

# Redesigning Nuclear Arms Control for New Realities

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# Redesigning Nuclear Arms Control for New Realities

Amid rising tensions and increasing geopolitical rivalry, nuclear arms control is more needed than ever. Building an arms control architecture that is fit for today's security challenges requires a coherent, innovative, and long-term political strategy. A coordinated transatlantic approach for such a strategy is necessary to help redesign nuclear arms control for new realities.

A joint report by Anna Péczeli, Brad Roberts, Jonas Schneider, Adam Thomson, Oliver Thränert, and Heather Williams

Edited by Névine Schepers

Nuclear arms control<sup>1</sup> has lost its place in the current security landscape. A revival of arms control, which is urgently needed, will not be possible by going backward to old approaches. Instead, arms control needs to adapt to new circumstances. Western experts have devoted a great deal of attention to possible further steps on the reductions pathway, such as a follow-on agreement to the New START Treaty or a new agreement on non-strategic nuclear weapons and their delivery systems. In the meantime, far too little attention has been given to the new deterrence landscape or to the political strategy that must be put in place to arrive at a point where new arms control approaches fit that landscape.

## Assessment of the Current Nuclear Arms Control Landscape

Today's international security context is increasingly tense and complex, characterized by growing competition – notably among the US, Russia, and China, in-

cluding at the strategic nuclear level – and driven by technological advances. The latter notably include developments in the cyber and outer space domains, in the fields of automation and information, and in developments of cer-

### Key Points

- The pursuit of viable long-term arms control strategies adapted to the current strategic environment should fully engage both the United States and its allies, both European and Asian.
- It is necessary to enhance the human capital, engagement mechanisms and institutions required for developing arms control frameworks.
- Innovative arms control calls for more political will and leadership from both sides of the Atlantic, but today it is most needed in Europe, where intellectual burden sharing is as important as military burden sharing.

tain conventional capabilities such as advanced missile defenses, long-range strike weapons, and anti-submarine warfare. These affect nuclear decision-making in various ways, some positive and others not, such as increasing the entanglement of nuclear and non-nuclear capabilities, shortening decision-making timeframes, and adding ambiguity that could lead to uncontrolled escalation arising from misperception. These emerging and disruptive technologies add new layers of players and risk and lead to enhanced hedging strategies.

The nuclear arms control architecture established during the Cold War, which provided some degree of predictability and served to manage the competition between Washington and Moscow, has receded into history, having been found wanting in a changed security environment. The resulting lack of transparency, ambiguity, and misperceptions further contribute to a global atmosphere that is increasingly polarized and more confrontational than collaborative. Given the complexity of nuclear power relationships, a world without arms control could become an extremely dangerous place. New arms control frameworks are more needed than ever to account for conventional technologies that affect the stability of nuclear deterrence and to account for a larger number of actors, in particular China. Beijing's ever more prominent role in international relations as well as its nuclear build-up makes arms control that excludes it look outdated. This means that nuclear arms control can no longer be only bilateral, nor only nuclear.

Following years of little to no strategic dialogue between great powers and downgraded consultations with allies during the Trump administration, there are some positive signals. The extension of New START until 2026, which limits US and Russian strategic nuclear forces and thereby provides for some predictability and transparency, and the restoration of US-Russia strategic stability talks provide the space to address nuclear issues at a bilateral level. US President Joe Biden has expressed his desire to resume a leadership role on nuclear diplomacy and to engage constructively with both Moscow and Beijing, as well as with allies. The problems are difficult, however, and translating these ambitions into constructive results will be challenging. How should the transatlantic allies proceed?

In this new context, the engagement necessary for arms control is missing. Politically, the nuclear powers are constantly below the thresholds of either the alarm or the hope that might spur arms control action, while mistrust and misperceptions are widespread. More specifically, China mistrusts arms control, judging it to be a trick to draw it into a Cold War-style confrontation and to limit its further



U.S. President Joe Biden and Russia's President Vladimir Putin shake hands as they arrive for the U.S.-Russia summit in Geneva in June 2021. *Saul Loeb / Pool*

rise. The mistrust between Washington and Moscow and between Washington and Beijing is also deep-seated. Further challenges such as the lack of willingness from either side to compromise on the inclusion of certain systems and capabilities or the political difficulty of ratifying an arms control treaty in the US Senate all add to the complexity of finding arms control solutions.

Moreover, Russia's insistence on the inclusion of European nuclear-weapon states in arms control negotiations is another obstacle, as both Paris and London consider their arsenals to be too small to be included in current reduction or limitation frameworks. Having a smaller arsenal is an argument similarly put forward by Beijing but seems less convincing given its extensive modernization program and stockpile increases. Finally, NATO is also at a crossroads. NATO has played an important role in the conventional arms control domain and taken part in some elements of nuclear arms control, such as its 1979 double-track decision. While European NATO allies have always promoted arms control and instigated some proposals, they have not been able to unite behind a comprehensive strategy for arms control. This sits uneasily with a growing number of European allies.

All of this suggests that legally binding arms control measures that provide restraint, transparency, and predictability will be difficult to agree and implement effectively. But difficult does not mean impossible. Success clearly requires new approaches and new concepts. Treaties that focus on quantitative reductions in a single weapon category would be difficult to achieve and would even be less sufficient to deliver stability than during the Cold War. Little would be accomplished by aiming at parity in terms of nuclear warheads and delivery systems as the sole or primary metric of strategic stability. It might be more feasible

and necessary to focus more on behaviors than capabilities, determine actual sources of instability, and discuss pathways to prevent unintended escalation scenarios. Hence, arms control needs to adapt substantively to today's geopolitical and technological realities, characterized by changed strategic military relationships where the nuclear element is but one piece of the larger puzzle.

The pursuit of new forms of strategic restraint do not run counter to the founding principles of arms control. In the words of Thomas Schelling and Morton Halperin in 1961, these comprised "all forms of military cooperation between potential enemies," also including "less formal, less institutionalized, less 'negotiated' understandings and agreements" such as political declarations or confidence-building measures. For any of these to work, however, political will and leadership are needed in order to implement what key actors find to be both important and feasible at a given time. Transparency and predictability may be at the core of what arms control aims to accomplish, but political drive, diplomacy and dialogue with the adversary are essential means for achieving it.

In this new environment, arms control strategy must also adapt to the changed and changing political strategies of the main actors. During the Cold War, arms control was possible in part because it played a prominent role in the West's overarching political strategy of containment and deterrence stability. Its role in contemporary strategy is less clear, in part because it is still taking shape, as the requirements of long-term strategic competition begin to come into focus. Today, policymakers in the West are in pursuit of both viable long-term strategies for an era of strategic competition and a logic for arms control that supports them.

This is a project that should fully engage the United States and its allies, both European and Asian. From the transatlantic perspective, it seems that Europe is, so far, largely on the sidelines. A number of European states, both nuclear and non-nuclear, have shown an interest and provided a number of proposals. These notably include German efforts to discuss arms control and missile proliferation, the warhead verification work of Norway and the UK, as well as Sweden's leadership in convening the Stockholm Initiative and broader efforts led by Switzerland on nuclear risk reduction. Such initiatives are welcome, especially given practical constraints and domestic political imperatives, including the impact of the Treaty on the Prohibition of Nuclear Weapons (TPNW) in Europe. However, they do not translate into a coherent European arms control effort. Trump's presidency amplified long held European concerns about the reliability of US extended nuclear deterrence, revived debates about strategic autonomy, and promoted voices pushing for more European-focused arms control approaches. Yet, even with President Joe Biden as a new partner in the White House, European input appears

to be modest, so far. Transatlantic equity and European credibility demand more of Europe if the US and its European allies are to share a political strategy for arms control that is coherent, innovative, and framed with a long-term perspective in mind.

This report therefore sets out a transatlantic approach on how to build a political strategy for arms control. It is not about specific arms control solutions; rather, it is about the political strategy that is needed to get to those solutions. This report is the result of discussions held by a transatlantic working group convened by the Center

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for Security Studies (CSS) at ETH Zürich between October 2020 and August 2021. The report first looks at building blocks that should inform a new track for arms control. These are neither exclusive nor absolute, but are meant to illustrate ways to take arms control forward. This report then outlines how the US and Europe should work on these building blocks, both separately and jointly, through a set of guidelines.

These building blocks and guidelines for a political strategy may be relevant to a transatlantic approach to arms control in general. This report, however, concentrates on nuclear arms control because this focus for the moment still seems the most consequential path to significant risk reduction.

### **Building Blocks for a Transatlantic Political Strategy for Nuclear Arms Control**

Policymakers and arms control experts understandably seek new nuclear arms control measures on an urgent basis, given increasing risks. That urgency feeds a certain "rush to judgment," evident today as the search continues for new agreements and initiatives. A more disciplined approach is needed, one that aligns various efforts in a coherent way to maximize the prospects for success. Key elements of this approach should focus on enhancing the supporting infrastructure for arms control, notably in terms of human capital, engagement mechanisms, and institutions, which contributes to shoring up the needed political will for putting into practice any arms control initiatives. A political strategy for arms control should be based on the following building blocks:

#### **1. Think of the adaptation of nuclear arms control as a long-term project**

Given the difficult geopolitical and security environment, the need to embrace nuclear arms control as a long-term project should be clear. Notwithstanding the possibility for

smaller and incremental initiatives, political conditions are not ripe for a broad agreement between Washington and Moscow that goes beyond current limitations implemented through New START, let alone for an agreement including Beijing. Things might well get worse before they get better.

As New START's 2026 deadline approaches, there is a potential chance for an agreement. However, beyond that and given such a narrow negotiation window, other opportunities may only arise if and when parties conclude that the costs and risks of competition outweigh the potential benefits. This has implications for the US, where restored bipartisanship is necessary in order for a long-term arms control strategy to work, and for Europe, where broader political commitments and patience are also needed to shore up arms control support.

## 2. Renew and diversify leadership

Arms control leadership is essential, in all its political, intellectual, and institutional forms. The US has played the leading role historically, and no other country can play the role it still can play in driving thinking and action. Yet, its leadership role is also different from the past — more contested by Russia and China, less forceful as American political division deepens, less dominant as allied stakeholders seek a leadership role of their own, and less purely governmental as stakeholders in the private sector and civil society emerge. While delivering on its promise of renewed leadership on international nuclear diplomacy, the Biden administration should also welcome and facilitate leadership by other stakeholders. This will be a test of the will and capacity of these other stakeholders to make good on their stated ambitions. Europeans, for instance, could push for norms governance in the cyber and outer space realms.

## 3. Rebuild institutions and human capital

On both sides of the Atlantic, there is a need for new intellectual capital in arms control matters. Many of the organizations set up in the 20th century to develop strategic thought went on to other tasks after the Cold War. While

## More institutional capacity is needed on both sides of the Atlantic to better understand the new security landscape.

some are being renewed, more institutional capacity is needed on both sides of the Atlantic to better understand the new security landscape and a possible future arms control logic. It is also the case that existing structures, thinking, and training often remain attached to their Cold War-era roots.

It is crucial to train a new generation of subject matter experts in arms control who are familiar with its history but also understand the security implications of

emerging and disruptive technologies and can look at problems from a strategic perspective. Furthermore, the integration of non-nuclear and increasingly dual-use technologies into arms control thinking requires further engagement with a new range of stakeholders, notably in the private sector. In the field of education, this implies creating more links between different fields and continued efforts to “de-silo” arms control thinking.

## 4. Enhance and expand strategic dialogues

The resumption of strategic stability talks between the US and Russia is a positive first step. It will take time, however, for this dialogue to mature, and it is but one of many channels of communication that need to be (re-)established and developed. Crisis communication tools, which feature heavily in nuclear risk reduction proposals, are more important than ever. There are also a number of existing multilateral forums, such as the Non-Proliferation Treaty framework, the P5 process, and the Conference on Disarmament, where nuclear-weapon states can reinvigorate and pursue dialogue on strategic issues. Track 1.5 initiatives, while not a replacement for official dialogue, also offer opportunities to generate useful insights and test out new ideas. China's prolonged and continued unwillingness to engage in strategic dialogue is a significant additional barrier to progress on understanding the new landscape and finding new approaches that enhance strategic stability.

European states in particular should urge more ambitious use of existing structures to develop a coherent narrative on arms control. These include the UK-France Lancaster House Treaty; the US-France-UK P3 consultations; the Germany-France-UK E3 mechanism; possible US-UK-France-Germany exchanges at NATO and elsewhere; and a stronger, more coordinated European voice in NATO's High Level Group. In all this, there is a clear role for greater joint British and French leadership.

## 5. Understand that arms control requires compromise

To build a logic for arms control in the new strategic landscape requires an understanding of Western interests and the perspectives of US allies, but also of the interests and perspectives of those with whom a deal might be struck. The Western community is better at the former and has so far generated little scholarship on the kinds of realistic compromises that might have to be struck. This

expands on previous points related to expertise and leadership development as well as engagement, without which it would be difficult to find such compromises.

## 6. Re-calibrate the public discourse

Leaders in the US and Europe should speak clearly and regularly to the interested public about the new strategic landscape and the place of arms control, disarmament, and deterrence in Western strategy. They should try to lead, not

simply follow, public opinion. In both Europe and the United States, the Trump years have strengthened more extreme views on these matters. Disarmament voices are growing, reflecting the success of TPNW advocates in mobilizing significant parts of public opinion. On the other end of the spectrum, deterrence voices are also growing, reflecting the rising anxiety about Russia's role in raising nuclear risks in Europe. Both ends of the policy spectrum should have a strategic interest in building bridges to the other.

Growing disparities in Europe on nuclear issues between disarmament and deterrence communities pose a number of risks, which European governments would do well to address sooner rather than later. There is a need to re-calibrate the public discourse and openly discuss how arms control and deterrence can mutually strengthen each other and what values they bring to the table. The development of the new NATO Strategic Concept provides an opportunity to engage European leaders and communities on such issues and set expectations.

#### 7. Focus on the reduction of nuclear dangers, not just nuclear arsenals

Emerging and disruptive technologies and some of their applications may significantly aggravate the problem of inadvertent escalation and also present distinct challenges for arms control. Experience suggests that states are reluctant to limit a novel capability before understanding its full potential, let alone share information or increase transparency. Disruptive technologies have created, or strengthened, qualitative and quantitative asymmetries in military postures that can undermine strategic stability. As long as there are significant military advantages to be gained by mastering an emerging technology first, most states are likely to choose competition over cooperation and are unlikely to agree to “blanket” limits on the application of certain technologies. Several other factors make it more difficult to devise effective arms control measures: first, the fact that many emerging and disruptive technologies are dual-use or dual-capable; second, the increasing linkages between different domains and technical complexity; and third, the difficulty of verification in areas where numerical limits or on-site inspections are simply not applicable.

Nuclear-weapon states all have an interest in avoiding inadvertent nuclear escalation. This means that the focus of arms control should be on measures intended to reduce nuclear dangers and on applications, rather than technologies themselves, that cause the greatest strategic instabilities and could be the

source of such escalation. Informal agreements, which could be political in nature or focus on rules of the road in certain areas, could be useful in this fast-paced environment as they are often swifter and less onerous than complex treaties. These could include general behavioral guidance in the new domains, a “Cyber No First Use” statement<sup>2</sup> or an agreement by the P5 to keep a “human in the loop” in nuclear decision-making.<sup>3</sup> A more ambitious informal agreement would be a 21st century version of the Incidents at Sea Agreement that would not be exclusive to a single technology, but rather provide guidance on abiding by certain rules of conduct and information sharing post-incident.

#### 8. While pursuing transparency, predictability, and adversary restraint, do not erode deterrence

A willingness to compromise and find arms control solutions should not come at the expense of deterrence. There might not be arms control solutions to certain security challenges. Therefore, a political strategy for arms control must combine the pursuit of transparency, predictability, and adversary restraint with a commitment to preservation of the means necessary for deterrence of threats that cannot be eliminated through cooperative measures.

Indeed, in the absence of alternatives to stable deterrence, it must be an objective of arms control to strengthen it. A strong defense is still needed if the West is to achieve its arms control goals. Possessing adequate military

#### Further Reading

Amelia Morgan and Anna Péczeli (eds.), **“Europe’s Evolving Deterrence Discourse,”** *Center for Global Security Research, Lawrence Livermore National Laboratory*, February 2021.

Offers a detailed overview of contemporary European debates on nuclear deterrence and strategic issues.

Névine Schepers and Oliver Thränert, **“Arms Control without Treaties,”** *CSS Policy Perspectives*, March 2021.

Provides an outlook of informal arms control measures for reducing nuclear risks.

Brad Roberts (ed.), **“Major Power Rivalry and Nuclear Risk Reduction Perspectives from Russia, China and the United States,”** *Center for Global Security Research, Lawrence Livermore National Laboratory*, May 2020. Outlines US, Russian, and Chinese views on nuclear risk reduction.

Heather Williams, **“Asymmetric Arms Control and Strategic Stability: Scenarios for Limiting Hypersonic Glide Vehicles,”** *Journal of Strategic Studies*, August 2019.

Provides a new framework for dealing with emerging technologies in arms control, using the example of hypersonic glide vehicles.

strength and political solidarity has been a guiding NATO principle since the 1967 Harmel report and Europeans, above all, should return to it. Redefining what the Harmel

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report means today, how political détente and deterrence can coexist, should also be discussed as part of NATO's Strategic Concept.

### 9. Prepare for arms control success but do not assume it

While efforts to pursue arms control initiatives should be sustained, planning for alternatives in case arms control initiatives fail to take hold is also necessary. In the absence of concrete arms control measures, stable deterrence is so far the only way to guarantee the security of Europe, hence the importance of engagement on deterrence issues in public discourse.

### A Transatlantic Approach to Implementing a Political Strategy for Nuclear Arms Control

With sustained focus on the implementation of this political strategy for arms control, we are cautiously optimistic that major-power rivals will come to see certain forms of strategic restraint as mutually beneficial and that both formal and informal mechanisms will come to pass. The odds of success seem likely to increase if the United States and its allies work in close partnership toward this goal. In addition, the US and Europe have shared security interests – a clear and present nuclear danger from Russia as well as a challenge to the regional and global order. They also have shared values and ingrained habits of cooperation. The Biden administration offers a fresh start for developing a transatlantic approach to arms control.

#### Guidelines for Europe

Innovative arms control calls for more political will and leadership from both sides of the Atlantic, but today it is most needed in Europe. Many European states wish to play a greater role in setting and advancing the arms control agenda, which starts by becoming a stronger partner in the transatlantic security relationship. Intellectual burden sharing is as important as military burden sharing. Most major European powers have the governmental and non-governmental capacity to be more active in the former and seek to strengthen the latter. Non-nuclear European powers must realize that nuclear deterrence will remain at the core of transatlantic security strategy, and invest in their capacity to engage other powers pragmatically on the requirements of deterrence.

Europeans should acknowledge that the current trajectory is toward deepening great-power confrontation

and not common security. This should be reflected in European diplomacy in nuclear risk reduction, an area that already garners European support. The upcoming NATO Strategic Concept and the EU Strategic Compass need to set a new direction on Russia, China, and European strategic autonomy in 2022. Europeans must also be smart about the processes and structures for greater ownership of future nuclear arms control. Existing processes like

the Creating an Environment for Nuclear Disarmament (CEND) and the Stockholm Initiative provide channels for new thinking. Initiatives should focus on European common ground, notably nuclear risk reduction. Europeans have stakes in cyber space and outer space, which gives them an opportunity to work on informal measures that could outline guidelines for responsible state behavior in these areas. The EU should be collaborating with NATO on norm-setting, capability development, and technology regulation, not just on military mobility.

As nuclear-weapon states in Europe, the UK and France bear a special burden of responsibility. This includes helping to lead the European and transatlantic nuclear discourse and to create the needed new intellectual capital. They also have a responsibility to make a clear and compelling response to the Russian argument that their deterrents belong on the negotiating table now. This is an argument that will only become more forceful as Western pressure mounts to get China to the table.

#### Guidelines for the US

The Biden administration has re-affirmed the US's commitment to a leading role in nuclear diplomacy and to close consultations with allies. Recent political crises over the Afghan withdrawal and the new AUKUS alliance clearly imply that more needs to be done to make good on the promise to consult. Deeper consultations should particularly be relevant within the framework of the NATO Strategic Concept, where arms control should play a significant role. The NATO Strategic Concept offers the opportunity to reinforce the transatlantic partnership, strengthen deterrence, reduce risks, and boost public understanding and confidence. As part of these exchanges, enabling a NATO-Russia dialogue on arms control would ensure that Europeans have a seat at the arms control table. This becomes even more important as diplomatic relations between NATO and Russia deteriorate and could start at the track 1.5 level. Not all strategic issues can be covered bilaterally, especially given that European security is a core concern and Europeans fear that a deal could be made over their heads.

Consultations are also key within the framework of the US's own strategic review process, as the Biden administration conducts its integrated deterrence reviews in the context of its defense strategy review. These reviews are focused on the new strategic landscape and on a com-



France's President Emmanuel Macron with US President Joe Biden and UK Prime Minister Boris Johnson at a NATO summit in Brussels in June 2021. *Brendan Smialowski / Pool*

prehensive US and allied response to multipolarity and multi-domain conflict. Consultations during these reviews should be substantive, not pro forma – meaning that the United States should account for allied views in the formulation of its policies, not simply hear them. Moreover, such substantive consultations should be routine among allies. In encouraging an elevated transatlantic dialogue on the new strategic landscape and the needed responses, Washington should exercise some more empathy with its European allies. Politically, Washington should acknowledge the domestic pressure for disarmament that European leaders are facing from ban treaty advocates and civil society. This also implies acknowledging and engaging with views in some European states that may run counter to American views, notably on missile defense, or the legacy the Trump presidency has left in Europe.

Strategically, the US should understand that, because Europe would be directly affected by increasing nuclear dangers, European tolerance for risking military clashes and, thus, European appetite for unrestrained military competition is lower than Washington's. However, this does not mean that Europeans are not willing to invest in their own defense. Debates regarding European strategic autonomy, including its impact on arms control measures, are a positive development for Washington and should be embraced as such. While Europe will remain militarily dependent on the US for decades, the more European states can look after themselves, the better a military and strategic partner they will be.

#### Transatlantic Guidelines

A core priority should be to develop a transatlantic discourse based on a comprehensive, long-term nuclear arms control strategy. This requires asking what specific prob-

lems nuclear arms control is meant to address, what are the benefits that can be achieved through it, what are the goals, both for the US and Europeans, and what can be put on the negotiating table in exchange for Russian and Chinese restraint. Answering these questions is key and provides opportunities for situational leadership on both sides of the Atlantic.

In a multipolar world, a transatlantic discourse that ignores the transpacific dimension is likely to prove inadequate. The transatlantic community must have a sound grasp of the ways in which arms control in Europe might affect East Asia and the interests of US allies there. Conversely, the absence of arms control initiatives in East Asia involving China affects the US' room for maneuver in ne-

gotiations with Russia. This requires a substantially more robust dialogue on deterrence and arms control between US allies in Europe and East Asia, along with the supporting analytical engagement. While the announcement around AUKUS was not handled as diplomatically as many may have wished, there should be further opportunities for European allies to weigh in on the Indo-Pacific dimension of the debate.

Regarding Russia, a dual approach is necessary. There is a need to compete with and counter Russia's expanding nuclear capabilities, while collaborating on arms control issues where possible. For this engagement to be constructive, double standards are neither useful nor possible. Concerns from both sides should be discussed and addressed, rather than taking off the table certain capabilities or behaviors. It is important to consider which elements of arms control to prioritize, how to sequence them and where political space can be opened for negotiations. In

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some cases, bold steps might be preferable over small ones in order to break deadlocks. In all cases, this requires open communication channels, which allow for a disciplined dialogue and agile diplomacy.

Societal resilience is more important and more difficult than ever. Each partner owes it to its allies to deliver its best possible governance of its own open society. This is both an arms control and deterrence measure. The US and Europe are stronger together. At the same time, extended deterrence creates political, strategic, and practical vulnerabilities, leading to credibility gaps that adversaries will try



to exploit. That means it is important to find ways to engage with and debate the nuclear ban community without undermining alliance cohesion.

### Closing Observations

This report has expressed several contrarian views. Many interested stakeholders call for new arms control measures with great urgency, whereas we urge a long-term approach. Many prioritize arms control over deterrence, whereas we see two mutually reinforcing strategies. Many put the onus for leadership squarely on the Biden administration, whereas we see an opportunity and requirement for leadership by others, notably by Europeans in the transatlantic realm. Many envision a continuation of steps on the START reductions pathway, whereas we envision adaptations driven by multipolarity and multi-domain conflict. We see a need for such contrarian thinking, as a way to help generate the needed new intellectual capital for a different era so that arms control can find its place in the new security landscape.

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1. The authors' definition of nuclear arms control is not a restrictive one but encompasses any non-nuclear technologies that have an effect on nuclear relationships.
2. Jackie Schneider, "A Strategic Cyber No-First-Use Policy? Addressing the US Cyber Strategy Problem," *The Washington Quarterly*, 43:2 (2020).
3. National Security Commission on Artificial Intelligence, Final Report, March 2021.

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