new European security environment.

1 Matthew Kroenig, "The Renewed Russian Nuclear Threat and NATO Nuclear Deterrence Posture," Atlantic Council Issue Brief, February 2016, http://www.atlanticcouncil.org/images/publications/Russian_Nuclear_Threat_0203_web.pdf.

2 Warsaw Summit Communiqué - Issued by the Heads of State and Government participating in the meeting of the North Atlantic Council in Warsaw, July 8-9, 2016, http://www.nato.int/cps/en/natohq/official_texts_133169.htm.

3 Ibid.

4 Defense News, "Carter: Nuclear Triad 'Bedrock of Our Security'," *Defense News*, September 26, 2016, http://www.defensenews.com/articles/carter-nuclear-triad-bedrock-of-our-security.

5 NYT Editorial Board, "President Vladimir Putin's Dangerous Moves," *New York Times*, April 16, 2015, accessed August 26, 2016; Bruce Blair, "Could U.S.-Russia Tensions Go Nuclear?" *Politico Magazine*, November 27, 2015. "What Russia Wants: From Cold War to Hot War," *Economist,* last modified February 14, 2015; BBC, "Russia reveals giant nuclear torpedo in state TV 'leak'," BBC News, November 12, 2015; National Institute for Public Policy, *Russia's Nuclear Posture*, 2015, accessed September 6, 2016; "The Unkicked Addiction," *Economist,* May 7, 2015; Paul Bernstein, *Countering Russia's Strategy for Regional Coercion and War*,

Russian strategy must include a NATO ability to respond with limited nuclear strikes of its own.[6] With a legacy nuclear posture developed for larger-scale Cold War contingencies, however, NATO arguably does not possess the capability necessary to follow through on such a strategy. If NATO hopes to reliably deter Russian nuclear strikes and broader nuclear coercion, therefore, the Alliance must consider the development of new, more flexible nuclear capabilities.[7]

Analysts have suggested an array of possible solutions to bolster the Alliance's nuclear deterrence with more flexible nuclear capabilities, including placing lower yield warheads on silo-based intercontinental ballistic missiles (ICBMs) or on submarine-launched ballistic missiles (SLBMs); forward basing B-52 bombers in Western Europe; bringing back a nuclear sea-launched cruise missile (SLCM); forward deploying existing B61 gravity bombs in Eastern Europe; improving survivability of the B61 gravity bombs already in Europe; developing new nuclear ground-launched cruise missiles (GLCM); and developing new nuclear air-launched cruise missiles (ALCMs).[8] Others disagree that changes are necessary and have argued that NATO's existing nuclear capabilities are up to the task without further enhancements.[9]

This issue brief will review the available options for a NATO limited nuclear strike capability, considering issues of military effectiveness, escalation control, coupling and alliance burden sharing, and cost effectiveness. In the end, it finds merits to many of the above options. It will also argue, however, that the development of a short-range, air-to-surface nuclear-armed cruise missile that can be deployed in Europe alongside NATO's existing stockpile of B61 gravity bombs and delivered by NATO dual-capable tactical aircraft (DCA), best provides NATO with a credible response to a limited Russian nuclear strike, while ensuring the coupling of European security to US strategic forces at an acceptable economic and diplomatic cost.

The Renewed Russian Threat and the Gap in NATO's Capabilities

In an effort to counter NATO's aggregate conventional military superiority, Russia has placed an increased emphasis on nuclear weapons in its military strategy and doctrine over the past decade and a half. Russian strategy calls for limited nuclear "de-escalation" strikes on NATO targets in the event that it is on the losing end of a conventional war with NATO. The strikes would not primarily aim to destroy NATO military or civilian targets, but to signal Russian resolve and thereby shock NATO into suing for peace on terms favorable to Moscow. As the old Cold War phrase had it, this strategy attempts to force Western leaders to choose between "suicide and surrender," betting that European capitals would choose a hasty and unfavorable peace over an escalating nuclear exchange.

The prospect of a Russian nuclear strike is undoubtedly remote, but nuclear deterrence specifically aims to prevent remote, but possible, catastrophic contingencies. Moreover, even if Russia never exercises this nuclear strike option, the threat of doing so provides it with coercive leverage in crises and serves as a persistent tool of political intimidation against NATO and its allies.

Russia's aggressive nuclear strategy exploits weaknesses in NATO's nuclear posture in the wake of its post-Cold War nuclear drawdowns. A quarter century of de-emphasizing nuclear weapons in its defense posture has left NATO ill-equipped to deal with this Russian nuclear challenge. A comprehensive response must include a revitalization of NATO's strategic concept, defense policy, posture, and capabilities. This brief focuses narrowly on bolstering nuclear capabilities.

Currently, Western leaders fear the possibility that Russia may attempt to repeat its aggression toward

National Defense University, March 2016, https://cgsr.llnl.gov/content/assets/docs/Countering_Russia_Strategy_for_Regional_Coercion_and_War.pdf.

6 Dr. Andrew F. Krepinevich, Jr., Dr. Matthew Kroenig, Dr. George Perkovich, Dr. Ashley Tellis, "Statements," *Regional Nuclear Dynamics: Hearings Before the United States Senate Committee On Armed Services*, 2015, accessed September 6, 2016, http://www.armed-services.senate.gov/hearings/15-02-25-regional-nuclear-dynamics; Matthew Kroenig, "Facing Reality: Getting NATO Ready for a New Cold War," *Survival: Global Politics and Strategy*, 49-70; Matthew Kroenig, Mikhail Troitskiy, Götz Neuneck, Egon Bahr, Lukasz Kulesa, and Steven Pifer, "Forum: NATO and Russia," *Survival* 57, no. 2 (March 20, 2015): 119-44.; Clark Murdock, Samuel J. Brannen, Thomas Karako, Angela Weaver, Barry Blechman, Elbridge Colby, Keith B. Payne, Russell Rumbaugh, and Thomas Scheber. *Project Atom A Competitive Strategies Approach to Defining U.S. Nuclear Strategy and Posture for 2025–2050*, Center for Strategic and International Studies, 2015, accessed September 6, 2016, http://csis.org/files/publication/150601_Murdock_ProjectAtom_Web.pdf; Evelyn N. Farkas, "Understanding and Deterring Russia: US Policies and Strategies" House Armed Services Committee, February 10, 2016.

7 Ibid.

8 Ibid.

9 Kroenig et al, "Forum: NATO and Russia," 2015.

A JASSM-ER missile is released from B-1 bomber. *Photo credit*: US Air Force.

Ukraine, but this time against a NATO member state, perhaps in an attack on Estonia, Latvia, or Lithuania. In such a scenario, NATO members would be compelled to come to their allies' defense, but if they were successful in pushing Russian forces out, President Putin might be tempted to conduct a de-escalatory nuclear strike against NATO targets.

If Russia were to conduct a limited nuclear strike in the most likely conflict scenarios in Eastern Europe, NATO lacks strong existing nuclear response options. Some will certainly argue that NATO should refrain from employing nuclear weapons at all, even in response to a nuclear attack, and that it should instead retaliate with a devastating conventional response.[10] This would certainly be consistent with the United States and NATO's current policy of "de-emphasizing" nuclear weapons, developed before the re-emergence of the Russian threat.[11] Deterrence, however, is in the eye of the beholder, and President Putin may not be deterred by the prospect of a conventional-only response, especially one that might take weeks or months to assemble and employ. Moreover, NATO could be quickly outgunned in such an approach if Russia continued to use nuclear weapons in repeated strikes. Furthermore, in the wake of a nuclear attack, the leaders of NATO countries, including the United States, would need to consider the precedent being set and broader Alliance commitments. For decades, US nuclear deterrence policy has rested on the threat that nuclear weapons would be employed in response to a nuclear attack. A conventional-only response to a Russian nuclear attack may signal restraint, but it might also encourage future nuclear aggression by establishing the precedent that states can use nuclear weapons without suffering a nuclear response. Whatever one's personal views on the matter, it is possible that Alliance leaders would demand a nuclear response in this case. Therefore, it is imperative that the Alliance sustain or develop feasible nuclear options for such a scenario.

NATO's preferred nuclear response would likely be B61 gravity bombs delivered by NATO member states' dual capable aircraft (DCA), but these capabilities are

10 Kroenig et al, "Forum: NATO and Russia," 2015.

11 NATO, *Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization*, adopted by Heads of State and Government at the NATO Summit in Lisbon 19-20 November 2010; United States Department of Defense, *Nuclear Posture Review Report*, April 2010.

no longer up to the task in most Eastern European scenarios. Russia has developed some of the most sophisticated air defenses and anti-access/area-denial (A2/AD) capabilities in the world, and NATO's tactical aircraft and the B61 bomb would be vulnerable to Russian air defenses before reaching their intended target.[12] When attempting to fight a limited nuclear war, NATO's leaders would need confidence in the reliable delivery of its nuclear warheads in terms of timing, accuracy, and the number of nuclear strikes employed.

Some minimize the threat from Russia's air defenses, arguing that Russia would only escalate to nuclear use at the end of a conventional war, at which point Russian air defenses will already have been thoroughly destroyed.[13] Given its "escalate-to-de-escalate" strategy, however, it is quite possible that Russia would use nuclear weapons earlier in a crisis. NATO cannot be hamstrung by a nuclear posture that requires first suppressing Russia's integrated air defense system, including possibly striking command and control and sensor targets on the Russian homeland, before being able to deliver a nuclear response. NATO needs a nuclear capability that could credibly penetrate Russia's layered air defenses.

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The Alliance's three nuclear members, France, the United Kingdom, and the United States, give NATO its other current nuclear options. All three states maintain SLBMs. The United States also possesses ICBMs and strategic bombers; France has a fighter-delivered nuclear ALCM. These capabilities could penetrate Russian air defenses, but they also come with a number of significant downsides. First and foremost, NATO has had good reason to maintain NATO nuclear weapons on the European continent both during the Cold War and in the decades since. They tie NATO's nuclear weapons to the European theater and prevent any "decoupling" of European security from the strategic forces of the nuclear-armed allies, thus enhancing NATO's nuclear deterrent. Moreover, there is an important "burden sharing" role in bringing other NATO members into the nuclear enterprise, including by hosting nuclear weapons on their territory and participating in nuclear strike missions. Moving to a NATO nuclear deterrence model based solely on the independent nuclear capabilities of NATO's nuclear-armed members does not provide these benefits and would represent a sharp break in a decades-old and successful policy. If NATO leaders desire such a change, they should make it consciously and not have it come about due to the increasing unsuitability of existing capabilities in the face of new challenges.

Beyond this, responding to a limited Russian tactical nuclear strike in theater with strategic nuclear capabilities from outside the theater could be seen as an escalatory step toward a broader strategic nuclear exchange. Russia might feel justified in retaliating against the sources of these attacks, namely air and submarine bases in France, Britain, and the United States. For this reason, it is preferable to have nuclear capabilities pre-positioned closer to the likely theater of conflict.

Furthermore, the yields of the warheads on ICBMs, SLBMs, and even existing ALCMs are likely too large for a proportionate response to a limited Russian nuclear attack.[14] Russia has a full range of tactical nuclear options with yields in the sub-kiloton range. If Russia were to conduct an attack with these forces, NATO's leaders might prefer a commensurate response. Unfortunately, the lowest yield at present on US ICBMs is 300 kilotons (kts) (about twenty times the destructive force of the Little Boy bomb used at Hiroshima in World War II).[15] For SLBMs, the lowest yield is 100 kt. For this reason, some have recommended placing lower-yield warheads on ICBMs and SLBMs—an option considered below.[16] Even set at its minimum, the dial-a-yield ALCM yields 5 kt, which is closer to meeting the necessary requirements, but might still be an indiscriminate option given a sub-kiloton scenario.[17]

12 Sydney J. Freedberg, Jr., "Russians 'Closed the Gap' For A2/AD: Air Force Gen. Gorenc," *Breaking Defense*, September 14, 2015, accessed September 6, 2016, http://breakingdefense.com/2015/09/russians-closed-the-gap-for-a2ad-air-force-gen-gorenc/

13 Author interview with former senior US Department of Defense official, November 2015.

14 For information on the yields of every nuclear warhead in the US arsenal, see Murdock et al., "Project Atom," 2016, Table 1, p. 20.

15 Ibid.

16 See, for example, Kroenig, "Facing Reality," 2015.

17 Murdock, "Project Atom," Table 1, Page 20.

NATO does have a single sub-kiloton nuclear option. The B61 gravity bombs can reportedly be adjusted to yield between 0.3 and 150 kts, but, as pointed out above, the DCA may not have the ability to penetrate Russian air defenses.[18] The B61 could be delivered by US B2 bombers, but, as discussed above, employing these capabilities in a limited war scenario might be seen as escalatory and could invite Russian nuclear retaliation against B2 bases on the US homeland. Moreover, compared to missiles, bomber aircraft are slow fliers. Whereas missiles can reach an intended target in thirty minutes or less, B2 aircraft, currently not on day-to-day alert, taking off from the United States would require many hours to reach Eastern Europe.[19] This is unsuitable for contingencies that require rapid reaction to limit damages, for example. Furthermore, while current stealth technology may allow US aircraft to penetrate Russian air defenses, America's stealth advantage may be a wasting asset and, looking forward, NATO will likely need a standoff option to be effective. As John Harvey, former principal deputy assistant secretary of defense for Nuclear, Chemical, and Biological Defense Programs recently argued, even the next generation stealth bomber, the planned long-range strike bomber (LRSB), may not provide a reliable delivery capability against certain adversaries. He noted that "even after LRSB enters the force, it is not wise, over its expected service life, to rely exclusively on its ability to penetrate to targets in increasingly netted and effective air defense environments."[20]

Another possible option could be for NATO to rely solely on British nuclear capabilities, as British SLBMs have adjustable yield including in the sub kiloton range.[21] (France's lowest yield warhead is 100 kts).[22] As above, however, this would also risk widening the scope of the conflict to Russian retaliation against naval bases on British territory. Further, if Russia were to conduct a limited nuclear strike, the US president, the leader of the most powerful and important NATO member, might want—and should have—an A2/AD penetrating sub-kiloton nuclear option more fully within his or her control. Washington would not want to be forced to outsource its response to London and therefore through the UK's decision-making process.

Some might counter that this gap in NATO capabilities contributes to deterrence, because any potential adversary would know that NATO does not have finely tailored nuclear options and, therefore, these adversaries would have to consider that any use of nuclear weapons against NATO would automatically provoke a massive nuclear retaliation. Such arguments may be too clever by half, however, because if deterrence failed, NATO may be forced into the massive nuclear exchange that it sought to avoid. Alternatively, the other obvious option available to NATO leaders, and the one that potential enemies might bet on, is that NATO would prefer surrender, retreat, or capitulation over instigating a large-scale nuclear war. As a result, it would be much more advantageous to have credible options along the spectrum of conflict to deter enemies from being tempted by gaps in NATO's capabilities.

Currently, the United States and NATO do not have an obvious and credible response to a limited Russian nuclear strike. Such a capability is required, not so that NATO can fight a nuclear war, but rather to demonstrate that NATO has a credible response to any feasible scenario in order to deter Russia from conducting a nuclear attack in the first place. What are the characteristics of a capability that would meet this requirement and enhance NATO nuclear deterrence?

Selection Criteria

When considering possible upgrades to its nuclear posture, NATO should take into account the benefits of new options, such as flexibility, but also the downsides, such as economic cost and controversy within the Alliance. This section will outline the criteria to evaluate any possible capability enhancement.

Military Effectiveness. The primary objective of an enhancement to NATO nuclear capability would be to fill the gap in its current forces. It is essential that any credible nuclear deterrent force be able to penetrate current and planned Russian air defenses to reach its intended target. It must also have a low enough yield (ideally with a sub-kiloton option) to provide a discriminate and proportional response to a limited Russian use of nuclear weapons. The capability should

18 Ibid.

19 Richard Hartley-Parkinson, "Touchdown: B-2 Stealth Jets Return after Epic 11,500 Mile Journey to Bomb Libyan Aircraft Shelters," *Mail Online*, March 21, 2011.

20 John Harvey, Remarks at Woodrow Wilson International Center, December 10, 2015.

21 "Britain's Nuclear Weapons: The Current British Arsenal," The Nuclear Weapon Archive, Accessed September 6, 2016, http://nuclearweaponarchive.org/Uk/UKArsenalRecent.html.

22 Natural Resources Defense Council, "Minimize Harm and Security Risks of Nuclear Energy," Natural Resources Defense Council, Accessed September 6, 2016, http://www.nrdc.org/nuclear/nudb/datab16.asp.

The Ohio-class ballistic-missile submarine USS Pennsylvania returns to Naval Base Kitsap-Bangor following a routine strategic deterrent patrol. *Photo credit:* US Navy/Flickr.

allow a prompt response option, which could be essential in a limited nuclear war scenario.

Escalation Control. Since the early Cold War, strategists have debated—without conclusion—whether a limited nuclear war could stay limited. It may be the case that any and every use of nuclear weapons carries a severe risk of escalation to higher, more catastrophic levels. Still, if Russia were to initiate a limited nuclear war, NATO would be forced to find a way to achieve its national security objectives while minimizing, to the greatest extent possible, the risk of a strategic nuclear exchange. For this reason, any credible NATO response to a Russian nuclear strike must have attributes that contribute to escalation control. Ideally, the capability would be pre-positioned in theater to avoid the perception that NATO was attempting to escalate the conflict by flowing in forces or striking from bases outside the region. This would also deny Russia a strong rationale for retaliating outside the theater by striking the base in the nation from which the NATO nuclear response originated. In addition, as mentioned above, smaller or adjustable-yield warheads could better provide a proportional response. If NATO retaliates to a sub-kiloton Russian strike with a significantly more powerful warhead, it may be harder to send the message that NATO hopes to keep the conflict limited.

Coupling and Burden Sharing. For decades, NATO leaders have believed that dual-key NATO nuclear weapons have contributed to Alliance security and stability by coupling European and American security, increasing the credibility of NATO's nuclear threats while sharing burdens and demonstrating Alliance solidarity. As in the early days of the Cold War, dual-key NATO capabilities continue to achieve these ends more effectively than independent capabilities of nuclear-armed members. This may not be a necessary requirement, but it remains a highly desirable one.

Alliance Unity. Although there is a growing consensus within NATO that Russia presents a serious threat, nuclear weapons remain controversial within the Alliance. Efforts to develop additional nuclear

capabilities will be rejected in many quarters as unnecessary and dangerous, reflective of "Cold War thinking," antagonistic towards Russia, or worse.[23] While some NATO members would enthusiastically welcome new capabilities to deal with the growing Russian threat, others would put up fierce resistance. Often this divide also exists within nations internally, either among administration members or from opposition parties. Any changes to NATO's nuclear posture, therefore, must be acceptable to NATO member states. Certainly, NATO's three nuclear-armed members can make changes to their national nuclear capabilities independently. However, changes to NATO's posture that require the approval of other Alliance members will require laying the groundwork with careful diplomacy. Moreover, many NATO members will likely oppose anything that could be seen as contravening previous NATO agreements with Russia, including the Intermediate-Range Nuclear Forces (INF) Treaty, the Russia-NATO Founding Act, or the 1991 Presidential Nuclear Initiatives (PNI)—even if Russia is already violating these pacts.

Timeliness. The Russian nuclear threat to NATO is here today. Ideally, NATO should have a credible nuclear response option ready. Unfortunately, it arguably does not, and the longer the Alliance waits, the greater the danger that deterrence fails in the interim. The sooner NATO can generate a credible response to a Russian limited nuclear strike, the better. Developing new weapons programs from whole cloth will require more time than reconfiguring or redeploying existing assets.

Cost. With a large US national debt and deficit and the Department of Defense suffering under a budget sequester, issues of cost must be considered. A more flexible NATO nuclear posture must be affordable. As with considerations of timeliness, creating new programs will generally be more expensive than adding variants to existing programs or reconfiguring existing capabilities.

Weighing the Alternatives

Nonnuclear options. Inevitably, when the subject of nuclear weapons is raised, someone will argue that nuclear weapons are no longer necessary, and the United States can substitute advanced conventional weapons for missions previously performed by nuclear weapons.[24] As pointed out above, however, NATO leaders may justifiably demand a nuclear response to any nuclear attack, making it necessary for NATO to have credible nuclear options. Moreover, despite their increasing lethality, conventional weapons do not, and may never, provide a substitute for nuclear weapons. The nuclear warhead with the lowest yield in the United States' arsenal at present is the B61 gravity bomb with an adjustable yield as low as 0.3 kt, or approximately 300 tons.[25] This is NATO's only sub-kiloton nuclear option and, as highlighted before, it may be incapable of penetrating Russian air defenses. The largest conventional weapon in the United States' arsenal is the massive ordnance penetrator (MOP) with a yield more than one order of magnitude lower, weighing in at 30,000 lbs., or 15 tons.[26] This leaves NATO with a vast capabilities gap in its strike options, while Russia possesses many nuclear options in the sub-kiloton range.

Designating a portion of US, UK, and French nuclear weapons as "NATO" nuclear weapons. Some have suggested that NATO's nuclear weapon states, the United States, the United Kingdom, and France, could simply designate some specific portion of their nuclear weapons as belonging to NATO.[27] Such a move could gesture toward burden sharing and coupling goals by reinforcing the message that NATO is a nuclear alliance. Although, since the forces would not be based on the territory of NATO's nonnuclear members, they would arguably not couple European and American security. Additionally, since the weapons would not be hosted or delivered by NATO's nonnuclear members, they would not meet the burden-sharing requirement either. Most importantly, since the capabilities and basing of the nuclear forces would not be changed, it would not improve military effectiveness or reduce the risk of escalation inherent in the independent nuclear arsenals of NATO's nuclear members. In short, while carrying few, if any costs, this option does not directly address the central problem of NATO's lack of a credible response to a limited Russian nuclear strike.

Forward base B-52s in Europe. In the aftermath of Russia's renewed nuclear threat, the United States has begun to rotate B-52s through Europe for exercises, but press releases surrounding these deployments

23 Kroenig et al, "Forum: NATO and Russia," 2015.

24 Kroenig et al, "Forum: NATO and Russia," 2015.

25 Murdoch, "Project Atom," 2016 Table 1, Page 20.

26 Ibid.

27 Matthew Kroenig and Walter B. Slocombe, "Why Nuclear Deterrence Still Matters to NATO," Atlantic Council, August 2014, http://www.atlanticcouncil.org/images/publications/Why_Nuclear_Deterrence_Still_Matters_to_NATO.pdf.

reassure the public (and NATO's potential adversaries) that these aircraft were not carrying nuclear weapons.[28] In order for these aircraft to deliver a nuclear strike, they would need to return to the United States and retrieve their nuclear payloads. These deployments signal existing nuclear capability for deterrence and assurance missions, but they do not otherwise address the shortcomings of existing capabilities discussed above.

Forward deploy B61s in Eastern Europe. Some have recommended forward deploying NATO's existing B61 gravity bombs on the territory of NATO's easternmost members, such as Poland.[29] This could enhance deterrence by clearly coupling the security of these nations to NATO's strategic nuclear forces. It also contributes to burden sharing by spreading the responsibilities of the nuclear mission to additional states. It does not, however, overcome the core challenge posed by Russia's A2/AD capabilities. B61 gravity bombs delivered by DCAs, even if based in Eastern Europe, would still be vulnerable to Russian air defenses. NATO could attempt to overcome these limitations by experimenting with low-level flying tactics using the F-15 or F-16, in addition to other planning and technical capabilities to improve reach and penetrability. These steps, however, would still fall short of what could be provided by other capabilities. Moreover, the nuclear bombs may be more, not less, vulnerable as they would be positioned closer to Russian territory and therefore easier targets for a Russian first strike.[30] Finally, such a move might be seen as contravening NATO's promises to Russia not to deploy nuclear weapons on the territory of NATO's new member states. This, in itself, should not be determinative, but it would increase the difficulty of gaining approval from all NATO members. This option could still be considered, but it does not address the central capabilities gap explored in the present study.

Improve survivability of B61s in Europe. Following the previous point, as Russia's military capabilities improve, NATO's existing B61 gravity bombs in Europe may become increasingly vulnerable to a Russian first strike. It would likely be prudent for NATO to take steps to improve their survivability, including hardening (reinforcing) and dispersing the bases where B61s are located. While these steps should be taken, they would not contribute in any way to the central problem of penetrating Russian air defenses in the aftermath of a limited Russian nuclear strike.

Place lower-yield warheads on US ICBMs or SLBMs. Another possible option is to place lower-yield warheads on US ICBMs or SLBMs. Some have suggested that this could be done simply by disabling the secondary in a two-stage thermonuclear warhead.[31] This option provides only mixed benefits, however, in terms of military effectiveness. ICBMs and SLBMs should be capable of penetrating Russian air defenses, and a lower-yield option would provide a more discriminate response to a limited Russian nuclear strike, but given the large yields of these warheads, it may be that even a primary-only warhead would not provide a sub-kiloton-range yield. On other criteria, this option rates even lower. Even lower-yield warheads on ICBMs and SLBMs would still carry a risk of escalation. If Russian radars picked up an incoming strategic missile, they would have no way of knowing the size of the payload it was carrying and might well assume that it represents an American intention to escalate the conflict. Moreover, Russia's leaders may feel justified in retaliating against the source of the attack, which would mean a direct nuclear attack on the homeland of the United States, which could, again, widen the scope of the conflict. Finally, this option comes with all the costs and benefits of a unilateral change to the nuclear posture of NATO's nuclear states: it would cause little controversy within the Alliance, but it would not contribute to the Alliance's traditional coupling and burden-sharing goals. Again, it would mean accepting the end of a viable NATO nuclear force. Since this option can be implemented on short order with little controversy and it enhances US and Alliance military capabilities, it should be pursued. However, unlike options considered below, it does not meet all the desired criteria for deterring a limited Russian nuclear strike.

Bring back a nuclear-armed SLCM. Until it was retired in the 2010 Nuclear Posture Review (NPR), the United States possessed a nuclear-armed submarine-launched cruise missile (SLCM), the Tomahawk Land Attack Missile-Nuclear (TLAM-N). Some have suggested that Washington should bring back the TLAM-N or

28 Thomas Gibbons-Neff, "In a Rare Deployment, B-52 Bombers Head to Europe for Training Exercises," *Washington Post*, March 2, 2016, https://www.washingtonpost.com/news/checkpoint/wp/2016/03/02/in-a-rare-deployment-b-52-bombers-head-to-europe-for-training-exercises/.

29 Kroenig, "Facing Reality," 2015; Murdoch et al, "Project Atom," 2016.

30 Kroenig et al, "Forum: NATO and Russia," 2015.

31 Murdoch et al., "Project Atom," 2016.

develop a new nuclear-armed SLCM.[32] The TLAM-N option is unrealistic, however, as it has been retired and bringing it back would be technically difficult. Another option, therefore, would be to develop a new nuclear-armed SLCM, perhaps by developing a variant of the planed long-range standoff ALCM (LRSO) that could be delivered by sea. The LRSO is not expected to reach initial operational capability (IOC) until about 2027 and the employment of this option in battle raises the risk of further escalation, as Russia may be tempted to retaliate against submarine bases in the US homeland. Further, a new sea-based LRSO would contradict America's commitments under the 1991 PNIs to eliminate all non-strategic nuclear forces from the Navy. While it is true that the Russians have not fully followed through on their commitments under the PNIs, and it would be ill-advised for Washington to be unduly constrained by nuclear arms agreements that Moscow blatantly ignores, this option would still face political resistance within the West. Moreover, a US-only capability would not contribute to the long-standing Alliance goals of coupling and burden sharing. If the United States goes to the trouble of developing a new capability, it would be preferable if it could also contribute to these traditional Alliance goals. This option may be helpful for other purposes, such as strengthening extended deterrence in Asia, but it fails to provide a short-term solution to the central challenge at hand.

A US-only capability would not contribute to the long-standing Alliance goals of coupling and burden sharing.

GLCM. In recent Congressional testimony, former Deputy Assistant Secretary of Defense for Europe Evelyn Farkas called for bringing back ground-launched cruise missiles to Europe.[33] Like the SLCM, this capability could potentially be designed as a variant of the existing LRSO program. A new GLCM would meet all of the necessary military requirements. It could penetrate Russian air defenses and could be designed with a sub-kiloton warhead. Furthermore, it could be deployed in Europe, contributing to long-standing Alliance goals of coupling and burden sharing and reducing the risk of uncontrolled escalation. It also, however, comes with downsides. Developing a new capability would be a costly and decade-long endeavor. Moreover, it would directly violate the INF Treaty, making it potentially controversial within the Alliance. This shouldn't rule out the option, but it does not stack up as well as the next, and final, option.

Tactical Nuclear Air-Launched Cruise Missile. A final option would be for NATO to equip its DCA with a nuclear-armed, air-to-surface cruise missile. Like the LRSO, this would be a nuclear-armed, air-launched cruise missile, but, unlike the LRSO, it would be lighter weight, with a shorter range, and could be delivered by NATO DCA. The missiles could be pre-positioned in the bases in Europe that currently house the B61 gravity bombs. In other words, it would be a short-range standoff weapon, or SRSO. Such a capability could be developed in one of two ways. First, the existing LRSO program could be amended to include a shorter-range variant. This option, however, would require a decade or longer to reach IOC. The second, more promising option would be to equip an existing conventional ALCM, the Joint Air-to-Surface Standoff Missile (JASSM) and the JASSM Extra Range (JASSM-ER) with stockpiled US nuclear warheads, such as the W80 or W84. Some European states, including Poland, have already contracted for the purchase of JASSM.[34] JASSM and JASSM-ER are currently being produced, and it would be possible to build a nuclear warhead into the missile on relatively short order.

This capability would be very similar to the Short-Range Attack Missile-Tactical (SRAM-T), which was planned by NATO in the 1980s but was canceled with the end of the Cold War in 1991.

A tactical ALCM would meet all of the necessary requirements for deterring the Russian nuclear threat with much less downside than other options. The cruise missiles would ensure penetration of Russian air defenses. The nuclear warhead may even be lighter than the conventional package, providing a nuclear JASSM with an even greater range than the

32 Author interviews with former US Department of Defense and Department of State officials.

33 Farkas, "Understanding and Deterring Russia," 2016.

34 Lockheed Martin, "Poland Selects Lockheed Martin's JASSM," News release, September 14, 2015, accessed September 6, 2016, http://www.lockheedmartin.com/us/news/press-releases/2015/september/mfc-091415-poland-selects-lm-JASSM.html.

conventional variant. The warheads would provide a discriminate response with a reported variable yield going as low as 5 kts for the W80 and 0.20 kts for the W84.[35] Moreover, since this capability would be developed specifically to provide a low-yield option, they could be installed as primary-only warheads. Since these forces would be pre-positioned in Europe, there would be less danger that their use on the battlefield would risk escalation to other regions. To reduce the risk of unintended escalation still further, the missiles could be designed to ensure that their ranges were sufficient to reach targets in Eastern European conflict zones, but incapable of ranging to Moscow.

Moreover, since they would be delivered on NATO DCAs, just like the B61 gravity bombs, they would also contribute to NATO's long-standing goals of coupling European and American security and of burden sharing.

This option would come with economic costs from marrying the warheads to existing platforms and upgrading nuclear vaults in Europe to house ALCMs. Given that the JASSM is currently being produced and the W80 and W84s are available, however, the key component parts for this option already exist. While it is impossible to put an exact price tag on this option, it would certainly be cheaper than other options that require producing new capabilities from scratch.

Finally, while many in Europe and the United States will fight the development of any "new" nuclear capability, this option should be relatively easier to sell than others. It would not contravene the INF, the PNIs, or the NATO-Russia Founding Act. In the 2012 Deterrence and Defense Posture Review (DDPR), the Alliance reaffirmed that NATO is a nuclear alliance and that NATO should retain nuclear weapons in Europe.[36] The case could be made that these capabilities are simply a supplement for an existing capability, which takes into account technological changes in adversary air defenses. A similar argument was successfully made in the past to win approval for the modernization of the B61. Further, they could rightly be justified as a response to Russia's INF violation. Finally, it could be argued that this step would enhance the Alliance's traditional disarmament goals, as they would give Moscow a stronger incentive to re-enter future arms control negotiations. Given the growing concern with the Russian nuclear threat in European defense circles, and with the support of careful and sustained diplomacy, NATO's European members could be persuaded to update NATO's nuclear posture for present day realities.

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There will still be some who will continue to oppose any new nuclear capabilities. Some have argued that cruise missiles are inherently "destabilizing" and have argued that the United States should kill even its plans to develop LRSO.[37] These same analysts would almost certainly oppose an SRSO. However, the theoretical edifice of many of these stability arguments rests on a shaky logical foundation.[38] Moreover, even if that edifice is sound, there is no reason to believe that cruise missiles are any more destabilizing than other existing dual-use delivery vehicles, including bombers and ballistic missiles.[39]

Others will certainly argue that developing new nuclear capabilities would provoke Russia and instigate a new nuclear arms race.[40] There was a time when such arguments had an air of plausibility, but, in the face of Russia's nuclear modernization and saber rattling, they look increasingly untenable.

35 Wikimedia Foundation, Inc., "W84," Wikipedia, accessed September 6, 2016, https://en.wikipedia.org/wiki/W84.

36 NATO, "Deterrence and Defence Posture Review," News release, May 20, 2012, accessed September 6, 2016, http://www.nato.int/cps/en/natolive/official_texts_87597.htm.

37 William J. Perry and Andy Weber, "Mr. President, Kill the New Cruise Missile," *Washington Post*, October 15, 2015, https://www.washingtonpost.com/opinions/mr-president-kill-the-new-cruise-missile/2015/10/15/e3e2807c-6ecd-11e5-9bfe-e59f5e244f92_story.html?utm_term=.34bedc7d55a3.

38 Matthew Kroenig, "Think Again: American Nuclear Disarmament," Foreign Policy, Last modified September 3, 2013, accessed September 6, 2016, http://foreignpolicy.com/2013/09/03/think-again-american-nuclear-disarmament/.

39 John Harvey, Remarks at Woodrow Wilson International Center. December 10, 2015.

40 Kroenig et al., "Forum: NATO and Russia," 2015.

In sum, the SRSO is the only option that provides NATO, as an alliance, with a discriminate nuclear option capable of penetrating Russian air defenses that also limits the risks of escalation to strategic nuclear exchange. It meets NATO's long-standing goals of coupling European to American security and updates NATO's nuclear capability for a new era. It would come at an acceptable cost and, when compared to the alternatives, it is the most desirable option for developing a credible deterrent to a Russian nuclear "de-escalation" strike.

Recommendation and Conclusion

NATO planners have long believed it was important that NATO, as an alliance, possess its own nuclear capability. This capability coupled European security with America's strategic forces, allowed European states to share the burden of providing for the nuclear mission, and enhanced NATO's nuclear deterrence. For decades, this capability has been provided by B61 gravity bombs delivered by NATO DCAs. As this report makes clear, however, this capability does not suit the most important nuclear deterrence missions in Europe given new advancements in Russian strategy and capabilities.

NATO faces a choice. It can come to rely solely on the nuclear weapons of NATO's nuclear-armed members and, therefore, abandon the idea of a nuclear force for the alliance. Or it can enhance NATO's nuclear capabilities to more reliably deter enemy nuclear attack. At a time of increasing Russian nuclear threats and deteriorating relations between Moscow and the West, the choice is clear.

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