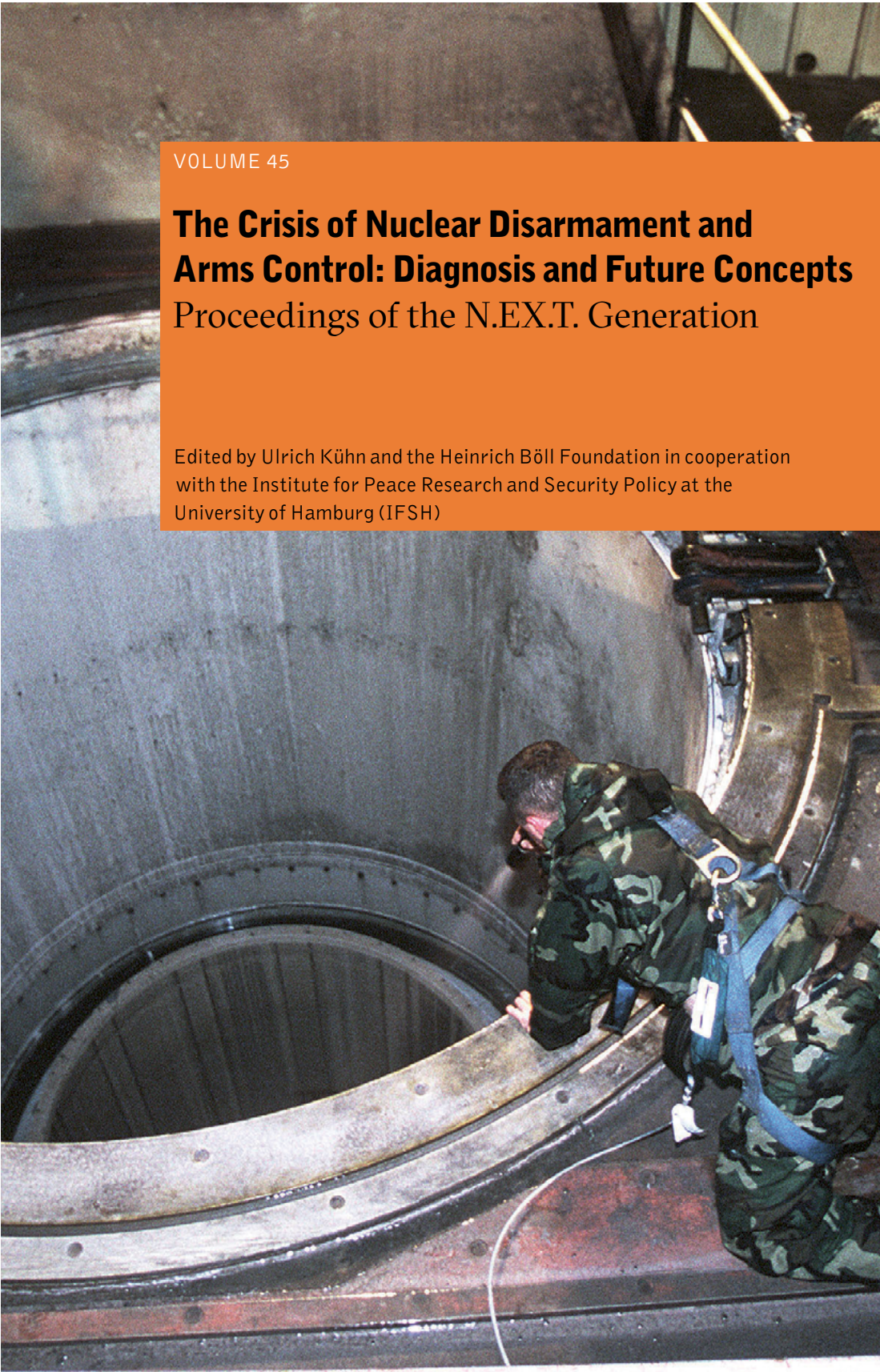


VOLUME 45

The Crisis of Nuclear Disarmament and Arms Control: Diagnosis and Future Concepts

Proceedings of the N.EX.T. Generation

Edited by Ulrich Kühn and the Heinrich Böll Foundation in cooperation
with the Institute for Peace Research and Security Policy at the
University of Hamburg (IFSH)



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**HEINRICH BÖLL STIFTUNG
PUBLICATION SERIES ON DEMOCRACY
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PREFACE

«Thinking outside the box» is a phrase often used by those who grapple to find meaning in a world that is increasingly chaotic. However, when it comes to the global nuclear order, «thinking outside the box» is an almost existential imperative, as, two and a half decades after the end of the Cold War, the danger of a nuclear war has returned and all hopes for nuclear disarmament and détente have vanished almost entirely.

Instead, what we witness today are the beginnings of a new arms race in Asia and, between the West and Russia, a return to patterns only too familiar from the times when the relationship between Eastern and Western bloc was characterised by great tensions. All these developments increase the danger of potentially deadly conflicts and cast a looming shadow over the 21st century. At the same time, we observe that many of the measures, which, during the Cold War, were used to foster confidence and defuse tensions through improved security co-operation and especially through arms control are rarely viable anymore.

It was against this background that the Heinrich Böll Foundation asked a group of transnational experts and nuclear analysts to explore new avenues of arms control and nuclear risk reduction. We would like to express our gratitude to Ulrich Kühn, who took up the challenge and prompted a group of 15 security experts from the United States, Russia, Germany, and Eastern Europe to go beyond the well-trodden paths of nuclear security debate and develop new ideas that open up novel approaches to the issue.

Many early to mid-career security policy professionals avoid unconventional angles of research, as institutions and think tanks that are active in the field tend to sponsor only mainstream expertise. I would thus like to thank all participants in N.EX.T. and all authors represented in this publication for their courageous and creative quest towards solutions for the nuclear threats we are facing in the 21st century. Hopefully, decision makers will take up some of their new ideas and approaches and incorporate them into future strategies for nuclear risk management.

Berlin, December 2017

Giorgio Franceschini
Department Head Foreign and Security Policy
Heinrich Böll Foundation

FOREWORD

Whatever our expectations in disarmament and non-proliferation were a few years ago, they have now changed – and certainly for the worse. The global nuclear non-proliferation regime, the strategic stability between the major powers and other states, are at risk. In addition, the serious challenges to progress toward nuclear disarmament and arms control have increased in recent years.

The 2015 Review Conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) was unable to agree on a Final Document, amidst disagreements on the holding of a conference on a zone free from Weapons of Mass Destruction (WMD) in the Middle East. The outlook for the bilateral US-Russian New Strategic Arms Reduction Treaty (New START) is bleak; Russia wants the next reduction talks to be multilateral. The 2016 NATO Summit in Warsaw reaffirmed the role of nuclear deterrence for the alliance. The security dialog in Europe – post-Ukraine – is static and focuses on negative public statements and accusations rather than searching for cooperative solutions, especially in the conventional arms control area.

North Korea is continuing nuclear testing in defiance of a moratorium on testing and UN Security Council sanctions. The Comprehensive Nuclear-Test-Ban Treaty is still not in force, twenty years after opening for signature. The membership of non-NPT states in the Nuclear Suppliers Group (NSG) has divided the NSG membership. Nuclear weapons programs and/or modernization are proceeding, in almost all nuclear weapons states – all at enormous cost.

The election of Donald Trump brought a heightened wave of uncertainty. What are the implications of his administration for constructive multilateral diplomacy, and particularly for non-proliferation and disarmament? Will he reduce funding for multilateral institutions, like the United Nations, the International Atomic Energy Agency or the Comprehensive Nuclear-Test-Ban Treaty Organization? In what way will he impact the US participation in NATO? What about the Joint Comprehensive Plan of Action, designed to prevent Iran from going nuclear? Was he serious about the comments during his election campaign that Japan and Korea should develop their own nuclear weapons rather than rely on the US «nuclear umbrella»?

And finally, the awesome power of the US nuclear arsenal is now under the control of an impulsive and unpredictable man who has no international diplomatic experience and who has shown a lack of understanding about nuclear weapons.

Each of these factors is a cause for concern. Taken together, they are powerfully and wildly worrisome. Let's start by looking at the developments around the NPT. There are many voices that are declaring the demise of the NPT, a treaty that has guaranteed nuclear stability for nearly fifty years. But has it? What about India, Israel, Pakistan, and North Korea?

Every Review Conference is affected by the political situation of its time. The 2010 Action Plan was adopted by consensus after US President Obama had come into office triggering high expectations of nuclear disarmament. Five years later, those hopes had fizzled. Some of the provisions of the Action Plan had been implemented, but none that related to nuclear weapons. In 2015, the P-5 (China, France, Russia, the United Kingdom, and the United States) offered a nuclear terms glossary – an issue that did not even feature in the Action Plan. It should therefore not come as a surprise that the NPT is put into question. Even the indefinite extension of the Treaty is being challenged, as some non-nuclear weapon states hold that this extension was conditioned on commitments by the P-5 – notably on the Middle East – that were not fulfilled.

So it should also not be a surprise that a decision was taken on July 7, 2017 by 122 UN Member States in favor of a legally binding Treaty on the Prohibition of Nuclear Weapons – a treaty aimed at effectively banning the possession, use, and threat of use of nuclear arms. There were celebrations when the votes were announced at UN headquarters in New York and the participating States – nearly two-thirds of the entire UN membership – can be proud of their achievement. But deep fissures remain, evident in the participation themselves, with all nuclear possessor states and their allies having been absent from the negotiations. The statement by France, the United Kingdom, and the United States upon the adoption was categorical: «We don't intend ever to become party to the treaty.»

So how will this develop? Will this legally binding instrument remain an exclusive effort of the like-minded; a hollow exercise that will further deepen the rift between the nuclear powers and those who do not possess nuclear weapons and want to see them abolished? Will it strengthen the norm to outlaw the last remaining WMD? Will those states – like Germany – that do not possess nuclear arms but enjoy extended nuclear security guarantees one day be ready to join the treaty? And what are the repercussions, the potential fall-out of the negotiations? Are there scenarios that contemplate a Plan B?

Having worked at the United Nations for a long time, I am the perennial optimist, and so I would like to look at the positive, though I recognize that the new instrument might also be seen as divisive. What I have experienced over the years as High Representative for Disarmament Affairs of the United Nations, is the widening gulf between the nuclear possessors and the non-nuclear States who feel that they abide by the commitments they entered into under the NPT, while the nuclear powers do not fulfil their legal obligation to pursue – and conclude – multilateral negotiations for nuclear disarmament, despite their repeated statements to achieve a nuclear-weapon free world. The NPT was always touted as the sole bulwark against nuclear non-proliferation; now we have a nuclear disarmament treaty: will it force the nuclear-weapon states to act?

But even if the ban negotiations can be criticized as being a gathering of like-minded, they already sent a powerful signal: chemical and biological weapons were outlawed many years ago, so why not nuclear weapons? Was that not the goal of the NPT when it came into force, 46 years ago?

The coming years will see continuing preparations for the 2020 NPT Review Conference. What will be the implications of the nuclear ban negotiations for the review cycle? What effect will the ban treaty have on nuclear deterrence and on those non-nuclear weapons states that are also members of NATO? What are the implications for Asian states like Japan and the Republic of Korea who are known to not exclude the possibility of acquiring nuclear weapons? And what can the nuclear weapons states deliver in the NPT review cycle to ameliorate the frustrations held by the non-nuclear states regarding the lack of progress on disarmament commitments? Will they offer more transparency? Will they modify their modernization programs or, perhaps, dismantle older – and potentially more unstable – weapons?

And finally, it remains to be seen what will be the impact of the new Secretary-General and the newly appointed Under-Secretary-General and High Representative for Disarmament Affairs, Miss Izumi Nakamitsu, who only took up her position in May 2017. It is my hope that she will be an effective bridge-builder yet firm on the principles of disarmament. The Secretary-General and the High Representative have powerful voices and their convening ability is unparalleled. The High Representative can engage not only with Member States but also with civil society and other constituents, to further the goal that is at the heart of the UN Charter: to save succeeding generations from the scourge of war.

Angela Kane

*Former Under-Secretary-General and High Representative for
Disarmament Affairs of the United Nations*

The Crisis of Nuclear Disarmament and Arms Control: What N.EX.T?

The instruments of bi- and multilateral nuclear disarmament and arms control are in a state of despair. Russia and the West have entered a new round of conflict. The US-Russian nuclear arms control and disarmament dialogue has stalled. East Asia is rattled by North Korea aggressively pushing forward its nuclear and missile programs. Beyond the bilateral and regional levels, frustration about the nuclear-weapons states' unwillingness to meet their own disarmament obligations under Article VI of the Nuclear Non-Proliferation Treaty (NPT) has already led a majority of UN states to seek alternative venues to ban the risks and threats associated with nuclear arms.

That leads to some urgent questions: Which arguments could help to reinvigorate moral and political support for further nuclear disarmament? What can the international community do to move further with multilateral nuclear disarmament? What could or should a stable future US-Russian framework for managing the nuclear relationship look like? How can Europe deal with its nuclear challenges against the background of a missing «grand deal» between NATO and Russia? How can the world better bridge the gap between the need for broader civil society engagement and the lack of interest in many societies?

This reader is the result of a one-year project generously funded by the Heinrich Böll Stiftung/The Green Political Foundation in cooperation with the Institute for Peace Research and Security Policy at the University of Hamburg (IFSH). Under the label of N.EX.T. (Nuclear Expert Talks), fifteen early and mid-career scholars from Europe, Russia, and the United States gathered in Berlin in November 2016 to discuss the current state of disarmament and arms control and to devise concrete future concepts for overcoming the manifold obstacles in current politics. N.EX.T. fellows were guided by three principles: thinking outside of the usual boxes, asking questions that in other professional settings are either politically taboo or deemed naïve, and, also – critically – whether the common narratives in favor of nuclear disarmament are really compelling.

This fruitful effort led to five outstanding articles. Taking on Europe's current and future nuclear woes, Shatabhisha Shetty, Polina Sinovets, and I argue that in parallel to increased efforts at managing the tense NATO-Russian relationship, both sides must address the core problems, underlying the current conflict – «above all the future of NATO enlargement.» Meanwhile, Anne I. Harrington, Eliza Gheorghe, and Anya Loukianova Fink emphasize a focus on the environmental, human, and financial costs of maintaining nuclear arsenals, contending it will better sustain public

engagement and political activism in favor of nuclear disarmament than other strategies. Kelsey Davenport, Jana Puglierin, and Petr Topychkanov lay out a proposal for a series of disarmament summits aimed at advancing multilateral disarmament. Tatiana Anichkina, Anna Péczeli, and Nick Roth approach the future of US-Russian nuclear deterrence and arms control from the premise that Moscow and Washington have to once again find a common interpretation of strategic stability. Finally, Anastasia Malygina, Sven Fikenscher, and Jenny Nielsen provide a compelling argument for further measures of restraint – including a universal no-first-use norm and dialogue on de-alerting nuclear weapons and developing verification procedures for decommissioning nuclear warheads – in an era of increasing international tensions.

Having engaged in a common effort to address these pressing questions and to provide much-needed recommendations on how to move forward with nuclear arms control and disarmament at the global and regional levels, the N.EX.T. fellows will continue their work in the years ahead. International crises, such as in Ukraine, underline the importance of mutual measures of restraint and predictability. It is therefore encouraging to see that young experts from divergent national backgrounds can find common ground and formulate fresh ideas that, I hope, governments and influential scholars will heed.

This project would not have been successful without the input and support of a number of highly dedicated and constantly motivated friends and colleagues. I would like to thank, first of all, Gregor Enste and Stephanie Mendes-Candido of the Heinrich Böll Stiftung/The Green Political Foundation for constantly believing in that project, for providing the necessary financial support, and for bringing together N.EX.T. experts. In addition, my deepest gratitude goes to Angela Kane, Britta Fisch and Mona Peter of IFSH, John Mecklin of the Bulletin of the Atomic Scientists as well as to Samuel Charap, Tom Sauer, Ward Wilson, and Amy F. Woolf. Last but not least, I would like to thank all N.EX.T. fellows for their personal and intellectual dedication.

Ulrich Kühn

Europe's nuclear woes: Mitigating the challenges of the next years

Over the coming decade, Europe will be faced with a series of difficult challenges in the nuclear realm. The most significant, from which all the others flow, will be managing the nuclear relationship with Russia. Since the start of the Ukraine crisis, relations between NATO and Russia have further deteriorated with NATO allies expressing concern over Russia's belligerent rhetoric on potential nuclear weapons use. In addition, serious disagreements between the United States and Russia as well as between NATO and Russia over nuclear weapons policies have increased over recent years with many predating the Ukraine crisis. These include Moscow's alleged violation of the Intermediate-range Nuclear Forces (INF) Treaty, Russian exercises involving simulated nuclear weapons use, and the ongoing Russian nuclear modernization program.

The nuclear challenges facing Europe are interconnected. If the West's relationship with Russia continues to be confrontational, the urgent task will be to manage that confrontation. For NATO, this requires striking a balance of deterrence and assurance measures for its allies, while avoiding to enter a new arms race with Russia. Such efforts should include maintaining restraint in the nuclear realm while concentrating on conventional deterrence.

NATO should step up its efforts to foster dialogue to stabilize and manage the current confrontation. This includes dialogue about the most contentious issues such as the INF Treaty and missile defense. Such talks could be undertaken in a reconstituted NATO-Russia Council (NRC). But arms control efforts alone will not mend the relationship. In parallel, the core problems underlying the conflict between Russia and the West, must be addressed – above all the future of NATO enlargement.

The renaissance of nuclear signaling

Since the beginning of the Ukraine crisis, Russia has engaged in a variety of dangerous practices under the rubric of «nuclear signaling.» Increased patrols of nuclear-capable Russian aircraft, violations of other states' airspace, military incidents with NATO allies and partners, and loose talk about the possible use of nuclear weapons – including statements by President Vladimir Putin and other senior Russian officials highlighting nuclear «resolve» to underscore Russia's status as a global nuclear power – have all raised significant concern in capitals across Europe.

In addition, Russia has continued or stepped up a number of worrisome nuclear policies already in place before the Euromaidan protests in Ukraine: its practice of integrated conventional/nuclear military exercises (including simulated nuclear attacks on neighboring states such as Poland); a robust nuclear modernization program in all three legs of Russia's nuclear triad (intercontinental ballistic missiles, strategic nuclear bombers, and strategic nuclear submarines); the maintenance of up to 2,000 tactical nuclear warheads for short-range systems; and (perhaps) an ambiguous, though unconfirmed, doctrine on possible nuclear weapons use to «de-escalate» a conventional crisis.¹

These policies have three significant implications for Europe. First, they underscore that Russian reliance on nuclear weapons for different policy purposes is unlikely to lessen over the coming years. Second, Russia no longer shies away from high risk tactics that might ultimately involve its nuclear arsenal to intimidate its neighbors and unnerve NATO. Third, NATO cannot let this go unanswered if it wants to maintain alliance unity and deter Russia from continuing down this dangerous path.

In comparison, NATO's counter-messaging has been modest so far. Initially, one could argue that this was primarily because NATO was unwilling to provoke or escalate the Ukraine crisis, or that NATO is unpracticed in the art of nuclear signaling 25 years after the end of the Cold War. As the NATO-Russia crisis continued, nuclear signaling from NATO and in particular from its most powerful member, the United States, increased. Non-routine long-range flights to Europe of strategic nuclear bombers increased in frequency and were publicized for the first time.² This is significant; NATO rarely publically disclosed information on its nuclear-related activities and exercises in the past (Durkalec 2015). This growing visibility includes the deployment of US nuclear-capable heavy bombers (B-2s and B-52s) to the United Kingdom, which was previously a rare occurrence, and their participation in two NATO exercises in the Baltic States. As well as nuclear counter-signaling to Russia, these measures were also intended to provide reassurance to the eastern-flank allies.

Washington in particular undertook further public efforts to demonstrate its commitment to its European partners. This included a statement by General Philip Breedlove, then-Commander of NATO's United States European Command (EUCOM), to the US House Armed Services Committee in February 2015. «The US stands side-by-side with our NATO Allies to provide safe, secure, reliable, and effective nuclear forces to deter aggression against Alliance members [...]» Breedlove said, «and as part of Operation Atlantic Resolve, EUCOM has forged a link between

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- 1 The unconfirmed Russian strategy of «escalate to de-escalate» implies the limited use of tactical nuclear weapons as a kind of «stop sign» in a crisis where the very existence of the Russian state is under threat (Sokov 2014). While this strategy is a matter of debate amongst Western analysts, particularly due to Russian ambiguity, some have pointed out that it is not (anymore) part of any serious Russian strategy (Oliker 2016).
 - 2 In October 2014, as part of the *Noble Justification* exercises two B-52s flew to Europe. During the *Polar Groul* exercise on 1 April 2015, four B-52s flew to the Arctic and North Sea.

STRATCOM Bomber Assurance and Deterrence missions to NATO regional exercises» (Breedlove 2015).

He added an even more pointed comment: «Operation Atlantic Resolve uses US access and strategic reach to develop a unified response to revanchist Russia» (Breedlove 2015).

While nuclear signaling has increased on both sides, the readiness levels of NATO's dual-capable aircraft in Europe have only changed marginally since the start of the Ukraine crisis (Reif 2015). According to NATO's latest public announcement, it would take weeks for NATO's nuclear forces in Europe to be readied for launch (NATO 2015). Russia integrates its conventional and nuclear forces in some military exercises, NATO has shown restraint by not instituting such integration.

For some in NATO, this puts the alliance in an uncomfortable position. On the one hand, not responding to Russia's increased nuclear signaling could be misread by Moscow as a sign of weakness, potentially helping to escalate a crisis with Russia. On the other hand, reacting to Moscow's signaling in kind could as well spur escalation, by heightening the threat Russian policy-makers and military officials might already feel from the conventional military superiority that NATO and the United States hold.

Readjustment of nuclear doctrines and postures

As a reaction to Russian nuclear signaling, there have been calls for NATO to readjust its nuclear strategy in line with its recently strengthened conventional deterrence and defense posture (Lucas and Mitchell 2014). These include calls by former Polish President Lech Walesa in 2014 for Poland to lease nuclear weapons (tvn24 2014) and by the Polish Deputy Defense Minister in December 2015 for the country to participate in NATO's nuclear sharing arrangement (The Guardian 2015). In December 2015, US Secretary of Defense Ash Carter suggested that NATO planners are at least considering future options for integrated planning and exercises for conventional and nuclear forces (Carter 2015).

Although the 2014 NATO Summit in Wales reaffirmed that NATO remained a nuclear alliance and would undertake «the most significant strengthening of our collective defense in decades,» there were no alterations to its nuclear policy (Stoltenberg 2015). The 2016 Warsaw Summit presented small but arguably significant changes on nuclear policy with the relevant paragraphs in the Final Communiqué showing a slight hardening of the language, as compared to the 2010 Strategic Concept and the 2012 Defense and Deterrence Posture Review that form the basis of NATO nuclear policy.³ Analysis of the 2016 communiqué reveals the reintroduction of the language of «peacetime basing of nuclear forces,» which was absent from the 2012 review. The renewed emphasis on US nuclear weapons «forward deployed in Europe» in the 2016 documents stands in contrast to both the 2010 and 2012 documents, which indicate that the alliance would explore further reductions

³ The 2012 DDP and 2010 Strategic Concept form the basis of current NATO nuclear policy.

of non-strategic nuclear weapons in Europe as long as reciprocal measures were undertaken by Russia (Andreasen, Lunn, and Williams 2016).

The 2010 Strategic Concept stated that «the circumstances in which any use of nuclear weapons *might have to be contemplated* are extremely remote» [emphasis added]. The Warsaw Communiqué removed the reference to contemplation while placing a slightly stronger emphasis on nuclear deterrence and potential nuclear weapons use.⁴ This was designed to demonstrate NATO's resolve, conveying that any use of nuclear weapons, even in a «limited» fashion, would be considered unacceptable. It was also an attempt to deter any Russian use of its alleged «escalate to deescalate» strategy whereby nuclear weapons are used in a limited war to de-escalate a crisis (NATO 2016).

Moreover, a new sentence was introduced in the 2016 communiqué, explicitly referencing the strategic nuclear forces of the United Kingdom and France. This could be interpreted as strengthening NATO nuclear deterrence by emphasizing the role of British and French strategic forces as separate centers of decision making.⁵ Although France does not assign its nuclear weapons to NATO or participate in NATO's Nuclear Planning Group (NPG), its ambassador participates in the North Atlantic Council (NAC) strategic discussions and would have a say in the language in final communiqués issued at the end of NATO summits. France therefore has some influence over what NATO agrees internally and says publically about its nuclear policy and posture.⁶

The UK's nuclear forces are assigned to NATO and it participates in all of NATO's nuclear forums. The UK considers its nuclear weapons not only vital for domestic security but also as part of the alliance's deterrent posture.⁷ The British parliament vote in July 2016 to replace its existing submarine fleet ensures that the UK retains its

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- 4 «Nuclear weapons are unique. The circumstances in which NATO might have to use nuclear weapons are extremely remote. If the fundamental security of any of its members were to be threatened however, NATO has the capabilities and resolve to impose costs on an adversary that would be unacceptable and far outweigh the benefits that an adversary could hope to achieve» (NATO 2016).
 - 5 «These Allies' separate centers of decision-making contribute to deterrence by complicating the calculations of potential adversaries» (NATO 2016). This sentence also endorses the deterrent value of the British nuclear weapon system whilst demonstrates its commitment to NATO. This is significant in relation to the recent Brexit vote to leave the European Union and the concerns over the United Kingdom's commitment to Europe more broadly.
 - 6 France's own nuclear deterrent has sea-based and air-based components made up of four Le Triomphant ballistic missile submarines (SSBN), four squadrons of fighter aircraft and a stockpile of approximately 300 nuclear warheads. It is notoriously conservative about nuclear weapons possession both domestically and also within the NATO context and the least «forward leaning» among the nuclear armed states within the alliance.
 - 7 «The nuclear deterrent remains essential in my view, not just to Britain's security, but as our allies have acknowledged here today, to the overall security of the NATO alliance,» said Cameron, who resigned after last month's EU referendum (Emmott and Szary 2016).

nuclear capability for at least the next 50 years. Barring a dramatic change, this will also mean that these weapons are assigned to NATO for decades.⁸

The 2016 Warsaw Summit language on nuclear policy and use does not significantly depart from the 2010 and 2012 documents, with no announced changes to deployments, basing arrangements of B-61 bombs, or to the interoperability of NATO's conventional and nuclear forces. Yet NATO's nuclear capabilities are being updated as part of a modernization plan that pre-dates Russia's actions in Ukraine. This takes the form of the US life-extension program for its B-61 tactical nuclear weapons, which are the backbone of NATO's nuclear sharing arrangements in Europe. An estimated 180 B-61 warheads are deployed in six bases in Germany, Belgium, the Netherlands, Italy and Turkey.⁹ These will be replaced by updated B-61-12 precision-guided weapons that have greater accuracy and ability to penetrate the earth including hardened targets (Kristensen and McKinzie 2016). The warheads in these «modernized» bombs will also allow yields to be varied, to limit collateral damage (Kristensen 2011). Furthermore, the fighter-bombers that these five countries now assign to carry B-61s (if ever necessary) are also in the process of being replaced. A new stealth fighter jet, the Joint Strike Fighter or F35A, is advertised as providing «greater survivability and access» as compared to the older generation of aircraft currently in use.¹⁰

Critics argue that the modernization process could lower the threshold for nuclear use (Kristensen 2011). This line of reasoning holds that the B-61 enhancements will make these weapons more «usable» (Kristensen 2015). NATO and Washington reject such claims, arguing that the B-61 life-extension program is simply designed to replace an ageing warhead that is reaching the end of its service life.

8 The UK's nuclear force is comprised of four Vanguard class ballistic missile submarines (SSBN) with a total stockpile of 120 warheads.

9 NATO does not provide public information on the location or number of the non-strategic nuclear weapons in Europe. Italy and Turkey have taken the decision to purchase the F-35A aircraft which enables these countries to continue to participate in NATO nuclear sharing in Europe. However Germany is planning to replace its current DCA fleet with non-DCA aircraft, the Eurofighter. Belgium has not yet decided to renew DCA aircraft and in 2013 the Netherlands government passed a motion for a non-nuclear aircraft. This presents possible challenges to continuing the nuclear-sharing arrangements all of the existing hosting countries Europe.

10 To deploy the non-strategic gravity B-61 bombs, Belgium, Turkey and the Netherlands currently have F-16s and Germany and Italy have PA-200 Tornado aircraft. The decision to replace these aircraft has been, and will continue to be contentious in some of the European hosting countries, particularly Germany, the Netherlands and Belgium. These countries have been managing domestic pressure from their parliaments and publics to remove these weapons and stop their participation in NATO's nuclear sharing arrangement. After the DDPR was agreed an uneasy consensus was agreed to continue the nuclear mission in Europe. In the coming decade, procurement decisions about new DCAs will still need to be made by Germany, Belgium and the Netherlands and they, along with Italy and Turkey, will also need to introduce the modernized B-61-12s. This may present difficulties in continuing the nuclear sharing mission in the future. Yet, despite the domestic challenges, the forward basing arrangement and deployment of non-strategic nuclear weapons in Europe is likely to continue.

Accordingly, the B-61-12 is not a «new warhead» nor does it provide improved military capability.¹¹

Nonetheless, the argument that the B-61 modernization, coupled with the introduction of the F35A, not only prolongs NATO's nuclear assets in Europe but also improves the alliance's targeting capabilities is compelling. Together with the more robust use of nuclear language in Warsaw and the almost complete disappearance of calls to withdraw the B-61 from countries such as Germany or Belgium, this development conveys a clear message: The words and deeds of nuclear deterrence are back in Europe.

This development clouds any prospects for negotiating reductions in non-strategic nuclear arms with Moscow, which had halted even before the Ukraine crisis. Back in 2012, NATO stated that it would look to reduce its stockpile of non-strategic nuclear weapons as long as Russia undertakes reciprocal measures. Discussions were underway at the NATO-Russia Council on how to devise some tentative confidence-building measures in the realm of transparency, but talks then stalled in 2013 to Russian lack of interest. Russia is estimated to have around 2,000 non-strategic nuclear weapons,¹² with most of them reportedly located in the proximity of Russia's borders with EU and NATO countries (Zagorski 2011), and maintains that these are necessary to offset NATO's conventional superiority.¹³ If NATO were to give greater impetus to its forward-deployed assets, Russia would be less inclined to reduce its stockpile and may even move towards modernizing this category of weapons.

Pursuing reductions of non-strategic nuclear weapons with Russia will become even more challenging, because Moscow already argues that its non-strategic nuclear weapons are meant to compensate for its conventional inferiority, not for NATO's nuclear systems in Europe. The existing asymmetry in non-strategic weapons between NATO and Russia may increase if NATO continues to enhance conventional capabilities in Central and Eastern Europe.

Missile defense in Europe

Beyond the problematic effects of the modernization of US non-strategic nuclear weapons and Russian nuclear signaling in Europe, the issue of missile defense complicates the nuclear situation in Europe. Recognizing the relationship of nuclear offense and defense to mutual deterrence, the United States and the Soviet Union signed the 1972 Anti-Ballistic Missile (ABM) Treaty, which Moscow hailed as

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- 11 «LEPs will use only nuclear components based on previously tested designs and will not support new military missions or provide for new military capabilities. The United States will not develop new nuclear warheads.» U.S. Nuclear Weapons Stockpile Life Extension Programs, Fact Sheet, Bureau Of Arms Control, Verification, And Compliance www.state.gov/t/avc/rls/202015.htm.
 - 12 Russia's non-strategic nuclear weapons are reportedly kept in storage, not forward deployed with delivery units.
 - 13 Although not officially mentioned in Moscow, China is also a great concern for the Russian defense establishment.

«the cornerstone of the strategic stability» (Podvig 2014). When the United States declared its withdrawal from the ABM Treaty in 2001, in Moscow's view Washington confirmed suspicions that it was attempting to tip the strategic balance in its favor, posing a direct challenge to Russia's strategic second-strike capabilities.

To make matters worse – from a Russian perspective, at least – the United States under President George W. Bush stepped up its missile defense efforts and agreed to bilateral arrangements with its European allies for the construction of a so-called «third site» of US missile interceptors in Europe. This site was to be located in Poland and supported by a radar station in the Czech Republic. The Russian response to this development was unequivocally negative, and even though one could argue that the issue of ballistic missile defense was purely bilateral in nature, the political fallout also affected European security and arms control more broadly. The first visible victim of the deteriorating US-Russian relationship was the Conventional Armed Forces in Europe (CFE) Treaty which Russia «suspended» in 2007 (Bigg 2007).¹⁴ After President Obama took office, the United States cancelled the Bush proposal but continued its efforts to create a European missile defense architecture to counter possible missile threats emanating from the south of Europe (meaning Iran). This European Phased Adaptive Approach (EPAA) is composed of land and sea-based Aegis missile defense elements deployed, or under construction, in Romania, Poland and Turkey as well as on ships in the Mediterranean and the Baltic Seas.

The biggest difference between the Bush administration approach and the EPAA involved the range of missiles that could be targeted; the EPAA was not to have a capability against missiles of strategic ranges (above 5,500 kilometers). Originally, US military planners designed this missile defense system to consist of four sequential phases, one of which – Phase IV – Moscow voiced concern about, because it allowed for the deployment of faster SM-3 IIB interceptors in Poland. According to Moscow, these interceptors would have the potential to intercept even Russian ICBMs (Pifer 2013). Also, the Russians criticized the fact that the new X-band radar could see deeply into Russian territory.

But when Washington abandoned Phase IV and decided to limit the deployments to (slower) SM-3 IIA interceptors with non-strategic capabilities, Moscow again expressed its disappointment. The main reason was the absence of an officially defined, legal missile defense framework that would guarantee Moscow the continued integrity of its strategic deterrent. Russia took issue with what it perceived to be the prospect of an open-ended US missile defense architecture in Europe and other parts of the world.

For the Obama administration, such legal guarantee was never a viable option, given the resistance by the US Congress to any «artificial» limits on US missile defenses. So Moscow resorted to military countermeasures. Aside from citing missile defense as one of the prime drivers for modernizing its aging strategic forces (Giles

14 Even though missile defense was regularly referred to by Russian decision-makers as a reason for the suspension of CFE, the 2002 decision by NATO not to ratify the Adapted CFE Treaty together with continuing rounds of NATO enlargement had a decisive impact on the Russian decision as well.

and Monaghan 2014),¹⁵ Moscow plans to respond to the EPAA by deploying offensive systems in the south and west of its country «to ensure Russia's capability to take out any part of the US [missile defense] system in Europe» (Medvedev 2011). This will include increased deployment of the newest Russian sea-launched cruise missile (SLCM), the Kalibr, which was successfully employed by Russia during its ongoing military operation in Syria. The Kalibr model is most likely of dual-use, meaning it could be mounted with a conventional or a nuclear warhead, and it has a range between 1,500 and 2,500 kilometers, providing Russia with the potential to strike any target in Europe from its territory (Lewis 2015). For now it is expected that Russia will deploy the Kalibr at its naval bases in Sevastopol and Novorossiysk to hold at risk the southern direction (e.g., the EPAA missile defense site in Deveselu, Romania) and at the naval base in Kaliningrad to be able to target the missile defense site in Poland.¹⁶ This mission could also be supported by the deployment of the latest generation of Russian air-launched cruise missiles and short-range Iskander missiles in the Kaliningrad oblast. The latter missiles could reach almost all of Poland and parts of Germany.

The missile defense situation provides Moscow with a convenient, and at some point even reasonable, argument to counter US allegations that Russia has violated the Intermediate-range Nuclear Forces (INF) Treaty. Russian officials often refer to the potential «breach» of the INF Treaty by the United States (Sputnik 2016), noting that the EPAA SM-3 vertical launch systems are the same as those used to launch cruise missiles such as Tomahawks from AEGIS-capable ships. In essence, the Russian leadership seems to fear the scenario of a decapitating strike against its command and control posts, using cruise missiles launched from missile defense sites in Romania and Poland.

The INF crisis

The most serious nuclear challenge for Europe in the next years could be the lingering crisis over the Intermediate-range Nuclear Forces Treaty.¹⁷ Since 2014, the US government has consistently accused Russia of violating the INF by developing «a ground-launched cruise missile [GLCM] with a range capability of 500 km to 5,500 km» (U.S. Department of State 2016). On March 8, 2017 General Paul Selva, the vice chairman of the US Joint Chiefs of Staff, told the House Armed Services Committee that «we believe that the Russians have deployed a land-based cruise missile that violates the spirit and intent of the Intermediate Nuclear Forces Treaty» (Gordon 2017b). He therewith confirmed earlier reports by the *New York Times* that «the

¹⁵ According to Russian sources, the new road-mobile «Yars» and «Yars-M» ICBMs as well as the new «Sarmat» ICBM are designed with the potential to counter and defeat any missile defense system.

¹⁶ The Polish site is currently under construction and is planned to be equipped with SM-3 IIA launchers. Its completion is slated for 2018 (Trukhachev 2015).

¹⁷ This part builds on some elements of an earlier draft, jointly written by Ulrich Kühn and Anna Péczeli.

Russians now have two battalions of the prohibited cruise missile,» one deployed at the Kapustin Yar missile test site and the other shifted «from that test site to an operational base elsewhere in the country» (Gordon 2017a). Diplomatic efforts to resolve US compliance concerns have yielded no satisfactory outcome. Instead, Russia tabled a number of counter charges related to the US-led Aegis ashore ballistic missile defense program in Europe and the use of drones (The Ministry of Foreign Affairs of the Russian Federation 2016). Parties to the treaty met at the Special Verification Commission (SVC), the treaty's consultation mechanism, in mid-November 2016.

Several US security experts have issued warnings that the INF crisis could make further arms control endeavors with Russia impossible (The Deep Cuts Commission 2016). These pundits argue that «if a New START follow-on treaty could be negotiated, it would have little chance for US Senate ratification if the INF Treaty compliance issue had not been resolved» (The Deep Cuts Commission 2016). Without a follow-on treaty to New START, which expires in February 2021, the US-Russian nuclear relationship would be reduced to a state of almost complete non-transparency and unpredictability. In that case, the only viable option for preserving strategic arms control would be the one-time extension of New START for another five years, which would not require Senate advice and consent. If the non-compliance issues and accusations relating to the INF are not resolved, Cold War and post-Cold War era arms control agreements could well unravel.

Putting arms control concerns aside, the INF crisis could also lead to the re-introduction of intermediate-range nuclear weapons to the European theatre. For this to occur, Russia would officially pull out of the INF Treaty or reliable evidence would be found determining that Russia is in material breach of the treaty, producing and deploying INF-prohibited ground-launched cruise missiles west of the Urals (as the latest revelations might indicate). This would be a significant game changer for European security, no matter what the Russian intentions, and NATO would come under enormous military and political pressure – with increasing calls for Washington, in particular, to formulate an answer to the Russian deployments. This potential escalation cycle has already led the US Department of Defense to look into possible military options to respond to this scenario.¹⁸ Potential options could range from increasing missile defenses in Europe, over deploying US conventional-armed air- and sea-launched cruise missiles, to extreme countermeasures such as developing and deploying nuclear-capable ground-launched Tomahawks, perhaps even launched from modified MK-41 launchers in Romania and Poland under an altered basing arrangement.

To prevent such a scenario, the West would need to know the answer to a simple question: Why would Russia test and perhaps deploy a cruise missile forbidden by the INF Treaty? Even though all answers to this question fall in the realm of

18 One such option might be for the next U.S. Administration to close the so called «capability gap» and focus on weapons systems which are currently prohibited under INF (Burns 2015).

speculation at this point, enumerating some possibilities might give indications as to Russian concerns.

One reason Russia might want an intermediate-range capability could involve fear of a decapitation first strike with cruise missiles launched from the two EPAA missile defense sites in Romania and Poland. Another reason might center on hedging: Russian military planners might want a GLCM with INF-ranges in place, just in case the United States were to pull out of the INF.¹⁹ A third – and not inconceivable – reason might be that the INF crisis is yet another political tool to unnerve and threaten NATO. A new Russian intermediate-range cruise missile might be yet another sign of Russian intent to take on the role of an irresponsible and, maybe, even unpredictable nuclear power that would be better left alone in its «sphere of influence» in order to avoid possible escalation – that is, it would be a move aimed at inducing the West to effectively accept a Yalta model of dividing lines in Europe. Last but not least, the Russian actions might not be related to the European equation at all and might reveal more about Moscow's concerns with regard to its southern neighborhood, including China.

Negative effects of Europe's re-nuclearization

Europe is on the brink of a new nuclear era. The post-Cold War period of continued downsizing of nuclear weapons arsenals, together with the policies of devaluing nuclear weapons and postures in Europe, is over. The West and Russia face another round of increased competition and confrontation coupled with deepening mistrust. No quick fix or magical silver bullet will remove the structural problems that afflict the relationship. Instead, the already visible negative effects of these trends will most likely further increase.

To begin with, nuclear disarmament in Europe is moribund, at least in the short term. Responding to Russia's aggressive nuclear posturing by strengthening NATO's nuclear policy would only accelerate the shift away from the post-Cold War trend of reducing the role and number of nuclear weapons in Europe. In broader terms, this shift could cause additional negative repercussions, damaging efforts to reduce the role and salience of nuclear weapons in other parts of the world. In addition, re-nuclearization of Europe would be politically problematic, given that NATO's Western European members face publics and parliaments that do not support a return to Cold War nuclear practices. Ignoring those national majorities would be particularly worrisome in times of populist movements that claim political elites do not care about «ordinary people.»

Beyond such general effects, the unfolding military tit-for-tat between Russia and NATO will not only deepen existing mistrust but possibly lead to very real arms race dynamics. One example: mutual nuclear modernization and enhanced reliance

¹⁹ In 2005 then-U.S. Secretary of Defense Donald Rumsfeld commented that he would not mind if Russia withdrew from the INF Treaty, thus, indicating that also the United States had no real interest in the treaty (Lewis 2014).

on non-strategic weapons. These policies will increase the possibility of misunderstandings between NATO and Russia and ultimately bury the last tentative efforts to effectively reduce the role of nuclear weapons in Europe. In that regard, the inability of both US and Russian administrations to find a mutually satisfactory way to smooth over the challenges arising from missile defense policies has turned the EPAA into one of the most serious stumbling blocks impeding further nuclear reductions. The missile defense dispute between the United States and Russia also serves as an additional driver for Russian nuclear modernization programs.

The INF crisis could have severe consequences for both Europe and Asia. As a worst case scenario, it could ruin the entire remaining system of US-Russian nuclear arms control for years to come and lead to a serious debate amongst NATO members about re-introducing INF-range cruise missiles to the European theater. That's to say, the INF crisis might result in a historical throwback, creating a «nuclear Europe» akin to the early 1980s.

Classical arms control measures will most likely not be sufficient to overcome the political and normative divide separating Russia and NATO. This is primarily for three reasons: Even under best conditions, the changing global order might allow only one more round of bilateral US-Russian nuclear reductions before third parties, such as China, will have to be considered. Also, the gradual deterioration of arms control agreements since the end of the 1990s has stigmatized arms control in both Moscow and Washington, with both sides showing disappointment with the actions of each other. And finally, as Samuel Charap and Jeremy Shapiro note, cases like the INF crisis are unlikely to be resolved as long as the West and Russia do not engage «in addressing the *core issue* in the dispute, namely the regional order in post-Soviet Europe and Eurasia» (Charap and Shapiro 2016) [emphasis added].

Some recommendations for the next years

In the absence of a larger and long-term effort at addressing the «core issue,» and as long as the West's relationship with Russia continues to be confrontational, the urgent task will be to stabilize and manage the confrontation.

For NATO, this primarily means balancing deterrence and assurance measures to its easternmost allies without entering a new arms race prone to dangerous miscalculations. So far, the conventional measures enacted at the 2014 Wales Summit and further supplemented at Warsaw provide credible, flexible, and responsive assurance to allies in Central and Eastern Europe. They could be augmented by some modest additional measures such as the rotational deployment of lightly-armed multi-national border patrol units for the three Baltic States.

In that vein, NATO allies should recognize that the continuous rotational deployment of multinational forces and equipment is a far more credible deterrent than nuclear weapons. This is demonstrated by the fact that the current deployments of non-strategic nuclear weapons in Europe alone were not able to provide sufficient reassurance of NATO's deterrence capabilities or Article V resolve to members in the East. Allies should therefore continue showing restraint with respect to NATO's

nuclear policy and posture, resisting calls to abandon NATO's earlier pledge not to deploy or store nuclear weapons on the territories of its newer members²⁰ or to raise the readiness levels of its nuclear forces in Europe. Instead, NATO and other countries must continue to publically denounce Russian nuclear signaling to ensure that the norm against «loose nuclear talk» isn't permanently undone. Even though the Kremlin might reap internal and external benefits from creating a belt of insecurity and instability along its borders, its leaders must understand that the concomitant strategy of nuclear intimidation bears enormous risks of inadvertent or accidental escalation with NATO – particularly since many of the stabilizing arms control agreements of the Cold War era are not in place anymore.

Even though the time might not be ripe for a serious dialogue about the «core issues» that trouble NATO-Russia relations, NATO should step up its efforts to foster continuing talks on current military threats – and here, arms control has a valid role to play. As a possible measure, the NRC could be reconstituted as a permanent crisis management forum and mechanism for dialogue, dealing with dangerous military incidents and better communicating each side's intentions. Both NATO and Russia must clearly communicate messages to each other to better manage confrontations, avoid misunderstandings, forestall possible military incidents, and de-escalate tensions. One proposal for the NRC would be to institute a NATO-Russia Memorandum of Understanding to manage dangerous incidents akin to earlier Cold War bilateral agreements between the United States and the Soviet Union (Kearns and Raynova 2016).

Once the relationship between Russia and NATO stabilizes, future arms control options could include the consolidation of NATO's tactical nuclear weapons into fewer sites in Europe. In light of recent security concerns, removing US nuclear weapons from Turkey should be discussed among all allies, even if the final decision is up to Washington. Also, transparency talks about numbers and locations of US and Russian non-strategic nuclear weapons could help to build confidence about the other side's capabilities and intent.

Another helpful measure would be reopening the dialogue on mutual nuclear doctrines. This could be done as part of a larger effort to set up a NATO Center of Excellence on Deterrence with the aim of better communicating to Russia and to the citizens of NATO countries the purpose and means of NATO's deterrence posture.

As for the INF crisis and the interlinked issue of the EPAA, US officials should consider options reassuring Russia about the EPAA vertical launchers, for example by making it technically impossible for them to fire tomahawk cruise missiles. This could be augmented with site visits by Russian military personnel, coupled with reciprocal visits of Russian sites for NATO personnel.

To address possible Russian concerns about third-country nuclear and conventional missiles with intermediate ranges, NATO might reconsider an initiative put forward by Moscow in the United Nations framework during the mid-2000s – that is, multilateralizing the treaty (President of Russia 2016). In this way, both sides could

20 This pledge was formalized in the 1997 NATO-Russia Founding Act.

take account of a changing geopolitical landscape, tackling a problem that may no longer be resolvable in a classical bilateral setting.

All the aforementioned options could provide a face-saving solution for Russia – provided that Russia has convinced the new US administration that it has returned to compliance with the INF Treaty. Washington and its European allies need to remind Moscow again and again of the enormous political and security costs involved from potentially abrogating INF; above all, they need to make clear that without INF, further strategic nuclear dialogue might well be doomed to fail, as well.

To avoid such an outcome, it would be helpful if the Trump administration rethought the general US stance towards missile defense. Since the Russians seem to insist on legally binding limits akin to the ABM Treaty, and given the US Senate's likely resistance to such an approach, the new administration should explore other options for a politically binding accord. That's to say, Washington could use one or both of the European missile defense sites as a bargaining chip, if other issues of US interest – such as Ukraine, INF, or the continued intimidation of NATO's easternmost allies by Russia – are resolved to Washington's satisfaction.

Over the mid- to long-term, NATO and Russia must initiate a serious and open dialogue about the two core issues at stake – the freedom and sovereignty of states to seek alliance membership and the (contradicting) Russian interest of maintaining a sphere of influence over its «near abroad.» So far, both sides are sticking to their maximum positions, even though both suffer from maintaining them. NATO must ask itself if a possible membership of Ukraine, Georgia, or Moldova really increases the security of its members, and whether the prospect of membership really increases the security of the countries in question. Russia should ask herself why almost all states in its direct neighborhood are eagerly looking for the protection of NATO and the United States, and whether the costs of creating a permanent perception of threat along its borders really serves the long-term interest of the Russian people.

A well-prepared conference – akin to the 1975 Helsinki Summit, with various preceding rounds of consultations at ambassadorial level, and including the non-aligned states in Europe – might be a way to kick-start the discussion. In any case, the West should not fall prey to false illusions that a change in leadership in Russia will simply end the standoff. Any successor to Putin will fight the prospect of further NATO enlargement, as did all his predecessors.

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What arguments motivate citizens to demand nuclear disarmament?

In many countries around the world, including those that have nuclear weapons, a majority of citizens support the goal of nuclear disarmament. This should be good news for organizations like the Nuclear Security Project, Global Zero, and the International Campaign to Abolish Nuclear Weapons, which want to stimulate and engage civil society in an effort to reduce global nuclear dangers. Many of these groups have the funds and sophistication to conduct robust outreach, by, for example, engaging students on university campuses, building civil society coalitions, or producing full-length documentaries.

Yet despite the disarmament organizations' best efforts, and despite people's stated support, at least in principle, for nuclear abolition, only a small minority actively engages in initiatives that contribute to the goal. Why? In part, this lack of civil society engagement could be due to a perception that the era of the nuclear arms race is over. Another reason might be that in a number of nuclear weapon states, criticism of national security policies can be dangerous. Still, the gap between support for the goal of nuclear disarmament and the lack of public engagement is puzzling.

One way to provide insight into this puzzle is to break apart the various arguments in favor of nuclear disarmament and evaluate them each for potential effectiveness in motivating grassroots participation. Too often, disarmament groups are painted with a broad brush, but their visions and goals are actually quite distinct. They make at least six separate arguments about the desirability of disarmament, each with its own strengths and weaknesses. Specifically, they argue that we should get rid of nuclear weapons because: terrorists can get their hands on a nuclear device; not all adversaries are rational; the very existence of nuclear weapons poses a danger to us all; nuclear weapons are inherently immoral and abhorrent; they are accident-prone; and they cost an unaffordable amount.

While sometimes subsets of these arguments can reinforce one another, that's not always the case. Arguments grounded primarily in the fear of nuclear attack are only effective at motivating grassroots engagement when people feel like those threats are imminent. These fear-based arguments may also have the inadvertent effect of strengthening security-based arguments for maintaining nuclear deterrence, with citizens reasoning that their own government needs atomic weapons to make sure another government doesn't attack. On the other hand, arguments that

focus on the current environmental, human, and financial costs of maintaining nuclear arsenals could be more likely to sustain meaningful public engagement and generate political activism.

Lackluster public engagement

Over the last decade, there have been numerous polls focused on understanding societal attitudes toward nuclear weapons. These polls have detailed public opinion on the use of nuclear weapons, their modernization, agreements to reduce their numbers, and their possible elimination. Arguably, in both nuclear and non-nuclear states, a majority of citizens views nuclear weapons negatively, and therefore could support the goal of nuclear disarmament in principle (ReThink Media 2016). However, only a small minority takes part in initiatives that raise awareness about the dangers of nuclear weapons or contributes to the goal of abolition (Wittner 2010a).

This lack of civil society engagement could be due to the perception that the most dangerous era for nuclear weapons – the Cold War – is over, and that today's nuclear policies are not a matter of great concern or urgency. International enthusiasm spawned by US President Barack Obama's 2009 call for a world free of nuclear weapons appears to have waned. And, as the United States and Russia, along with other nuclear-armed states, embark on nuclear weapon modernization programs, windows of opportunity to promote nuclear disarmament appear to have closed.

The lack of broad disarmament activism could also be due to the fact that the public is uninformed about the basic facts with regard to nuclear weapons, let alone their role in today's security environment (ReThink 2016). The public could also believe that there are defenses against a potential nuclear attack (Moore 2001). In some cases, public opinion may reflect the fact that a country relies on another's «nuclear umbrella,» benefiting from the protection offered by a nuclear patron in case of an attack (International Business Times 2015). And, in many «nuclear newcomer» countries, the development and demonstration of nuclear technologies, peaceful and otherwise, is linked to a sense of national achievement and pride (PIPA 2015).

Because disarmament activism in nuclear-armed states implies a public objection to the policies of a standing government, this type of activism takes courage. During the Cold War, activism and peace advocacy by nuclear scientists in the Soviet Union and the United States was viewed with great suspicion. In the Soviet Union, dissidents like the creator of the Soviet hydrogen bomb, Andrei Sakharov, were persecuted and lived in internal exile for decades. Even in the United States, nuclear scientists were caught up in public hearings about their potential Communist sympathies. In addition, anti-nuclear weapons activism may be dangerous in states that have deliberately sought to disempower nongovernmental organizations. In these states, civil society groups rarely go against the government line, as they risk persecution and harassment or even being shut down.

There is also competition for activist energies. In many Western democracies, there is an ongoing public backlash to the trends of globalization, automation,

and social change that, some feel, threaten their way of life. More disturbing is the heightened sense of internal insecurity that has mobilized public sentiment and action against «the other,» that is, immigrants and minorities. In comparison, the dangers associated with nuclear weapons may seem less pressing. Moreover, public polling suggests that when the public perceives a growth in external or internal security threats – even threats, like terrorism, that cannot be countered with nuclear weapons – they are much less likely to support nuclear weapons reductions (Grice 2016; Sagan and Valentino 2016).

Even in places where the public is aware of the dangers of nuclear weapons, they may not perceive them as an immediate policy priority on par with the economy or internal security. They may also distrust scientists. To this end, there may be overlaps between the challenges faced by climate change scientists in motivating public action and those faced by nuclear experts in catalyzing action on disarmament (CRED 2009).

Finally, disarmament is only likely to seem like a high priority, on par with shelter and safety, to those whose well-being is personally and immediately affected by nuclear technology. There are numerous examples of such people, including the survivors of the nuclear bombings of Hiroshima and Nagasaki (the Hibakusha) and individuals impacted by nuclear testing (such as the Downwinders in the United States). A terrible nuclear accident can also make nuclear dangers in general a higher priority in people's minds. For example, concerns stemming from the human and environmental consequences of the 1986 Chernobyl nuclear power plant accident had an impact on the Soviet leadership's views on nuclear weapons (Gorbachev 1986).

It may also be that today's nuclear disarmament movement has simply not yet had a chance to apply the kind of focus, persistence, and time that motivated nuclear activism during the Cold War era. The call to halt the nuclear arms race initiated in the 1970s grew into the full-fledged Nuclear Freeze Movement in the United States only as a result of diligent grassroots organizing; endorsement of its platform by a coalition that included major religious denominations, academic associations, women's organizations, and doctors' groups; and the passage of related resolutions by numerous city councils and state legislatures (Wittner 2010b). At its height, the Freeze was able to offer a vocal and organized counterpoint to the nuclear rhetoric of the Reagan Administration, and even become a plank of the Democratic Party platform in 1984. Achieving a desired policy outcome is usually the product of sustained coordination that includes not only civil society, but also draws in policy makers, funders, and other stakeholders (ORS Impact 2015).

All that said, public engagement remains a very important driver of policy change, in nuclear disarmament as in anything else. Understanding the different arguments and how they motivate the public can only help advance the cause.

Why nuclear disarmament is desirable

Too often, arguments about the desirability of nuclear disarmament, and the groups that champion those arguments, are treated monolithically, making them easier for opponents to dismiss. By disaggregating the different arguments, it becomes possible to assess their relative strengths and weaknesses. At the same time, separating the arguments from one another brings into relief tensions within the disarmament movement. In particular, there is a schism between those who would eliminate nuclear weapons but seek to maintain the existing balance of power, and those who believe nuclear disarmament should liberate states from the inequities of the current structure of nuclear «haves» and nuclear «have nots.»

Below, we identify six arguments for *why* nuclear weapon states ought to disarm, and subsequently we consider how these different arguments are taken up by advocacy groups.

Argument 1: Terrorists have «no return address.»

The post-9/11 shift in American security culture from a paradigm in which traditional nation-state adversaries reigned supreme to one in which non-state actors became a major justification for the use of military force had a profound impact on nuclear politics. The possibility of a nuclear terrorist act provided a new rationale for eliminating nuclear weapons, because nuclear terrorism did not fit within the conceptual framework of nuclear deterrence. By definition, non-state terrorist groups have no sovereign territory; they have no «return address» (Shultz et al 2007).

Therefore, deterrence using a threat of retaliation in kind is not a viable option. In fact, in the current political climate, no one considers the large-scale destruction of another states' sovereign territory a credible option, even if those states are harboring terrorists. (Instead, retaliation takes the form of targeting terrorists for kill or capture.)

The weakness of the no-return-address argument is that it overestimates and exaggerates the security threat terrorism poses. The risk of being killed in a terrorist attack is about 1 in 3.5 million, which is much lower than dying from an accident involving a home appliance (1 in 1.5 million) or a bathtub (1 in 950,000) (Mueller and Stewart 2010).

Argument 2: Not all adversaries are rational.

Critics of deterrence theory have long argued that not all actors can reliably be deterred, because their behavior cannot be assumed to be rational (Morgan 1984). Deterrence relies on the assumption that the actors in question are rational and will seek to preserve their own survival. New nuclear states, in particular, have been viewed with suspicion. From Iraq to North Korea to Iran, states that have flouted international norms and laws with clandestine nuclear programs have engendered debate about whether or not their leaders could be counted on to make rational decisions.

The weakness of this argument is that by emphasizing the threat posed by non-rational states, it could end up strengthening the case of those who argue that it's best to negotiate with these nuclear newcomer countries from a position of force. Nuclear weapons offer the ultimate embodiment of such force, which is why this argument may play well in the hands of anti-disarmament advocates.

Argument 3: Eliminating nuclear weapons reduces the likelihood of nuclear war.

The third argument is one that focuses on the dangers posed by nuclear war. In contrast to the arguments focusing on nuclear terrorism or irrational actors – which posit that rogue states and terrorist groups are the primary threats to national security – the central claim of this argument is that nuclear weapons themselves are the primary threat to human security. The advocates of this perspective reject the central premise of nuclear deterrence, namely that preparing to fight a nuclear war is the best way to prevent one. Instead, they see the production of nuclear weapons as generating a risk to global security that would not otherwise exist. Their preferred solution to the nuclear dilemma, therefore, is to rid the world of nuclear danger by eliminating nuclear weapons. However, by hyping the danger of nuclear weapons, this approach can inadvertently feed the perceived need for a strong nuclear deterrent. Deterrence advocates fetishize the dangers of nuclear war in a similar way, but feel that maintaining a nuclear arsenal is the best way to prevent nuclear weapons from being used (Harrington de Santana 2009).

Argument 4: Nuclear weapons are immoral and illegitimate.

The next argument involves delegitimizing nuclear weapons. Like those who argue that nuclear weapons are inherently dangerous, those who call them immoral say that nuclear weapons are threatening regardless of who possesses them. However, the delegitimizing line of persuasion is unique in that it makes a moral argument. Proponents argue that possessing or using nuclear weapons violates basic principles of human rights. By focusing on human rights, advocates of delegitimizing nuclear weapons widen the discussion to include the human suffering that has occurred as a result of nuclear explosions, and will occur in the event of a nuclear war (Ritchie 2014; Sauer and Pretorius 2014).

However, the desire to prevent the horrors of a nuclear-armed conflict is also a keystone for supporters of nuclear deterrence. Nuclear deterrence is a strategy to dissuade military aggression through the threat of retaliation in kind. There is no disagreement, per se, among supporters of nuclear deterrence and supporters of delegitimizing nuclear weapons on whether or not using them would be inhumane. Rather, they disagree on the best method of preventing that outcome. Both groups depend on invoking a future imaginary loss – of individuals, states, or the human race. What for some may lead to the conclusion that ridding the world of nuclear weapons is the only way to prevent that loss may for others reinvigorate a commitment to deterrence.

Argument 5: Accidents will happen.

The fifth argument highlights the risk of accidents involving nuclear weapons. Accidents, by the usual definition, are abnormal occurrences, unintended aberrations from a normal protocol or routine. However, in tightly coupled, complex systems, like nuclear arsenals, accidents are inevitable. In fact, the more redundancies that are introduced to try to prevent accidents, the more opportunities arise for something to go wrong. Accidents are, therefore, to be expected in any complex system (Perrow 1999). The recent book *Command and Control* by Eric Schlosser revived the discussion of nuclear weapons as sophisticated machines embedded in complex systems that could be prone to catastrophic accidents (Schlosser 2014). Proponents of the «accidents will happen» argument seek to raise awareness within academic and policymaker communities, as well as among the wider public. It's an argument that focuses attention on the importance of safety in organizational culture, with the goal of making changes to the way nuclear arsenals are structured in order to minimize tight coupling and complex interactions. If one's goal is to reduce nuclear danger, then eliminating nuclear weapons and the inevitable accompanying accidents is one of the surest ways.

This approach, however, is not necessarily an effective disarmament argument since its primary focus is not on elimination, but on making nuclear weapons «safer» and also reducing their number in order to minimize, among other things, the risk of accidental wars, the threats to command and control emerging from the cyber domain, and the dangers of proliferation.

Argument 6: Maintaining nuclear arsenals is costly.

Most arguments about the desirability of nuclear disarmament are future oriented; they focus on the threat of annihilation. The construction and maintenance of nuclear programs, however, also comes with existing human, environmental, financial, and political costs. Many of these costs, especially environmental ones, are poorly understood. In the United States and other nuclear-armed states, the focus on future costs has pre-empted or obscured discussion about the current costs and other social tradeoffs of nuclear weapons. Focusing on the latter instead may be a promising argument for public engagement.

Advocates and policy

Disarmament advocates use many of these arguments simultaneously in different combinations. For example, the International Campaign to Abolish Nuclear Weapons (ICAN) invokes arguments about humanitarian norms heavily, but also frequently connects them to «current costs» or «accidents» arguments. Yet there is not universal agreement among advocacy groups about why nuclear weapon states ought to disarm. For instance, the so-called four horsemen – George Shultz, William Perry, Henry Kissinger, and Sam Nunn – use the nuclear terrorism argument, and also frequently bring up accidents and current costs. But they mostly ignore the humanitarian norms argument as it does not fit with their realist worldview; this puts them at

odds with some other disarmament advocates. The arguments outlined above can be connected to three new organizations that emerged in the early 2000s and have dedicated resources to public engagement.

The Nuclear Security Project

Multiple organizations have taken up the nuclear terrorism argument and added it to their list of reasons for disarmament. However, this argument played a special role for the leadership of the Nuclear Security Project, which was formed by the «four horsemen,» all former US statesmen, in 2007. In providing a new rationale for disarmament, it allowed the old guard to hold on to its belief in the effectiveness of Cold War-era nuclear deterrence, while at the same time advocating for abolition on a practical rather than moral basis. When Shultz and his colleagues first came out in favor of «a world free of nuclear weapons,» critics questioned their sincerity and grumbled about the effect of old age on their judgment. How, people wondered, could these architects of the Cold War have had such a change of heart? Their answer was that they had not changed, but the world around them had.

Unlike Cold War-era grassroots disarmament movements and groups like Pugwash, the new abolitionists do not take issue with the rationality and practice of state-based nuclear deterrence – they argue that nuclear weapons were essential to maintaining international security during the Cold War. Now, they argue, the actors have changed: Not only are small states like North Korea now testing and refining their warhead design, but the possibility of nuclear terrorism by non-state groups looms large. The new abolitionists argue that «non-state terrorist groups with nuclear weapons are conceptually outside the bounds of a deterrent strategy» (Shultz et al. 2007).

Unlike traditional advocates of disarmament, the new abolitionists do not conceive of the goal of a world free of nuclear weapons as the solution to preventing nuclear war. They are primarily focused on preventing nuclear attacks that fall short of full-scale nuclear war, and believe that the risks of disarmament are worth the benefits. They agree that working toward the goal of complete nuclear disarmament, regardless of how ill-defined it remains, is necessary to motivate the cooperation required to secure loose nuclear materials and keep them out of the hands of terrorists. As Shultz and company explained in their 2007 op-ed, «Without the bold vision, the actions will not be perceived as fair or urgent. Without the actions, the vision will not be perceived as realistic or possible» (Shultz et al. 2007). However, as they readily admit, they have not yet reconciled the desire for a world free of nuclear weapons with the fact that their vision sits uncomfortably within the broader framework of their Cold War-era worldview.

In sum, proponents of this argument envisage a world free of nuclear weapons, with a short- and medium-term focus on reducing threats of terrorism and accidental use. Their actions are an effort by elites to engage elites, primarily in nuclear states. The immediate focus is on reducing the dangers posed by nuclear weapons, decreasing nuclear reliance, and improving the security of nuclear weapons and materials. However, it takes considerable time to bring about the kind of policy

change they aim for, and this lack of immediacy may diminish the degree to which civil society engages in the effort.

Global Zero

The focus on eliminating nuclear weapons was common among Cold War-era disarmament movements, which began with the dissident nuclear physicists who founded two organizations that are still in existence today: the *Bulletin of Atomic Scientists* and Pugwash. The *Bulletin* is, of course, a policy-focused publication that provides scientifically grounded, expert-level analysis, and Pugwash is a forum for dialogue among international nuclear experts. Concerns about the peril to future generations posed by atomic arsenals also lay at the heart of numerous grassroots anti-nuclear protests during the Cold War, including the demonstrations organized by the Campaign for Nuclear Disarmament or the Women's International League for Peace and Freedom, as well as spontaneous movements that sprung up through existing women's networks – enabled by chain letters and phone trees – like the Greenham Common Women's Peace Camp in the United Kingdom, which spread to the United States, Italy, and Australia.

In today's environment, Global Zero is the highest profile advocacy group that relies on this line of thought to structure its rhetoric. Global Zero launched in the wake of the 2007 call by Shultz, Perry, Kissinger, and Nunn for a world free of nuclear weapons. While the nuclear-danger argument advanced by Global Zero has some overlap with other arguments, like other organizations it is also distinguished by a central animus.

Global Zero gained a lot of its prominence and energy after President Obama's 2009 speech in Prague, in which he announced, «America's commitment to seek the peace and security of a world without nuclear weapons» (White House Office of the Press Secretary 2009). The group solicited (and garnered) support from world leaders, including Russia's then-President Dmitry Medvedev, allowing these leaders to gain credit for endorsing disarmament as a long-term goal without committing to any practical steps. Global Zero endorses an action plan that begins with bilateral US and Russian reductions and builds toward a multilateral instrument, compliance with which would be supported by rigorous on-site inspections. Under their plan, all nuclear weapons would be eliminated by 2030 (Global Zero Commission 2010). However, with the worsening of US-Russian relations and the continuation of nuclear modernization programs, including in the United States, enthusiasm for these initiatives appears to have waned. Today, Global Zero is primarily an effort to build millennial support and grassroots validation for disarmament and risk reduction. Without high-impact activism, nuclear policy in nuclear weapon states remains an elite issue.

The Humanitarian Initiative and the International Campaign to Abolish Nuclear Weapons
Moral arguments are traditionally espoused by religious organizations, and indeed the Catholic Church has become an important advocate for disarmament from a moral standpoint. (During the Cold War, it accepted deterrence in a limited way, but

its ethic has since shifted.) Today, though, the key international movement advancing the moral argument is made up of ICAN and the Humanitarian Initiative. The Humanitarian Initiative grew out of frustration among non-nuclear weapon states and civil society groups with the lack of progress on key elements of the disarmament agenda under the 1970 Nuclear Non-Proliferation Treaty, or NPT. The final documents produced by the NPT Review Conferences of 1995 and 2000 called for specific multilateral steps, including ratification of the Comprehensive Test Ban Treaty, negotiation of a Fissile Material Cut-off Treaty, and the establishment of a Nuclear Weapon Free Zone in the Middle East. While non-nuclear weapon states viewed continued bilateral US and Russian nuclear reductions as a further step in the right direction, they had become disillusioned with the glacial pace of progress on multilateral measures. Bilateral arms control alone does not reduce dependence on nuclear weapons, or create institutional structures that might supersede deterrence. With that in mind, the Humanitarian Initiative has sought to reframe the debate about nuclear disarmament in terms of the unacceptable humanitarian impact of nuclear war, and in doing so delegitimize nuclear weapons as tools of security (Ritchie 2014; Sauer and Pretorius 2014).

The Humanitarian Initiative models itself on the success of two previous campaigns: the one that resulted in the 1997 Anti-Personnel Mine Ban, and the one that resulted in the 2008 Convention on Cluster Munitions. Despite resistance from countries that possessed anti-personnel mines and cluster munitions, including the United States and Russia, those campaigns transformed the perception of these weapons. By broadening the conversation to include evidence of their inhumane effects, organizers were able to conclude treaties that ban their use, stockpiling, production, and transfer (Borrie 2014).

The momentum behind the Humanitarian Initiative began as early as 2007, when a variety of civil society groups formed ICAN, a coalition of nongovernmental organizations with representation from one hundred countries. That momentum got a boost from one of the major organizations behind the earlier land mine and cluster munition bans when, in the lead up to the 2010 NPT Review Conference, the President of the International Committee of the Red Cross (ICRC) turned his attention to the humanitarian consequences of nuclear war. He publically said that «the ICRC finds it difficult to envisage how any use of nuclear weapons could be compatible with the rules of international humanitarian law» (Sauer and Pretorius 2012).

The first major conference on the Humanitarian Initiative took place in spring 2013 in Norway. It brought together 128 governments, United Nations organizations, and civil society groups. The conference provided a forum for an evidence-based-discussion of «the humanitarian and developmental consequences of a nuclear weapons detonation» (Government of Norway 2013). At that meeting, and subsequent ones hosted by Mexico and Vienna in 2014, experts presented evidence of the catastrophic global consequences of using nuclear weapons, including effects on the climate, environment, and human health – as well as, potentially, on the ability of humankind to survive.

The crux of the Humanitarian Initiative's argument is that the humanitarian consequences of using nuclear weapons make them immoral and inhumane, and that as long as they exist, there is a possibility they will be used. However, the agenda broadened and evolved over the course of the conferences to include considerations of immediate, mid- and long-term human and environmental costs associated with nuclear tests. The Vienna conference also included a presentation by Schlosser on nuclear accidents.

Many participants came to agree on the need for an international legal instrument that would outlaw the use of nuclear weapons. In October 2016, with a vote of 123 in favor, 38 against, and 16 abstaining, the United Nations decided «to convene in 2017 a United Nations conference to negotiate a legally binding instrument to prohibit nuclear weapons, leading towards their total elimination» (UNGA 2016). Negotiations on a Ban Treaty – which critics fear could undermine the NPT – were ongoing at the time of publication, with a first draft released on May 22, 2017 (Draft Convention on the Prohibition of Nuclear Weapons 2017).

The motivating effect of high costs

The authors of this piece have various opinions on disarmament, but we agree that one set of arguments stands out for its potential to spark a more informed debate and greater public engagement on the issue. It involves current costs.

Arguments based on the real-time costs of developing and maintaining a nuclear arsenal could lead to very different policy outcomes than those based on fear of an apocalyptic future. Cost-based arguments focus attention on all that is not being prioritized when governments spend money on their nuclear arsenals: social care, education, public infrastructure. In other words, cost arguments ask nuclear weapon states to examine the tradeoffs of their choice. A more substantive and comprehensive message about the financial, environmental, human, and political costs incurred in the pursuit of nuclear weapons could lead to a discussion of opportunity costs among the public.

Since the end of the Cold War, non-governmental organizations, journalists, and academics have begun collecting information on the costs, financial and otherwise, of nuclear weapons. Previously, the process through which nuclear weapon states produced and maintained their nuclear arsenals took place behind a wall of secrecy, pre-empting public debate about costs. Today, data is most readily available with regard to the US nuclear program. The price tag for the Manhattan Project, which developed the first US nuclear weapons in 1945, came to approximately \$26 billion (in 2016 dollars). The most recent available data shows that between the early 1940s and the mid-1990s, the United States spent \$5.8 trillion on nuclear weapons-related activities. And for the period from 2010 to 2018, the United States allocated more than \$179 billion to developing and maintaining its atomic arsenal (NTI/CNS 2013). Additional costs are difficult to calculate, given that many of the activities associated with a nuclear military program are interwoven with the civilian economy. Despite the resources allocated by the United States for environmental restoration and waste

management, some have observed that «no amount of money can return all the land and water under [Department of Energy] facilities to their original condition» (Schwartz 1998). Global concern about fallout played a roll in driving most nuclear testing underground in the mid-1960s. Even so, as Joseph Masco observed in his study of nuclear labs and their surrounding communities, as a result of nuclear testing, the United States is already «the most nuclear-bombed country in world, having detonated nearly one thousand nuclear devices within its own territorial borders» (Masco 2006). Communities surrounding former nuclear weapons production facilities, like the one located at Rocky Flats in Colorado, are slowly unearthing evidence of contamination, although establishing reliable causal links to increased rates of cancer remains controversial (Iverson 2013).

To be sure, the sum of these costs could not have been foreseen from the start, and many believed that they could be offset. For the first nuclear weapon states, peaceful nuclear energy represented a welcome spin-off from the atomic weapons effort (Union of Concerned Scientists 2011). The expectation was that nuclear power would allow governments to reap positive returns on the huge investment in nuclear weapons (Nucleonics 1948). Creating a nuclear arsenal entailed a vast infrastructure, covering everything from mining to uranium enrichment or plutonium reprocessing. Splitting the atom, according to nuclear industry advocates, would lead not only to the creation of tremendously destructive arsenals, but also to energy which, as one chairman of the US Atomic Energy Commission put it, would become «too cheap to meter» (Strauss 1954). In those years, industry discourse on the feasibility and profitability of nuclear energy shifted from «if the atom becomes a viable source of energy» to «when the atom becomes a viable source of energy» without much consideration for the implications of such a transition (Nucleonics 1955). Beginning in the 1950s, the industries of the nuclear weapon states flooded the global market with nuclear technology.

As it turned out, despite the immense societal benefits of peaceful nuclear technologies, the export of certain related materials had downstream consequences in terms of nuclear proliferation and the danger of nuclear terrorism. For example, the United States and the Soviet Union transferred research reactors powered by highly enriched uranium to numerous states. After lengthy and elaborate efforts to convert or shut down these reactors, their material was repatriated back to the United States and Russia.

In addition to all of these costs, the United States and other Western donors also spent vast sums of money and enormous energy to deal with the Soviet nuclear legacy in Russia and other former Soviet states, including for threat reduction, environmental remediation, and defense conversion projects. Today, the United States and Russia continue to pay for dismantlement and destruction of old nuclear weapons and systems, as well as environmental remediation, even as they spend billions to undertake nuclear modernization. In light of all this, one is left wondering whether disclosing the full cost of nuclear weapons could galvanize public opinion.

Arguments focused on the real-time costs of nuclear weapons could provide a new basis for civil society engagement in the disarmament debate. Creating a sense

of urgency about the costs that are being incurred now, rather than emphasizing the possibility of apocalyptic costs that may or may not be incurred at some point in the future, may be the best way to engage civil society on abolishing nuclear weapons.

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Nuclear disarmament summits: A proposal to break the international impasse

This month, the United Nations will debate the provisions of a legally binding treaty that would prohibit states party to it from using, testing, developing, producing, or possessing nuclear weapons. Arising from humanitarian concerns about the catastrophic consequences of nuclear weapons use, the proposed treaty is intended to lead toward the total elimination of nuclear weapons. Progress on the ban treaty, however, will not necessarily lead to progress on disarmament.

It is now more than seven decades since the United Nations first embraced the goal of eliminating nuclear weapons, and almost five decades since the Nuclear Non-Proliferation Treaty (NPT) called for general and complete disarmament. Still, states possessing nuclear weapons have not yet relinquished them, and effective measures to prevent the continued spread of nuclear weapons have not yet been adopted.

Existing processes, including the Humanitarian Initiative to ban nuclear weapons under a new treaty, can provide momentum for disarmament but remain inadequate for achieving full participation. We propose a possible solution to this impasse: a series of biennial Nuclear Disarmament Summits that would include all states that possess nuclear weapons, and that would be complementary to the NPT process and ban treaty movement. These summits could provide a platform for discussion of issues necessary for verifiable disarmament, and an opportunity for states or groups of states to make voluntary commitments that can advance disarmament.

Mandates for disarmament

In its first resolution, the United Nations General Assembly in January 1946 called for the creation of a commission to develop proposals for «the elimination from national armaments of atomic weapons and of all other major weapons adaptable to mass destruction» (United Nations 1946). In subsequent years, agreements and initiatives have sought with varying degrees of success to reduce, and ultimately eliminate, nuclear warheads worldwide. The 1968 Treaty on the Nonproliferation of Nuclear Weapons (NPT) – which called for «effective measures relating to cessation of the nuclear arms race at an early date» and a «treaty on general and complete

disarmament under strict and effective international control» – became the linchpin of such efforts (United Nations Office for Disarmament Affairs 1968).

While the NPT spurred bilateral treaties and unilateral actions that have reduced the global stockpile of nuclear warheads by 85% since the height of the Cold War, most of these reductions took place in the late 1980s and early 1990s. Despite lofty aspirations for additional progress on reductions, US President Barack Obama's April 2009 speech in Prague envisioning a world free of nuclear weapons (Arms Control Association 2009) achieved little beyond modest US-Russian reductions of deployed strategic nuclear weapons and delivery systems. The prospects for additional bilateral reductions are uncertain and will likely remain so until President Donald Trump lays out a US nuclear policy and engages with Russia.

The conceptual goal of nuclear disarmament is well established by Article VI of the NPT, and recognized in the 1996 decision by the International Court of Justice as «an objective of vital importance to the whole of the international community» (Burroughs 2016). However, there is no consensus on the process for further progress. The legal obligations established under the NPT are also in dispute, with some states alleging that weapons modernization programs violate Article VI by producing «new» warheads (Article 36, 2014).

Additionally, the current disarmament architecture is under significant stress. It has not been able to integrate states that possess nuclear weapons outside of the recognized nuclear order (namely India, Pakistan, Israel, and North Korea) into multilateral efforts, nor to quell growing frustration over incremental arms control measures as a means of making progress on larger goals. New factors – such as the devolution of state authority to non-state actors and institutions, and emerging technologies that threaten understandings of the current strategic environment – put additional stress on existing institutions that do not necessarily have the structures or processes to address them. The disintegrating relationship between Russia and the West, nuclear saber rattling, and rapid modernization of delivery systems further complicate progress on disarmament. Given the current impasse and predictions of an impending new nuclear arms race (Tirone 2015), the international community must encourage bold and creative thinking to advance disarmament efforts.

Why a summit series?

While convening a summit to address disarmament is not a new idea, the current political environment is conducive to reexamining the contributions that a summit series could make.

The existing NPT process, the Conference on Disarmament, and the proposed ban treaty all have serious limitations. Over the past decade, steps taken by the recognized nuclear weapon states (China, France, Russia, the United Kingdom, and the United States) as part of the NPT process are largely viewed as inadequate. Established groupings within the NPT process – such as the Non-Aligned Movement, the Arab Group, and the New Agenda Coalition – have at times brought new ideas or built bridges, but at other times have held progress hostage to political interests.

For instance, at the 2015 NPT Review Conference, the Arab Group, led by Egypt, insisted on a timetable for convening a conference on a Middle East WMD-free zone, which prevented consensus on a final document (Davenport 2015).

The Conference on Disarmament, which successfully negotiated biological and chemical weapons treaties, is more inclusive than the NPT, but has been stymied since 1996 by rules requiring consensus. This allows a single state to block progress on a disarmament agenda.

Although the Conference on Disarmament could eventually serve as forum for negotiating treaties such as a ban on fissile material production, and the NPT has a critical role to play as the building block for larger nonproliferation and nuclear security efforts, growing frustration over the slow pace of reductions is the reason why a majority of states and civil society campaigners are pushing for a treaty to ban the possession and use of nuclear weapons. The first draft, which reflects input from more than 130 nations, was unveiled in late May (United Nations 2017). However, none of the states possessing nuclear weapons have participated in the negotiations. France, Israel, Russia, the United Kingdom and the United States voted against the UN resolution to take up negotiations; China, India, and Pakistan abstained. North Korea is the only state possessing nuclear weapons (although it is not recognized as a nuclear weapon state) to vote for the resolution. Despite the boycott, a ban treaty may be adopted as early as this month – which will further stigmatize the possession of nuclear weapons, strengthen the norm against use, and spur critical discussions on disarmament.

While a ban treaty is a major step toward disarmament, it will not, by itself, eliminate nuclear weapons. Additional hard work and bold leadership will be needed to change the status quo. It will be imperative to think about how the momentum garnered from the ban treaty can generate pressure on the nine states possessing nuclear weapons for a follow-up convention. A series of summits can help jumpstart this process.

A model for success

The Nuclear Security Summit series held from 2010 to 2016, aimed at preventing nuclear terrorism, makes a good model for future Nuclear Disarmament Summits. The process highlighted the positive impacts of high-level political attention and voluntary pledges. While each summit produced a communique, the tangible results were not limited to that consensus document. The main value of the process came from actions by individual states, as well as by groups of like-minded countries, to move beyond the status quo in key areas.

A similar process could produce meaningful results on disarmament. The flexibility offered by a summit process would allow for a targeted list of participants, while ensuring that all states possessing nuclear weapons – and states with enrichment and reprocessing technologies – are included. The latter group is critical for maintaining confidence in disarmament, because monitoring the production of uranium and plutonium ensures that material is not diverted for covert purposes.

Given the momentum generated by the ban treaty movement, leaders from this group should also be prioritized. States that drove the effort – including Austria, Mexico, Brazil, and Indonesia – can bring the concerns of the Humanitarian Initiative to a summit series, and serve as liaisons between the summits and the ban treaty movement.

The Nuclear Security Summits demonstrated that, even for recalcitrant states, participation in an event with high-level political prestige is attractive. And even if obligations are nonbinding, states can be willing to take actions that would be avoided if legally binding.

The difficulty of engaging recalcitrant states highlights the importance of the convener's role. Obama was willing to expend political capital to encourage participation from key states, and to urge leaders to make and fulfill national commitments. Even for the two summits hosted by South Korea and the Netherlands, Obama's commitment arguably contributed to the continued participation of more than 50 world leaders.

It is unclear whether Trump will put the same priority on the nuclear agenda, and personally work with other leaders to advance disarmament. Comments he made during the transition period do not indicate that his policy agenda or personality lend themselves to such a process (Pilkington and Pengelly 2016).

US leadership, however, is not necessary and may not even be advisable. A forum that appears to cater to the interests of the nuclear weapon states may have less chance of achieving significant results. Given the current frustration over the slow pace of disarmament, a summit process led by a non-nuclear weapon state, or group of states, may engender greater participation. «Umbrella states,» such as Japan and the Netherlands, may be well positioned to act as bridge builders. Leaders in the formation of nuclear-weapon-free zones may also be candidates. In the drafting of the zone treaties, these states demonstrated a commitment to disarmament, and a willingness to work with the recognized nuclear weapon states to garner support for the zones.¹ States that participate in the Nonproliferation and Disarmament Initiative (NPDI) may also be leadership options, as this group has worked to act as a bridge builder at past NPT review conferences.² Regardless of which states step up, it will be critical that convening states are willing to pursue a balanced agenda and expend time and political capital to motivate recalcitrant states to attend and actively participate.

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- 1 Article VII of the NPT says that «Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.» States have negotiated nuclear-weapon-free zone treaties in Latin America, Africa, the South Pacific, Central Asia, and Southeast Asia. These treaties have protocols for the recognized nuclear weapon states to ratify that respect the nuclear-weapon-free zone status. For more on the zones and protocols, see www.un.org/disarmament/wmd/nuclear/nwzf.
 - 2 The NPDI was founded by Australia, Canada, Chile, Germany, Japan, Mexico, the Netherlands, Poland, Turkey, and the United Arab Emirates in September 2010. Nigeria and the Philippines have subsequently participated.

In and of itself, creating a forum for all nine states that possess nuclear weapons to discuss disarmament issues, unburdened by preexisting factionalism and consensus decision-making, would be a positive step forward.³ A summit process also allows for responsiveness as new threats emerge. For instance, it became evident over the course of the Nuclear Security Summit process that the linkage between nuclear security and safety required further examination, and that cyber security for nuclear facilities needed to be prioritized at the 2016 summit.

The scope of the summits

While flexibility and responsiveness are advantages of the summit process, defining the initial scope of disarmament summits could pose a challenge. The Nuclear Security Summits organized around the narrow, but universally accepted, goal of securing and minimizing weapons-usable nuclear materials in the civil sphere to prevent acts of nuclear terrorism. Disarmament summits are unlikely to enjoy that same level of cohesion, despite an underlying commitment by all states to eventually achieve disarmament.

A scope that is too narrow may make the summits appear irrelevant to the stakeholders, while a scope that is too wide may be subject to mission creep. We suggest focusing initially on verification, which provides a range of technical and political challenges – in areas like warhead dismantlement and fissile material production – that could be the focus of national and multilateral commitments. Verification also has application for non-nuclear weapon states, as there are several states that possess weapons-usable materials, or the means to produce them, and would need to be subject to monitoring. A second focus could be cruise missiles, discussed in more detail below.

We recommend a time-bound biennial process with head-of-government leadership, as opposed to the NPT Review Conferences held every five years with lower-level governmental representation, to keep the issue of disarmament at the forefront of international political efforts for a concentrated period. When held at the head-of-government level, summits challenge participating leaders to bring domestic pledges of action to the table, to demonstrate each state's commitments to the overarching goals. Failure to participate in this commitment-making process risks stigmatization. This process also enables key groups of states to collaborate to address critical gaps.

State-level commitments: «house gifts»

The disarmament summits should continue the commitment-making of the Nuclear Security Summits, at which individual states made national commitments known

³ North Korea's participation would be positive, but an invitation should not be extended at the expense of recognition of Pyongyang as a nuclear-armed state. Additionally, Israel's participation should not hinge on formal acknowledgement of its nuclear weapons. If either state chooses not to participate, the summits should still go forward.

as «house gifts.» These commitments included pledges to minimize and remove nuclear materials, ratify key treaties, conduct exercises to simulate responses to nuclear incidents, and strengthen nuclear detection architecture. Due to the self-selecting, voluntary nature of the commitment-making, the pledges made were feasible rather than aspirational. Through self-reporting at subsequent summits, states were pressured to fulfill their commitments. Between the 2010 and 2012 summits, more than 90% of the commitments were completed (Cann, Davenport, and Balzac 2012).

There are a number of areas where states could pledge to take action that would support and advance nuclear disarmament. These areas could include, but are not limited to:

- **Fissile material stockpiles:** There is significant uncertainty regarding the size of military holdings for most of the nations possessing nuclear weapons. Individual commitments by these states to provide greater openness and transparency would be a step in the right direction.
- **Production and/or deployed warheads:** China, India, Israel, Pakistan, and North Korea do not provide any information about the number of warheads produced, and in some cases deployed. Greater transparency – from all states possessing nuclear weapons – regarding the size of deployed strategic weapons, tactical weapons, and reserve warheads would be useful.
- **Key treaties:** Russia, France, and the United Kingdom signed and ratified the Comprehensive Nuclear Test Ban Treaty. The United States, China, and Israel have signed, but not ratified, the treaty. India and Pakistan have neither signed nor ratified. These countries could commit to taking steps domestically to move toward ratification, or agree to move in tandem.
- **Excess warheads:** Commitments by all countries possessing nuclear weapons to disclose the number of warheads awaiting dismantlement would be a crucial step toward demonstrating the will and capacity to eliminate excess nuclear warheads.
- **Freeze in warhead numbers:** While Russia and the United States possess 90% of the global stockpile of nuclear warheads, the slow pace of arms control agreements to further limit these stocks by Washington and Moscow should not be an excuse for others to continue expanding their nuclear arsenals. All states could commit to a quantitative freeze, perhaps conditioned on further US-Russian arms control talks.
- **Security assurances:** A number of states reserve the right to use nuclear weapons first and against non-nuclear states under certain scenarios. Commitments to study or strengthen the saliency of nuclear weapons in defense postures could provide greater assurance to non-nuclear weapon states that the states in possession of nuclear weapons are looking to decrease reliance on their nuclear arsenals and further limit scenarios under which a non-nuclear state might be subject to a nuclear attack.

- **Modernization plans:** As part of a summit process, states might commit to establish review commissions to consider the feasibility and necessity of programs to modernize nuclear weapons or create new delivery platforms.

Multilateral commitments: «gift baskets»

The second substantive benefit of a summit process comes from multilateral commitment-making. Known in the Nuclear Security Summit process as joint statements or «gift baskets,» these initiatives allowed for groups of states to take action beyond the consensus documents endorsed by all. Over the course of the summits, 51 of the 53 participating states signed onto at least one multilateral effort (Cann, Davenport, and Parker 2016). By the last summit in 2016, the «gift baskets» generated additional support from countries initially skeptical of the multilateral process.

In a survey of the effectiveness of multilateral initiatives from the 2012 and 2014 summits, it was evident that joint statements containing time-bound goals and reporting requirements were much more likely to produce significant results and garner state participation. Subjects ripe for discussion and collaboration between states as part of a disarmament summit process could include: a verification architecture for areas such as warhead dismantlement and fissile material production and/or storage monitoring,⁴ a body to settle disputes that may arise during and after the dismantlement process, a consolidated reporting process that would allow states to provide information required by multiple treaties on one common form, and an ancillary body for discussions of emerging technologies and weaponry (so that states would not resort to the re-deployment of nuclear weapons to counter perceived imbalances in conventional forces). An ancillary group could also consider the impact of missile defense or prompt global strike on reduced nuclear arsenals as countries move toward full disarmament.

Joint statements could also focus on specific delivery systems, such as cruise missiles, with the aim of expanding disarmament discussions beyond Washington and Moscow. The past decade has seen a troubling trend, with nations including Pakistan, India, and China moving toward developing and deploying new

4 A number of initiatives already underway could provide a basis to begin such work. The International Partnership for Nuclear Disarmament Verification, a public-private partnership between the US Department of State and the Nuclear Threat Initiative, is designed to examine the technical challenges of nuclear verification. More than two dozen countries are participating in the initiative. For more information, see www.nti.org/about/projects/international-partnership-nuclear-disarmament-verification. The UK-Norway Initiative is a collaboration to examine issues related to arms control verification and to promote understanding between nuclear weapon states and non-nuclear weapon states. For more information, see <http://ukni.info>. The Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials, which entered into force in 1994, is an agreement between Brazil and Argentina to ensure that their nuclear activities remain exclusively peaceful. It is a full-scope safeguards agreement that complements and goes beyond IAEA safeguards. For more information, see www.abacc.org.br/?page_id=5&lang=en.

nuclear-capable cruise missiles.⁵ Cruise missiles are perceived as uniquely destabilizing, because it is impossible for existing missile defense systems to distinguish between cruise missiles tipped with nuclear warheads and those carrying conventional warheads.⁶ Banning particular types of cruise missiles, or ensuring that they are incapable of delivering a nuclear warhead, might be an option for involving a greater number of nuclear-armed states in disarmament talks despite the absence of numerical parity. At the very least, discussions between all states that possess nuclear weapons about the negative impacts of deploying cruise missiles would be a step in the right direction.

Action on cruise missiles may also be viewed favorably by non-nuclear weapon states frustrated with the slow pace of disarmament. As part of the meetings that led to a draft ban treaty, Sweden and Switzerland proposed that nuclear-armed states begin a process to «reduce risks» associated with nuclear-armed cruise missiles. Specific steps on cruise missiles in joint statements could include: counting cruise missiles as strategic delivery systems in any arms control or disarmament agreement (similar to how air-launched cruise missiles are counted in the New Strategic Arms Reduction Treaty), agreeing to halt investment in the development of new systems, and expanding the «gift basket» process to discuss and perhaps limit the development and deployment of hypersonic boost-glide vehicles.

These multilateral proposals could also be a way to integrate and discuss some of the concerns raised by the Humanitarian Initiative, thus giving voice to states that are supporting the ban movement. Given the reluctance of several of the nuclear weapon states to participate in the Humanitarian Initiative conferences, joint statements addressing some of the central issues of the conferences – such as the environmental and humanitarian consequences of the use of nuclear weapons, and the possibilities for joint response and mitigation efforts in the event of intentional or accidental use – could help bridge the divide between the two groups of states.

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- 5 Pakistan has developed the Babur and Raad missiles, whose missions are primarily nuclear. China and India have both fielded nuclear-capable cruise missiles: the CJ-10 and CJ-20 for China; and the Brahmos, Nirbhay, and Prahaar for India. While the Chinese and Indian systems are believed to be primarily conventional, ambiguity surrounds their missions. The United States may develop a new nuclear cruise missile, the long-range standoff (LRSO), and Russia has several nuclear-capable cruise missiles. The new US Secretary of Defense, James Mattis, promised at his confirmation hearing to study the necessity of the cruise missile before going forward with the project. This could provide an opening for pursuing cruise missile limitations more broadly.
 - 6 The United States Air Force failed to distinguish between conventionally armed and nuclear-tipped cruise missiles in 2007, and mistakenly flew seven nuclear-armed cruise missiles across the United States on a B-52 bomber. Concern over these ambiguities played into the decision by the United Kingdom not to pursue a new sea-launched nuclear cruise missile in 2013. At the time, Philip Hammond, then British defense secretary, said that «a cruise-based deterrent would carry significant risk of miscalculation and unintended escalation... such uncertainty could risk triggering a nuclear war at a time of tension» (Hammond 2013). US President George H. W. Bush made a similar decision in 1991, choosing to remove all sea-launched Tomahawk nuclear cruise missiles from surface ships and attack submarines.

Discussing these issues outside of the politicized Humanitarian Initiative process could give the recognized nuclear weapon states more space to engage on sensitive topics.

The first steps toward multilateral disarmament may be taken by nuclear weapon states negotiating bilaterally: the United States and Russia, the United States and China, Russia and China, Russia and France, Russia and the United Kingdom, China and India, and India and Pakistan. Under the auspices of the disarmament summits we propose, these states could initiate a synchronized process of bilateral talks on greater transparency and modest limitations on some systems. The bilateral tracks would be more transparent and predictable for other members of the disarmament summits than current processes, because they would correspond with the summits calendar, and would be tied to the main track of the summits.

If successful, this process could include more and more systems, and require additional measures. Unlike proposed steps in the NPT process, the summit process would include nuclear-armed states not recognized by the NPT. Ultimately, it could help to transform bilateral tracks into multilateral talks that would include both nuclear weapon states and non-nuclear weapon states, creating a process of multilateral arms control and limitations that we hope would be irreversible and transparent.

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The future of US-Russian nuclear deterrence and arms control

Since the end of the Cold War, US and Russian nuclear postures have largely remained the same. Even though both countries have dramatically downsized their arsenals, they each have maintained all three legs of their respective nuclear triads: strategic bombers, land-based intercontinental ballistic missiles, and submarine-launched ballistic missiles. Both countries continue to possess prompt launch capabilities and maintain their plans for missile defense systems. Consequently, both countries' nuclear arsenals continue to pose an existential threat to one another (and the rest of the world). Moreover, the most recent nuclear and conventional modernizations – including systems still on the drawing board – seem to exacerbate these nuclear risks at a time when the US-Russian political relationship is marked by mistrust and decreasing transparency.

Regarding the nuclear doctrines of the two countries, both the Obama and Putin administrations preserved elements of the nuclear thinking of previous administrations, but there were also important changes indicating interest in reducing reliance on nuclear weapons. For example, in the 2010 Nuclear Posture Review – which is the process that US presidents have used since the end of the Cold War to articulate their nuclear deterrence policy – the Obama administration pledged to work towards a world without nuclear weapons while simultaneously sustaining a safe, secure, and effective nuclear arsenal (Defense Department 2010). The Obama administration also stated that the fundamental role of US nuclear weapons is to deter a nuclear attack on the United States, its allies and partners, and that these weapons would only be used under «extreme circumstances.»

For its part, although Russia is not as transparent about its nuclear policy as the United States, in its December 2014 Military Doctrine, Russia stated that its nuclear weapons «will remain an important factor of preventing an outbreak of nuclear military conflicts involving the use of conventional arms.» This doctrine states that Moscow would only use nuclear weapons in case of a nuclear or weapons of mass destruction attack on Russia or its allies, or in case of conventional aggression which threatens the very existence of the state. These lines are essentially unchanged from Russia's previous Military Doctrine, but since the outbreak of the crisis in Ukraine, several high-ranking Russian officials have suggested that their country's nuclear threshold might actually be lower than the scenarios written in formal documents, thereby implying that Russia might use nuclear weapons even in situations when

its existence would not be at stake. For example, Russia could launch nuclear missiles against NATO ballistic missile defense sites, or even during the course of smaller-scale, regional wars in which weapons of mass destruction would not necessarily even be used by its adversaries (de Quetteville 2008).

To understand the background behind the emergence of these threats, it is important to realize that Russia's nuclear policy statements are embedded within a larger strategy of *cross-domain coercion* which incorporates the non-nuclear and the informational elements of deterrence and compellence with traditional nuclear deterrence (Adamsky 2015). (Nobel Prize-winning economist and former RAND Corporation staffer Thomas Schelling introduced the term «compellence» to describe a tool of coercive diplomacy. In his interpretation, while deterrence is a threat intended to keep an adversary from doing something, compellence is a threat to an adversary to do something.) Western literature often refers to this holistic strategy as «hybrid warfare,» while Russian strategists call it «new generation war.» Under this framework, the nuclear component of a nation's arsenal cannot be separated from the conventional, informational, cyber, and non-military tools of influence and coercion.

Russia is believed to have developed two nuclear deterrence strategies. On the one hand, its «traditional» global nuclear deterrence strategy is meant to deter nuclear aggression by threatening its adversaries with strategic nuclear retaliation. The main adversary in this regard is still the United States, and this strategy is primarily based upon deploying enough strategic nuclear weapons to maintain rough parity with US capabilities. On the other hand, since the early 1990s Russia has also established a strategy of regional nuclear deterrence (Adamsky 2014) where the emphasis is on *non-strategic* nuclear weapons, and the lines are sometimes blurred between nuclear and conventional capabilities. Western analysts believe that the Russian logic behind this strategy is that it would deter or de-escalate large-scale conventional aggression by NATO. Although the explicit mechanisms of this strategy are not clear, it is primarily used as a means of «nuclear manipulation» to achieve certain political goals. Theoretically, this would imply that Russia relies on asymmetric escalation, where nuclear weapons would be treated as actual war-fighting tools and the threat of nuclear first use is instrumental to deter conventional attacks.

The belief that Russia would be willing to escalate a conventional conflict into a nuclear one to de-escalate a crisis and force Western leaders to accept an outcome favorable to Russia has been very influential in US and NATO circles. There are, however, several scholars (many of them from Russia) who argue that the concept of escalate to de-escalate is in fact a Western invention, and that it is not integrated into Russian operational planning (Oliker 2016). There is indeed evidence that since the end of the Cold War, Russia has been relying more heavily on its nuclear capabilities (especially its non-strategic nuclear arsenals) and lowered its nuclear threshold. It is also true that for some time, Russian analysts were thinking about «the small-scale use of nuclear weapons to demonstrate credibility and resolve in conflict» (Oliker 2016). Some of these ideas were tested as far back as the 1999 Zapad Exercise, but then-President Boris Yeltsin came to the conclusion that these scenarios were

«implausible» and abandoned planning for this strategy. The most recent Russian exercises seem to support this notion because they primarily involve strategic systems in a strategic role – and the ongoing modernization efforts are still overwhelmingly focused on building the next generation of strategic nuclear arsenals.

Of course, Russia could still be capable of executing escalate to de-escalate strikes, but the debate in the West about the very existence of this concept is also evidence of the need for scholars to better understand the current directions of Russian strategic thinking. Most important, calls for possible responses by the West should not be based on statements of a few rogue Russian officials but should address the real challenges of nuclear deterrence and arms control. Otherwise, ill-conceived judgements could ultimately lead to unnecessarily developing capabilities that only feed into Russian paranoia.

Regarding the number of nuclear forces, in comparison to the peak of the Cold War, global nuclear weapons stockpiles have been reduced from 70,300 to an estimated 15,350 (Kristensen and Norris 2016a). But despite these dramatic cuts, the United States and Russia still possess approximately 93 percent of the global nuclear forces.

The total inventory of the United States is about 7,000 nuclear weapons, of which 4,480 warheads are in the active stockpile, according to a US Defense Department announcement (Defense Department 2015). This includes 1,560 deployed strategic warheads under New START and about 180 non-strategic nuclear weapons which are stored on the territory of five NATO member countries. The remaining 2,740 warheads are in reserve.

On the Russian side, the total stockpile includes 7,300 warheads, of which about 4,500 are operational. Of the operational warheads, roughly 1,800 are strategic warheads deployed at bomber bases and on missiles, with another 2,700 in reserve – and of the latter figure, estimates suggest that 700 weapons are strategic and 2,000 are nonstrategic. (A significant number of Russia's stockpile – about 2,800 warheads – are officially retired but still largely intact while waiting to be dismantled, thereby making for a total inventory of 7,300 Russian warheads [Kristensen and Norris 2016b]).

As many of the Cold War weapons systems are approaching the end of their service life, both countries are engaged in massive modernization efforts. According to the US Congressional Budget Office (Congressional Budget Office 2017), modernizing and maintaining the country's nuclear stockpile would cost the United States approximately \$400 billion over the next 10 years – with some outside organizations estimating that the total cost of the country's nuclear weapons modernization efforts over the next 30 years will be close to \$1.1 trillion (Middlebury Institute of International Studies 2014). (And some observers say that even this trillion-dollar cost estimate should be doubled or tripled [Bracken 2014].) The full scope of US nuclear modernization programs – many of which go beyond the 10-year timeframe – includes the development and early procurement of 12 new Columbia-class nuclear submarines, which will eventually replace the 14 existing Ohio-class submarines; the development and procurement of the new B-21 Long-Range Strike Bomber; a

new air-launched cruise missile; a next-generation Minuteman intercontinental ballistic missile (ICBM); the F-35 Joint Strike Fighter; multiple warhead modernization programs (including the development of the B61-12 gravity bombs which, in the mid-2020s, are replacing the US non-strategic nuclear weapons in Europe); and the modernization of command and control facilities, as well as investments in the nuclear infrastructure.

The Russian Federation has also been modernizing its nuclear forces for many years. In 2010, President Putin pledged to replace most Soviet-era armaments by 2020 under a 20-trillion ruble (approximately \$650 billion at that time) military modernization program (Sputnik News 2010). In the ICBM force, about half of Russia's missiles were already replaced by 2015, and the remaining missiles will be replaced by 2024. Russia is focusing on ICBMs with multiple warheads on them (also known as multiple independently targetable reentry vehicles, or MIRVs) to keep strategic nuclear parity with the United States – which means that the shrinking number of Russian missiles is counterbalanced by a higher number of warheads per missile. The Russian ICBM modernization efforts include the RS-24 Yars mobile ICBM, the RS-26 solid-fuel ICBM, and a new silo-based liquid-fuel heavy ICBM. Russia is also replacing its nuclear-powered submarine force with eight Borei-class submarines, which will carry 16 Bulava submarine-launched ballistic missiles (SLBMs) each. For the air leg of its triad, Russia is developing a new long-range nuclear cruise missile, and its current Tu-160 and Tu-95MS strategic bombers are undergoing modernizations as well. Russia is also upgrading its non-strategic nuclear forces, which includes modernizing its short-range ballistic missiles, air- and missile defense systems, a new fighter-bomber, a next class of nuclear attack submarines, and a new submarine-launched cruise missile. (Kristensen and Kile 2016).

Parallel to these ongoing modernization efforts, Washington and Moscow have increased the pace and visibility of military exercises with both conventional capabilities and nuclear-capable strategic forces. In response to the deterioration of US-Russia relations, US long-range bombers were deployed in the United Kingdom, a nuclear submarine port visit was conducted in Scotland (the first one in the last 25 years), NATO extended its exercises in Central and Eastern Europe, and an increasing number of states are involved in the SNOWCAT program (which provides an opportunity to contribute to the nuclear mission of NATO for states not involved in the nuclear sharing agreements). And, as part of its conventional reassurance mission, NATO decided to deploy fighter-bombers on a rotational basis to the Baltic States, Poland, and Sweden (Kristensen, H. 2015). For Russia's part, the past two years have seen hundreds of airspace violations of NATO territory. Snap exercises with aggressive scenarios – including conventional and nuclear-capable forces – increased in number, size, and complexity. And Moscow deployed nuclear-capable systems to Kaliningrad and Crimea in close proximity to NATO borders.

Reconciling nuclear deterrence and arms control

All these developments make it even more important to reconcile nuclear deterrence with arms control, which means preserving the existing mechanisms for dialogue and transparency while reconsidering US-Russian deterrence strategies.

Strategic relations between the United States and Russia have a long history of rough parity in strategic nuclear weapons, as well as stability based on the concepts of mutual nuclear deterrence (The latter provides that both parties are capable of a secure second, retaliatory, strike.) And these strategic relations have also included legally-binding bilateral nuclear arms control agreements that reduce incentives for nuclear build-up or use. With these precedents in mind, it is apparent that dialogue between the United States and Russia on strategic nuclear weapons continues to serve both countries' national interests, but in the current political environment the two sides face a number of challenges in maintaining stability and in returning to the arms control agenda.

Due to advances in military technology as well as significant political developments, the Cold War concept of strategic stability has broadened. Moscow and Washington, however, often perceive this new reality differently. This creates ample room for misperceptions, disagreement, and military tensions.

Strategic nuclear weapons

The New START agreement will remain in force through 2021, limiting each side to 1,550 nuclear warheads on 700 deployed ICBMs, SLBMs, and heavy bombers, with a total of 800 deployed and non-deployed ICBM launchers, SLBM launchers, and heavy bombers equipped for nuclear armaments. When Presidents Obama and Medvedev initiated discussions on the agreement, both sides concluded that it would be the first step to deeper reductions in nuclear weapons (President of Russia 2010). The two sides, however, have not yet agreed to pursue further cuts.

Speaking in Berlin in June 2013, President Barack Obama proposed to further reduce the number of deployed strategic nuclear weapons with Russia by about one-third. Moscow reacted skeptically, stating that both countries should first reduce their strategic offensive weapons as defined under New START and find acceptable solutions for a number of strategic issues – and only then begin negotiations on further cuts (Russia Beyond the Headlines 2013). In late 2014, with the Ukraine crisis in full swing, Russia changed its position. Speaking in Sochi at the Valdai discussion forum, President Vladimir Putin said: «We insist on continuing talks; we are not only in favor of talks, but insist on continuing talks to reduce nuclear arsenals... and we are ready for the most serious, concrete discussions on nuclear disarmament.» But no actions followed these announcements.

As for strategic parity between the two countries, analysts expect the United States to have an advantage in the number of deployed strategic delivery systems by February 5, 2018 when the New START limitations will be fully implemented. This, however, is not considered a critical threat to Moscow, because Russia's strategic nuclear forces will maintain parity with the United States by uploading more warheads to Russia's MIRVed missiles (missiles with multiple independently targetable reentry vehicles, which means that a single missile is capable of delivering more than one warhead). While the United States will enjoy a greater potential to upload more warheads on its own MIRVed missiles compared to Russia, it will not upset the strategic nuclear balance as neither side will be able to take advantage of such a potential as long as both countries remain within the New START limits. Some Russian experts believe that by 2021, Russia will either reach or come very close to the level of 700 deployed strategic delivery vehicles (Anichkina and Esin 2015) – which means that Moscow will achieve numerical parity with the United States not only in deployed strategic nuclear warheads but also in their delivery systems.

But to achieve further agreed-upon reductions below New START, Moscow argues that the nuclear capabilities of additional states must be addressed. Russia considers it impractical to continue bilateral reductions of strategic nuclear arms without taking into account these other third parties, which include NATO allies with nuclear capabilities and China – which is modernizing and increasing its nuclear arsenal (Kristensen and Norris 2016c). Russia therefore advocates for multilateral negotiations on nuclear arms reductions with the participation of all nuclear-weapons states (Sputnik International 2013).

Such a position, however, endangers the future of New START and of a possible follow-on treaty. Beyond 2021, the greatest risk is a legal vacuum created by the lack of binding and verifiable limits on strategic offensive arms of both sides. For decades, strategic arms control has allowed both parties not only to verify compliance with mutual obligations regarding the number, operation, deployment, and modernization of strategic forces, but also to enjoy reasonable certainty about the near future.

Non-strategic nuclear weapons

The United States has repeatedly tried to initiate negotiations on reducing not only strategic but also non-strategic nuclear weapons (NSNWs) – an area where Russia has a significant numerical advantage. But Russia continues to oppose these propositions out of fear of imbalances in regional deterrence and because of its genuine fears related to its geopolitical location. On the one hand, Russia's territory is within the reach of all nuclear weapons states, including North Korea, while the only countries that can threaten the United States with a nuclear strike are Russia and China. On the other hand, NSNWs are considered in Moscow as means of upholding and reinforcing regional deterrence. As Russia's neighbors – China to the east, and NATO to the west – enjoy an obvious advantage in conventional forces, Russia's NSNWs are also meant to deter a conventional conflict (large-scale or regional war) and,

as already mentioned, could be employed in case of an existential threat to the Russian state.

That is why, for Russia – unlike for the United States – NSNWs play a much greater role in ensuring national security, because these weapons provide the key elements for regional deterrence. Therefore, in dealing with this issue, Moscow thinks it is not possible to apply the same approach the two parties have been using to reduce their strategic nuclear weapons; that is, concepts of numerical parity. In addition, Russia has long insisted that the United States remove its NSNWs from Europe and commit to forego any deployment of tactical nuclear weapons outside of its national territory.

Ballistic missile defense

The United States currently deploys an integrated, layered architecture to its ballistic missile defense, which includes national components and regional systems such as the European Phased Adaptive Approach – a ballistic missile defense system against short- and intermediate-range missiles that is based on the Aegis technology and is being deployed in Europe between 2011 and 2018. The system's promoters say that it is designed to provide full coverage and protection for all NATO European populations, territory, and forces against the increasing threats posed by the proliferation of ballistic missiles. As it is deployed against short- and intermediate-range missiles from third parties, its proponents claim that does not upset the strategic balance between the United States and Russia – an argument which Russia does not find acceptable. In its current form, a ballistic missile defense structure such as this would not be able to degrade Russia's strategic nuclear deterrence (Dvorkin 2016A). But Moscow remains concerned about the future of the US missile defense program for two main reasons.

First, America's ballistic missile defense system is inherently open-ended, because Washington is not willing to formally accept any binding limits on this technology. Russia fears that regional systems like the European Phased Adaptive Approach could be upgraded, or that the United States could decide to deploy space-based ballistic missile defense assets. Besides, Washington is also reluctant to support the joint Chinese-Russian initiative on an international treaty to ban the deployment of weapons in space.

Second, Moscow believes that the ballistic missile defense potential of the United State cannot be considered in isolation from its strategic offensive forces, which include the nuclear triad and conventional prompt global strike capabilities (an effort to develop a system that can deliver precision-guided conventional weapons anywhere in the world within one hour). Even though the capabilities of the latter still occupy a relatively narrow niche, this technology might continue to grow in quality and quantity in the future. Together with the unrestricted buildup of US ballistic missile defense systems, conventional prompt global strike could lead to a dangerously destabilizing imbalance between the United States and Russia.

Conventional long-range high-precision weapons

One of the major military concerns of Moscow is the US potential in long-range high-precision conventional weapons, such as sea-launched or air-launched cruise missiles. From the Russian perspective, the United States' widespread deployment of Tomahawk sea-launched cruise missiles poses the biggest threat. (Russian experts and politicians often refer to a disarming strike by long-range cruise missiles as the greatest potential threat to the Russian strategic nuclear forces [Dvorkin 2016B].) Meanwhile, the United States is primarily concerned with the growing number of the Russian versions of this technology, known as SS-N-30A SLCMs, or «Kalibr.» (Office of Naval Intelligence 2015.) Even though in the short run, long-range conventional systems cannot seriously undermine strategic stability, their role will inevitably become more prominent if Washington and Moscow continue to reduce their strategic arsenals. Under such circumstances, these weapons systems might complicate any potential New START follow-on negotiations by blurring the lines between strategic nuclear and non-nuclear deterrence. At the same time, no arms limitations or confidence-building mechanism for these weapons is in place yet.

Future measures advancing nuclear arms control

Given all these unpleasant facts, perhaps now more than ever since Cold War's end, urgent action is needed to avoid a dangerous new nuclear arms race and to reduce the risk of inadvertent or accidental nuclear escalation between the United States and Russia. Both sides must immediately return to the successful approach of negotiated arms control initiatives and agreements that reduce nuclear risks by enhancing predictability, and transparency.

The United States and Russia have, for decades, maintained nuclear postures that posed an existential threat to one another. To many policymakers, these vestiges of the Cold War did not seem like a significant problem when relations between the two countries were good. That dynamic has now changed and there is once again the possibility that US and Russian nuclear modernization programs could fuel a new arms race. Russia is understandably concerned about US multi-decade, trillion-dollar modernization plans that, among other things, could increase the accuracy of its ICBM force. NATO is understandably concerned about Russia's potential to preemptively use nuclear weapons in the event of a conventional confrontation. All sides need to develop a greater understanding of how one's own nuclear posture affects the development of new nuclear systems or calculations of the likelihood of war. They also need to develop a better understanding of how long-term plans for nuclear modernizations in the United States and Russia impact total stockpile numbers.

One of the most fundamental concepts in the US-Russian nuclear relationship is the connection between offensive and defensive systems. Russian concerns need to be assuaged regarding US plans to further develop US missile defense and conventional prompt global strike capabilities. In 2002, the United States withdrew from the Anti-Ballistic Missile Treaty arguing that it was no longer needed, in part, because

the Cold War was over. It is now necessary to begin restoring the stability that the treaty once provided.

One important first step is for representatives from the United States and Russia to sit down and explain to one another how each country expects to defend itself from missile threats posed by countries like Iran and North Korea without giving the other a motive to build up its own offensive forces. Additionally, the two sides should discuss what assurances, transparency measures, or limitations could be provided with regards to conventional prompt global strike capabilities.

Future arms control agreements

Regardless of the likelihood of success (or the lack thereof), there is an urgent need for renewed negotiations on arms control measures, as well as on the underlying issues that may affect them.

The United States and Russia should resume negotiations on further nuclear reductions, focusing on reducing the number of deployed strategic warheads, limiting the total number of nuclear weapons (including non-strategic nuclear warheads), or some combination of both. Moscow and Washington also need to engage in negotiations on how to curtail provocative new nuclear or conventional modernization programs. Additionally, both countries should conduct their own reviews regarding the true necessity of current nuclear modernization programs. In the United States, there is a need to reevaluate plans to reconstitute and modernize the nuclear triad. Current plans are costly, unnecessary, and provocative. Similarly, Russia should consider redirecting funds for nuclear modernization programs to other high priority threats, such as guarding against nuclear terrorism.

As negotiations move forward, the two countries should continue to observe existing arms control agreements, including implementation and adherence to the New START provisions. In the meanwhile, because any future arms control progress may take time, the United States and Russia should reaffirm the importance of New START by agreeing to extend New START beyond its 2021 expiration date.

Multilateral arms control

If US-Russian nuclear arms reductions continue, it will be necessary at some point to include additional countries – particularly China, France, and the United Kingdom – in the negotiation process. Currently this may seem like a far-off goal. Until the time is ripe, all nuclear-weapons states should practice restraint, refrain from provocative policies, avoid arms build-ups, and work to strengthen multilateral arrangements and organizations, aimed at reducing nuclear threats.

One of the keys to successfully negotiating future arms control agreements will be addressing the existing distrust by engaging in areas of mutual interest, starting with possible confidence-building measures. In particular, there is a need to resume military-to-military, scientific, and diplomatic contact focused on jointly addressing the security threats that both countries face. In particular, the United States and

Russia should resume the scientific cooperation that was greatly reduced in 2014. During and after the Cold War, cooperation between US and Russian scientists, and in particular the national laboratories of both countries, played a critical role in strengthening ties and developing a common understanding between the two countries.

Both countries should also look at new mechanisms for enhancing the sharing of information by using tools like nuclear risk reduction centers (established by a 1987 agreement between the United States Secretary of State and the Soviet Foreign Minister to create an additional channel of communication to prevent misunderstandings that might lead to a nuclear war). There has been progress in strengthening these centers in recent years, but new initiatives should be considered. For example, in 2016, the United States employed nuclear risks reduction centers to send a message to Russia warning it about interfering in US elections (Nakashima 2016).

As Moscow and Washington pursue the longer-term goal of reducing nuclear stockpiles, they should also consider measures that reduce concerns about nuclear use in a crisis. Maintaining nuclear weapons on high alert is particularly dangerous in the current environment, where there is a heightened risk of miscalculation or accident. Both countries should consider reciprocal pledges that neither side will be the first to use nuclear weapons against the other. These declarations should be linked with negotiations on removing US and Russian nuclear weapons from high alert status.

One possible step would be for the United States and Russia to agree to reduce the readiness of their nuclear weapons in phases (Kristensen and McKinzie 2012). Both countries could agree to gradually take a percentage of their forces, or specific systems, off high-alert launch-ready status (i.e., de-alert) over a period of time, without risking vulnerability. This could be augmented by regular negotiations on the length of the de-alerting period, which systems to de-alert (for example, both countries could start by reducing the readiness of one system), and what mechanisms for verification would be most effective. Such approaches could also enable a dialogue between the United States and Russia on issues related to alert status.

Finally, the United States and Russia should consider more transparency regarding their modernization plans. The United States' Stockpile Stewardship Plan – published annually – includes, among other things, 10-year plans for the modernization of its nuclear warheads. Such information should be exchanged between the two countries, reducing incentives to maintain hedge arsenals and easing concerns about treaty compliance. These exchanges could include nuclear warhead production plans and dismantlement numbers. Moreover, both countries should consider exchanging data on the total number of nuclear weapons.

What have we learned?

As a matter of necessity, Moscow and Washington should again start identifying fields of mutual interest, and cooperate where appropriate. This could include measures to prevent the proliferation of nuclear weapons materials and technology to

third states; measures to address the threat of global terrorism – especially nuclear terrorism – and joint scientific and technological research. While the current US-Russian political dynamic makes cooperation difficult, leaders in both countries should remember their long history of cooperation in these areas.

Pursuing initiatives that are in both countries' interests could help enable a better understanding, and rebuild trust. The possibility of cooperation – particularly cooperation that has mutual economic benefit – should be a strong inducement. To be realistic, the future of US-Russian relations is very much a matter of speculation right now, particularly given the newly-elected American president. Yet, there are glimmers of hope. The recent transition of political power in the United States could lead to stronger relations with Russia, ultimately encouraging both countries to return to the path of mutually reducing nuclear risks.

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Amid high tensions, an urgent need for nuclear restraint

In recent years, tensions have re-emerged between the United States and Russia. More specifically, the old Cold War antagonists have experienced a highly worrisome number of close military encounters, while the rhetoric on both sides has become increasingly assertive. In 2015 the Russian ambassador to Denmark warned that «Danish warships [would] become targets for Russian nuclear missiles» (Withnall 2015) if Denmark were to come under the umbrella of a US-led missile defense shield. Last year Donald Trump perplexed observers by making ambiguous statements about the possible use of nuclear weapons. Meanwhile, North Korea has conducted several nuclear tests. Pakistan has flight-tested a ballistic missile, with a range of just 60 kilometers, that some are calling a battlefield nuclear weapon. China is expanding its arsenal of nuclear-equipped missiles – and all nuclear-armed nations are modernizing their arsenals. These are just some of the trends that have made the nuclear landscape more dangerous over the last few years.

And for the good news? It's basically limited to the successful negotiation of the 2015 Joint Comprehensive Plan of Action, an agreement that restricts Iran's nuclear activities for up to 15 years.

Since the end of the Cold War, the United States and Russia have greatly reduced their nuclear arsenals. The long-standing adversaries concluded and implemented a series of arms control and disarmament agreements, including START I, SORT, and New START. These developments were rooted in a common understanding of strategic stability. That is, the two sides worked scrupulously to decrease incentives for one side to conduct a nuclear strike before its opponent could do so (Acton 2013); this idea became a cornerstone of bilateral relations. But today, further nuclear disarmament does not appear to be a priority for Russian and American decision makers. To the contrary, the world seems headed in the wrong direction, toward greater nuclear instability. Changing course now will not be easy. Still, leaders can reestablish momentum toward disarmament and demonstrate their commitment to nuclear restraint through prudent, rational measures such as working toward a universal no-first-use norm, conducting dialogue on de-alerting nuclear weapons, and developing effective verification procedures for decommissioning and destroying nuclear warheads.

None of that will be possible, however, unless the two nations with the world's largest nuclear arsenals once again engage in serious confidence-building, arms control, and disarmament efforts at the bilateral level.

Bilateral blues

Moscow is thought to have about 7,000 nuclear warheads and the United States about 6,800. The nation with the third-biggest nuclear stockpile, France, has «only» 300 or so (Kristensen and Norris 2017). If Russia and the United States fought an all-out nuclear war, it would upend human civilization. So it makes sense to begin any assessment of prospects for nuclear arms control and reduction measures at the bilateral level. But Washington and Moscow's bilateral process of gradual nuclear disarmament has been in serious disarray since 2014. With the two sides at loggerheads over Crimea, Ukraine more broadly, and Syria, the bilateral atmosphere has deteriorated badly.

Indeed, the danger of military escalation between Washington and Moscow has increased significantly. US and Russian armed forces are operating in close proximity around Russia's Western border, especially in the Baltic region. The same is true in Syria – where, after the recent US airstrike against Syrian forces, Russia suspended an agreement (Filipov and Gearan 2017) that the two sides had reached regarding limited communications measures to reduce the risk of unintentional conflict. In Europe, risk reduction measures are still insufficient – even as the number of close military encounters has been disturbingly high (Task Force on Cooperation in Greater Europe 2015).

Moreover, Washington and Moscow have expressed clearly divergent nuclear priorities over the last several years. Under the Obama administration, the United States proposed that each side cut its strategic arsenal by one-third – and bring tactical weapons into the bargain too. Moscow rebuffed this offer, calling instead for limits on US missile defense. It remains to be seen how the Trump administration will position itself, but it is safe to say that further bilateral nuclear reductions seem unlikely in the foreseeable future.

Neither side can have an interest in allowing a conventional conflict to escalate to the nuclear level, but such escalation is nonetheless possible. In the last several years, both Moscow and Washington have engaged in some quite alarming rhetoric – as demonstrated by the Russian ambassador's language, quoted above, regarding Denmark. In the United States, when then-presidential candidate Donald Trump was asked whether he would consider using nuclear weapons in parts of Europe, he gave an extremely vague answer – saying that «Europe is a big place» and alluding to the possibility of «very deep, very difficult, very horrible negotiation[s]» (Legum 2016). Such statements imply that a nuclear exchange between the United States and Russia is a possibility.

The two sides' nuclear strategy and posture increase the risk of war. Russia, concerned about its inferiority in conventional arms, began in 2000 to maintain a national security strategy that explicitly contemplated using nuclear weapons if Russia were on the losing side in a conventional military confrontation (Russian Federation 2000). The wording was watered down somewhat in documents released in 2010 and 2014, but the nuclear option was still on the table for Moscow in case of «a military conflict involving the utilization of conventional means of attack» that might imperil «the very existence of the state» (Colby 2016). This element of Russian nuclear doctrine is dangerously ambiguous – though, encouragingly, the declassified version of the 2015 national security strategy does not allude to such scenarios.

Meanwhile, both sides keep their strategic nuclear systems on hair-trigger alert, which leaves leaders very little time to make «rational» decisions about using nuclear weapons during a crisis. This problem is compounded by the questionable reliability of early warning systems. Early warning depends on the reliable performance of satellites, radar systems, communications systems, and computers – but nuclear history is full of false alarms and misinterpretations (Lewis et al. 2014). Between 1977 and 1984 there were more than 1,100 «moderately serious» false alarms in the United States alone (Cirincione 2013).

All in all, the current climate is not conducive to further bilateral nuclear reductions. More worryingly, increased tensions between Moscow and Washington risk unintended escalation and may weaken the nuclear taboo. This suggests an increased need for multilateral nuclear disarmament efforts. Unfortunately, the situation at the multilateral level is more complicated than ever.

Multilateral muddle

Since 2010, an expanding group of non-nuclear weapon states has collectively demanded that the five nations recognized as nuclear weapon states under the Nuclear Non-Proliferation Treaty (NPT) demonstrate faster progress toward meeting their disarmament commitments. Meanwhile, nuclear weapon states and their close allies continue to rely heavily on nuclear deterrence in their national security strategies. The disarmament and nonproliferation regime seems to be splitting into two polarized camps, characterized by starkly differing views on the value, role, and risks of nuclear weapons. The most recent NPT review conference, in 2015, concluded without achieving consensus on a substantive final document – thereby failing a traditional test of the regime's health. One key issue that polarized nations at the review conference was pathways toward nuclear disarmament. This state of affairs suggests an urgent need for multilateral dialogue on disarmament.

The NPT remains the only nuclear disarmament instrument to which nuclear weapon states have committed. It is therefore imperative that the multilateral regime for nonproliferation and disarmament display positive atmospherics and represent a cooperative milieu. With the treaty's disarmament pillar facing a credibility crisis, trust and cooperation may begin to wane regarding the treaty's two other pillars – nonproliferation and the peaceful uses of nuclear technology.

The final document approved at the 2010 NPT Review Conference contained language expressing «deep concern at the catastrophic humanitarian consequences of any use of nuclear weapons.» This was the genesis of the humanitarian initiative – a progressively larger movement of nations and civil society organization that, through a series of pledges, conferences, and diplomatic actions, has insisted on accelerating disarmament progress. Highlighting the «unacceptable humanitarian consequences» associated with the «immense, uncontrollable destructive capability and indiscriminate nature of [nuclear] weapons,» states involved in the initiative have pressed their case not only through the NPT review process but also at the UN General Assembly, the Conference on Disarmament, and elsewhere. Last year, due in part to the humanitarian initiative, the United Nations voted to sanction negotiations toward a treaty banning nuclear weapons – negotiations that have now gotten under way.

In contrast, NATO members holding a summit in Warsaw last July issued a communiqué stressing the importance of nuclear deterrence to the alliance's security (NATO 2016). Also last July, the UK House of Commons voted overwhelmingly to renew Britain's Trident nuclear submarine program, with many members of parliament affirming a continued need for nuclear weapons as an ultimate insurance policy. The United Kingdom renewed its nuclear program even though it is widely viewed as the most progressive nation on nuclear issues among the five recognized nuclear weapon states.

To summarize: Supporters of the humanitarian initiative see no legitimate role for nuclear weapons in security and defense policy – while NATO nations, as spelled out in the Warsaw communiqué, assert that «the circumstances in which NATO might have to use nuclear weapons are extremely remote» (Warsaw Summit Communiqué 2016). The divide between «never» and «extremely remote» is deep and fundamental. Nonetheless, it is in the international community's interest for the nuclear nonproliferation regime to remain robust and effective. It is crucial that non-nuclear weapon states remain receptive to nuclear weapon states' initiatives in nonproliferation, counterproliferation, nuclear security, and export controls.

North Korea's defiance of nonproliferation norms poses a challenge both to the nonproliferation regime and to international security. Some analysts warn of additional proliferation in Northeast Asia if Pyongyang's nuclear and missile activities can't be effectively addressed. Cases of proliferation might also result if the United States were to withdraw its nuclear assurances – some US allies reacted with concern when the Obama administration reportedly considered adopting a nuclear no-first-use policy. With both Asia and Europe now experiencing acute geopolitical tensions, it is crucial to improve disarmament dialogue in both multilateral and regional frameworks.

What might help

It is crucial for nuclear powers to exercise restraint and seek to build nuclear confidence. Russia and the United States could take a helpful first step by negotiating

a confidence-building agreement aimed at reducing the risk of a clash between the two sides' militaries in Eastern Europe. Such an agreement might resemble the ambitious 2014 agreement to prevent military confrontations signed by the United States and China. (That agreement was informed by well-established international rules such as the Convention on International Civil Aviation and the Code for Unplanned Encounters at Sea.) Under a 2015 annex to the 2014 agreement, aircraft pilots are required to reveal their identities and maneuvering intentions, to communicate in English, and to refrain from provocative actions (Glaser 2015). Despite the recent tensions between Russia and the United States, Washington and Moscow should strive to negotiate a similar deal. In Syrian air space, meanwhile, de-confliction efforts should be reinstated and expanded.

The United States and Russia should each unambiguously commit not to launch a nuclear first strike against the other. Such a step would strengthen the nuclear non-use norm – and also undercut the rationale for keeping large parts of the US and Russian nuclear arsenals, especially intercontinental ballistic missiles, on alert at all times. A no-first-use agreement would therefore make a de-alerting agreement more possible. A bilateral no-first-use policy might even create momentum toward a universal no-first-use pledge, into which it could eventually be incorporated.

In the long run, the United States and Russia might aim for a grand bargain on arsenal reductions. Such a bargain, taking into account the entire spectrum of both sides' interests, would address tactical nuclear weapons, deployed strategic warheads, and missile defense. Ultimately, the two sides should seek to overcome the underlying tensions that plague their relationship (even if such rapprochement seems a bridge too far for the foreseeable future).

Russia has argued that the next round of arms control arrangements – in which US and Russian arsenals would fall below the levels specified in New START – should be multilateral (Pifer 2016). That is, other nuclear weapon states would reduce their arsenals as well. Some scholars of strategic stability and nuclear deterrence have likewise argued that arms control and reduction frameworks must include other nuclear-armed nations once US and Russian arsenals drop below certain levels (Acton 2011). But strategic stability and calculations about parity and symmetry will become more complex when the US and Russian arsenals shrink to sizes that could potentially be matched by other nuclear weapon states. China, for example, could someday attempt a «sprint to parity.» Achieving further nuclear cuts would therefore require great political will in all the states involved.

For now, constructive multilateral engagement on nuclear disarmament could be initiated through an existing forum for dialogue among the recognized nuclear weapon states, known as the P5 process. This forum, launched in 2005, has aimed to «enhance multilateral transparency, dialogue, confidence-building, and mutual understanding to pave the way for future progress toward the verifiable elimination of nuclear weapons» (Rose 2016). Though the P5 process has achieved only limited results so far, it could nonetheless be a useful forum for initial dialogue on the future multilateralization of arms control.

The five nuclear weapon states could themselves use the P5 process for another important function – to explore whether strategic stability might be maintained through means other than nuclear weapons. Such means might include frameworks of cooperative alliances – or future weapons systems. Today's emerging technologies may alter the military calculations of the future; they may both challenge and provide alternatives to the traditional concept of strategic stability based on nuclear deterrence. Discussing this reality in the P5 process could lead to reduced reliance on nuclear weapons – which might ameliorate tensions in the nonproliferation regime.

Even in these times of high political tension, sound reasons abound to continue working toward nuclear disarmament. Indeed, today's political tensions only emphasize the dangers inherent in a global security system that depends on nuclear weapons. Arguably, progress toward nuclear disarmament is now more urgent than ever.

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The Crisis of Nuclear Disarmament and Arms Control: Diagnosis and Future Concepts Proceedings of the N.EX.T. Generation

What we witness today are the beginnings of a new arms race in Asia and, between the West and Russia, a return to patterns only too familiar from the times of Cold War. All these developments increase the danger of potentially deadly conflicts and cast a looming shadow over the 21st century. At the same time, we observe that many of the measures, which were used to foster confidence and defuse tensions through co-operation are rarely viable anymore.

It was against this background that the Heinrich Böll Foundation asked Ulrich Kühn and a group of transnational experts and nuclear analysts to explore new avenues of arms control and nuclear risk reduction. This publication shows how they go beyond the well-trodden paths of nuclear security debate and develop new ideas that open up novel approaches to the issue.

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