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"Russian and Chinese Nuclear Arsenals: Posture, Proliferation, and the Future of Arms Control"
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Introduction

Chairman Poe, Ranking Member Keating, and members of the subcommittee, it is an honor to appear before you today to discuss Russian and Chinese strategic capabilities, and their implications for U.S. strategy and arms control. Let me begin by stating that although I am currently a senior fellow for security and strategy at the Brookings Institution, I am presenting testimony representing my personal views. As an independent think tank, the Brookings Institution does not take institutional positions on any issue.

The 2018 Nuclear Posture Review (NPR) states "that global threat conditions have worsened markedly since the 2010 NPR…The United States faces a more diverse and advanced nuclear-threat environment than ever before."[1] In particular, the NPR highlights the return of great power competition. As my colleague, Thomas Wright, notes in his recent book, *All Measures Short of War: The Contest for 21st Century and the Future of American Power*, "The United States is in competition with Russia and China for the future of the international order."[2] Russia and China are also modernizing their nuclear forces and developing new and disruptive counterspace and offensive cyber capabilities.

Indeed, strategic stability in the emerging security environment no longer follows the two-state (e.g., United States and the Soviet Union), one-weapon (e.g., nuclear weapons) model of the Cold War. Today's security environment includes multiple states and additional capabilities such as counterspace and offensive cyber weapons. How does the United States manage this competition in a way that allows the United States to effectively deter potential adversaries, maintain strategic stability, and reduce the risk of nuclear use?

To effectively respond to the Russian and Chinese challenge and the emergence of disruptive technologies, the United States will need to ***complete*** the modernization of its strategic nuclear forces; ***enhance*** the resiliency of its space and cyber infrastructure; ***maintain*** the cohesion and effectiveness of its alliances; ***engage*** Russia and China in bilateral strategic stability dialogues; ***pursue*** pragmatic arms control initiatives focused enhancing stability and predictability; ***begin*** a broader international dialogue on strategic stability that includes

[1] U.S. Department of Defense, "Nuclear Posture Review 2018," (Arlington, VA: U.S. Department of Defense, February 2018), p. 9, https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF.
[2] Thomas Wright, *All Measures Short of War: The Contest for the 21st Century and the Future of American Power*, (New Haven, CT: Yale University Press, 2017), 189.

additional actors (i.e., the members of the P-5, India, Pakistan); and ***deve*lop** norms of responsible behavior for emerging domains such as outer space and cyber.

The Russian Federation

Russia's view of the strategic environment and role of nuclear weapons

Any review of Russian nuclear policy needs to begin with an understanding of its overall geopolitical situation. Despite its aggressive actions in Ukraine and Syria, Russia faces significant long-term security challenges.

First, Russia possesses no allies or durable security partners. Yes, Russia does have Lukashenko in Belarus and Assad in Syria, but I would not describe either of those countries or leaders as particularly reliable partners. On the other hand, the United States has numerous alliances and strategic partnerships with countries around the world. Second, Russia continues to face serious demographic challenges and as a result, Russia no longer possesses the strategic weight of numbers it once had.[3]

Third, Russia lacks a modern and innovative civilian economy. Besides oil and gas, what does Russia export on the civilian market? I can't recall many items. Indeed, Russia has always had a challenge transferring its strong scientific research base into innovative commercial products.

Fourth, while there's no doubt that Russian conventional capabilities have improved since the early 2000's, which we've seen demonstrated most recently in Syria, I don't think any serious military analyst would argue that Russia's military capabilities are on par with that of the United States at the global level.

And finally, Russia remains concerned about growing Chinese political, economic, and military power in Eurasia. Though Russia and China currently have a "strategic partnership," that partnership is fundamentally about one thing: balancing the global power and influence of the United States. Any student of Sino-Russian relations knows that this is a very complicated relationship with numerous peaks and valleys throughout its history. If you scrape beneath the surface, it becomes evident that there are longer-term tensions between Russia and China.

Given these host of strategic challenges, we must ask ourselves the question: how will Russia guarantee its security over the long-term? In my view, the answer is very clear: nuclear weapons.

Since the end of the Cold War in 1991, Democratic and Republican administrations have sought to reduce of role of nuclear weapons in U.S. defense strategy. However, the Russian national security establishment has not shared this view. Indeed, as the U.S. National Intelligence Council noted in 2012:

[3] http://worldpopulationreview.com/countries/russia-population/

> Nuclear ambitions in the U.S. and Russia over the last 20 years have evolved in opposite directions. Reducing the role of nuclear weapons in U.S. security strategy is a U.S. objective, while Russia is pursuing new concepts and capabilities for expanding the role of nuclear weapons in its security strategy.[4]

The Soviet Union's primary motivation for pursuing nuclear reductions was driven by the need to reduce tensions with the United States so it could invest greater resources into the revitalization of its civilian economy. And Russia's subsequent pursuit of nuclear arms control agreements was driven by a desire to maintain strategic nuclear parity with the United States at a time of significant economic distress.

For example, Russia did not sign the New Strategic Arms Reduction Treaty (New START) because it believed in "a world free of nuclear weapons." It does not. Rather, New START was fundamentally about maintaining strategic nuclear parity with the United States, capping the number of deployed U.S. nuclear warheads, and providing Russia insights into the U.S. strategic nuclear arsenal that it would not have access to without the Treaty.

Additionally, Russia has expressed zero interest in pursuing further strategic nuclear reductions, or even beginning a discussion about non-strategic nuclear weapons, which are not limited by New START, and where Russia enjoys a large numerical advantage. This position is driven by several factors. First, Russia believes that emerging technologies such a missile defense, outer space, and the rise of increasingly accurate conventional strike systems are reshaping the strategic balance. Therefore, they argue that these types of military capabilities must be part of any future strategic arms control discussion. Russia is particularly concerned about the possible deployment of space-based missile defenses by the United States, which Russia views as an "existential threat" to the long-term viability of its strategic nuclear deterrent. Second, while the Obama administration had called for negotiating an additional round of bilateral strategic nuclear reductions, Russia opposed this, arguing that any future nuclear arms reduction process must be multilateral and include China, France, and the United Kingdom.

Russian strategic nuclear modernization programs

Russia has been modernizing its strategic nuclear forces for over a decade. The most important element of its modernization program has been the development of new land-based intercontinental missiles (ICBMs) armed multiple independent re-entry vehicles (MIRVs). Overall, sixty percent of Russia's strategic deterrent is deployed on land-based systems. The two primary ICBM modernization programs include the road-mobile Yars (SS-27 Mod 2) and the Sarmat (SS-30), which is reportedly carries up to 10 MIRVs.[5]

Russia is also modernizing the sea- and air-based elements of its deterrent. For example, it is building eight new Borei-class ballistic missile submarines (SSBNs), modernizing its aging fleet of strategic TU-160 and TU-95 bombers, and deploying a new nuclear-armed cruise missile, the KH-101.[6] In addition to aforementioned systems, the 2018 NPR notes that Russia is

[4] Nuclear Posture Review, Arlington, p. 9.
[5] [5] Shannon Kile and Hans Kristensen, "Trends in World Nuclear Forces, 2017," SIPRI Fact Sheet, July 2017, p.3.
[6] Ibid, p.3-4.

also developing at least two new intercontinental range systems: a hypersonic glide vehicle; and a new intercontinental, nuclear-armed, nuclear-powered, undersea autonomous torpedo.[7] It appears that these new systems are designed to ensure that Russian nuclear forces can penetrate any future U.S. missile defense system.

That said, Russia's strategic modernization program appears to be consistent with its obligations under New START. Indeed, the U.S. Department of State's annual New START report states: "Based on information available on December 31, 2017, the United States certifies that the Russian Federation is in compliance with New START."[8]

Russian non-strategic nuclear modernization programs

Russia is also modernizing its non-strategic nuclear forces. According to the NPR, Russia "is building a large, diverse, and modern set of non-strategic systems that are dual-capable" and that "these theater- and tactical-range systems are not accountable under the New START Treaty."[9] The NPR also notes that "Moscow believes these systems may provide useful options for escalation advantage."[10]

Of particular concern is Russia's development of a new ground-launched cruise missile (GLCM), the SSC-8, which is a direct violation of its obligations under the 1987 Intermediate Nuclear Forces (INF) Treaty. In the July 2014 edition of the U.S. Department of State's annual Arms Control Compliance Report, the United States declared that the Russian Federation was in violation of its obligations under the INF Treaty not to possess, produce, or flight test a ground-launched cruise missile (GLCM) with a range capability of 500 km to 5,500 km, or to produce launchers of such missiles.[11] Despite diplomatic efforts by both the Obama and Trump administrations to bring Russia back into compliance with the treaty, to date, those efforts have been unsuccessful.

At a March 8, 2017 hearing of the House Armed Services Committee, General Paul Selva, vice chairman of the Joint Chiefs of Staff, confirmed that Russia has moved forward with the deployment of that system. Selva stated: "We believe that the Russians have deployed a land-based cruise missile that violates the spirit and intent of the Intermediate Nuclear Forces Treaty."[12]

I believe it is unlikely that Russia will return to compliance with the INF Treaty. As I testified before this subcommittee last year, Russia's violation of the INF Treaty must be addressed. In that testimony, I recommended that the United States and its allies take a number of specific actions in response to Russia's violation of the treaty that would hold critical Russian

[7] U.S. Department of Defense, "Nuclear Posture Review 2018," p.9.
[8] U.S. Department of State, Annual Report on Implementation of the New Start Treaty, January 2018, https://www.state.gov/t/avc/rls/rpt/2018/280538.htm.
[9] Ibid
[10] Ibid.
[11] U.S. Department of State, *2014 Report on Adherence to and Compliance With Arms Control, Nonproliferation, and Disarmament Agreements and Commitments*, p. 8, July 2014.
[12] John M. Donnelly, "Hill Wants Answers on Russia's Fielding of New Missiles," *CQ Roll Call*, March 8, 2017.

assets at risk; maintain Alliance unity; and place the blame for the demise of the INF Treaty squarely where it belongs – with Russia.[13]

Russia's irresponsible rhetoric on nuclear weapons

Over the past several years, Russia has been extremely irresponsible regarding its public rhetoric on nuclear weapons. There have been several occasions where Russian officials have threatened to use nuclear weapons against U.S. allies. For example, in March 2015, the Russian ambassador to Denmark asserted that if Denmark allow its Navy to participate in the NATO missile defense system, Danish warships would become targets for Russian nuclear missiles.[14] That statement, and others like it, are totally unacceptable and do little to foster stability or reduce the risk of nuclear use. But one thing is clear: Russia views nuclear weapons as a way to intimidate and bully its neighbors. The NPR makes clear that the United States will respond to any first-use of nuclear weapons, stating that Russia should "understand that nuclear first use, however limited, will fail to achieve its objects, fundamentally alter the nature of a conflict, and trigger incalculable and intolerable costs for Moscow."[15]

The People's Republic of China

Chinese nuclear policy and doctrine

China's nuclear forces represent a fundamentally different challenge to the United States. While there is no doubt that China's nuclear capabilities represent a potential threat to the United States and its allies, I'm much less concerned about the evolution of Chinese nuclear forces and doctrine than I am with Russia's behavior.

Since achieving a nuclear weapons capability in 1964, China has maintained a "no first use" policy with regard to its nuclear arsenal. Under the policy, China will not to be the first to use nuclear weapons at any time or under any circumstances. Available evidence suggests this remains China's policy. Additionally, whereas Russia has made numerous public threats to use nuclear weapons against other nations, including several U.S. allies, China has not.

The primary challenge from China is its attempt to tilt the balance of power in the Western Pacific in its favor through a major conventional force build-up and development of anti-access, area denial and "asymmetric" capabilities (e.g., counter-space, cyber). While it is imperative that the United States continue to deter China's nuclear forces, our primary concern should be focused on countering China's efforts to gain conventional superiority in the Western Pacific.

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[13] Frank Rose, "Testimony on the Future of the INF Treaty", Joint subcommittee hearing by the Committee on Foreign Affairs' Subcommittee on Terrorism, Nonproliferation, and Trade and the Committee on Armed Services' Subcommittee on Strategic Forces. March 30, 2017, https://foreignaffairs.house.gov/hearing/joint-subcommittee-hearing-consequences-context-russias-violations-inf-treaty/

[14] Reuters Staff, "Russian threatened to aim nuclear missiles at Denmark ships if it joins NATO shield," Reuters, March 22, 2015, https://www.reuters.com/article/us-denmark-russia/russia-threatens-to-aim-nuclear-missiles-at-denmark-ships-if-it-joins-nato-shield-idUSKBN0MI0ML20150322.

[15] Nuclear Posture Review, p. 30.

Chinese strategic nuclear modernization programs

Though China has been actively modernizing its strategic nuclear forces over a decade, at this point, we have seen no any evidence to suggest that it seeks to move beyond a "minimum deterrent" force or pursue strategic nuclear parity with the United States. For example, it is estimated that China has about 270 total nuclear warheads, as compared to approximately 4,000 warheads in the active U.S. nuclear stockpile."[16] According to Director of National Intelligence Dan Coats, China's strategic nuclear modernization program is "intended to ensure the viability of China's strategic deterrent by providing a second-strike capability.[17]" Indeed, the overarching characteristic of the modernization program is to ensure that China's nuclear forces become more survivable, ultimately by making them less vulnerable to a first-strike by another nuclear power.

The Chinese strategic nuclear modernization program consists of several elements. First, it is adding more survivable road-mobile ICBMs (e.g., DF-31A and DF-41) to its arsenal to complement its silo-based systems.[18] China is also continuing to improve the sea-based leg of its strategic deterrent. The JL-2 submarine-launched ballistic missile, which is currently under development, will provide China "its first long-range, sea-based nuclear capability." China has also tested a hypersonic glide vehicle and expressed its intention to develop a next generation nuclear-capable bomber.[19]

Like Russia, China is also concerned about the development of U.S. missile defenses and the potential impact of those systems on its strategic nuclear deterrent. Missile defense is most likely the driver behind China's decision to deploy MIRVs on some of its ICBMs. According to a 2017 report by the Stockholm International Peace Research Institute, "China has prioritized the deployment of MIRVs in order to improve its warhead penetration capabilities in response to advances in U.S. and, to a lesser extent, Indian missile defenses."[20]

Russian and Chinese offensive cyber and counterspace capabilities

In addition to their nuclear modernization programs, Russia and China are also actively developing offensive cyber and counterspace capabilities. Russia and China's development of these types of "asymmetric capabilities" could have significant implications for strategic deterrence, especially nuclear command, control, and communications (NC3) systems.In his testimony before the Senate Select Committee on Intelligence on February 13, 2018, Director of National Intelligence Daniel Coats highlighted the U.S. Intelligence Community's increasing concerns of Russia and China's development in the offensive cyber and counterspace arenas.

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[16] Shannon Kile and Hans Kristensen, "Trends in World Nuclear Forces, 2017," SIPRI Fact Sheet, July 2017, p. 2.
[17] Coats, "Worldwide Threat Assessment," p. 7
[18] Ibid.
[19] Ibid
[20] Shannon Kile and Hans Kristensen, p. 5.

On Russian offensive cyber capabilities, Coats noted that in the coming year, it is likely that "Russia will conduct bolder and more disruptive cyber operations during the next year, most likely using new capabilities against Ukraine… In the next year, Russian intelligence and security services will continue to probe US and allied critical infrastructures.[21]" He also indicated that the U.S. Intelligence Community expects similar actions from China. Coats asserted: "China will continue to use cyber espionage and bolster cyber-attack capabilities to support national security priorities… China since 2015 has been advancing its cyber-attack capabilities by integrating its military cyber-attack and espionage resources in the Strategic Support Force, which it established in 2015."[22]

Regarding Russian and Chinese counterspace capabilities, Coats stated: "Both Russia and China continue to pursue antisatellite (ASAT) weapons as a means to reduce U.S. and allied military effectiveness… Military reforms in both countries in the past few years indicate an increased focus on establishing operational forces designed to integrate attacks against space systems and services with military operations in other domains."[23]

The United States Response to Russia and China

Modernize U.S. strategic nuclear forces and their supporting infrastructure

The United States requires a comprehensive strategy to effectively manage the strategic challenge from Russia and China. However, the foundation of that strategy must be continuing to maintain a safe, secure, and effective strategic nuclear deterrent.

In his April 2009 speech in Prague, former President Barack Obama outlined his long-term vision for peace and security in a world without nuclear weapons. But in that same speech, he also noted that as long as nuclear weapons existed, the United States would maintain a safe, secure, and effective deterrent. Therefore, under the Obama administration, the United States began a major recapitalization of its strategic nuclear delivery systems, nuclear command, control, and communications (NC3) system, and the Department of Energy nuclear infrastructure.

The Obama strategic nuclear modernization program included: the Columbia-class ballistic missile submarine (SSBN), the Ground-Based Strategic Deterrent (GBSD), the B-21 strategic bomber, and the Long-Range Stand-Off (LRSO) nuclear cruise missile. Additionally, the Obama administration began the modernization of the U.S. non-strategic nuclear capabilities, including the procurement of the nuclear-capable F-35 fighter and the B-61-12 nuclear gravity bomb. I believe it is critical that the United States move forward with the modernization of these nuclear delivery capabilities, the NC3 backbone, and the supporting DOE infrastructure.

The Trump administration's NPR essentially ratifies the Obama administration's strategic nuclear modernization program. However, the NPR recommended that the United States also "pursue select supplements" to the Obama administration's strategic nuclear modernization

[21] Coats, "Worldwide Threat Assessment," p. 5.
[22] Ibid
[23] Ibid, p.13.

program to "enhance the flexibility and responsiveness of U.S. nuclear forces."[24] These supplements include developing a new low-yield warhead for the D-5 submarine-launched ballistic missile (SLBM) and a new sea-launched cruise missile (SLCM) deployed on attack submarines and surface ships.

From my perspective, as long as the United States moves forward with modernization of the previously approved lower-yield capabilities (i.e., B-61-12 gravity bomb, and the LRSO nuclear cruise missile), that should be sufficient to deter the threat from Russia's non-strategic nuclear forces and other potential adversaries. In particular, I want to emphasize the importance of the LRSO nuclear cruise missile and the important stand-off capability that it provides. This stand-off capability will become increasingly important as Russia and China continue to improve their air defense capabilities.[25]

Enhance the resiliency of U.S. space, cyber, and other critical infrastructure

The U.S. nuclear command and control system is heavily dependent on access to outer space and cyber systems. As previously noted, Russia and China are dramatically improving their counterspace and offensive cyber capabilities. Therefore, it is critical that the United States finds ways to enhance the resiliency of these systems as it proceeds with the modernization of its nuclear forces. Indeed, the NPR directs the Department of Defense to strengthen the protection U.S. space-based assets. It also directs the DOD to "protect NC3 components against current and future cyber threats and ensure the continuity of U.S.-produced information technology necessary for the NC3 system."[26] Like the strategic nuclear modernization efforts, it is critical that Congress appropriate the necessary funds to enhance the United States' national security space and cyber infrastructure.

In addition to enhancing the resiliency of space and cyber capabilities, the United States also needs to pay close attention to the resiliency of the undersea cable communications network. Approximately 97% of the world's trans-oceanic communication transited over privately held, commercial, undersea fiber-optic communications cables.[27] According to a recent report by the Office of the Director of National Intelligence: "Deliberate physical attacks on the UCC [undersea cable communications] infrastructure have the potential to significantly disrupt the global economy and degrade national security."[28] The report also notes that coordinated attacks on multiple undersea cables in "a strategic manner could bring a country or region to a standstill."[29] These concerns are not theoretical. On June 11, 2018, the U.S. Department of Treasury imposed sanctions on several Russian entities involved in improving Russia's offensive

[24] Nuclear Posture Review, p. 52.
[25] For a greater discussion on the importance of the LRSO, see my article, "Five Myths About a Controversial Nuclear Weapon," *War on the Rocks*, June 20, 2017, https://warontherocks.com/2017/06/five-myths-about-a-controversial-nuclear-weapon/
[26] Nuclear Posture Review, p. 58.
[27] Frank A. Rose, "The Impact of Emerging Security Challenges on Strategic Stability," speech at the University of Virginia, December 2, 2016, https://2009-2017.state.gov/t/avc/rls/264756.htm
[28] Office of the Director of National Intelligence, "Threats to Undersea Cable Communications," September 28, 2017, p. 19, https://www.dni.gov/files/PE/Documents/1---2017-AEP-Threats-to-Undersea-Cable-Communications.pdf.
[29] Ibid

cyber and underwater capabilities. The release states: "Russia has been active in tracking undersea communications cables, which carry the bulk of the world's telecommunications data."[30]

Maintain the cohesion of U.S. alliances

In this increasingly competitive international security environment, America's allies are one of its "asymmetric advantages." The United States' worldwide system of alliances is something that neither Russia nor China possess. And from a military perspective, the United States also needs its allies to effectively deter and defend the U.S. homeland from strategic threats. For example, the upgraded early warning radars in Greenland and the United Kingdom provide early warning against strategic missile attack, track objects in outer space, and directly support the missile defense of the U.S. homeland; the two forward-deployed radars based in Japan support regional and homeland missile defense; and the relay ground stations and other communications around the world directly support U.S. nuclear command and control. Fundamentally, the security of the United States homeland is intricately linked to the security of our allies. Therefore, maintaining the cohesion and effectiveness our alliances must remain the United States' most important foreign policy objective.

Extend the New START Treaty and explore the future role of arms control in managing great power competition

Despite my continuing concerns about Russia's violation of the INF Treaty, I nonetheless believe that the Trump administration should extend New START for an additional five years as allowed by the terms of the treaty, primarily for stability and defense planning reasons. However, I readily acknowledge that it will be politically difficult to extend New START while Russia remains in violation of the INF Treaty.

As the NPR acknowledges, arms control can complement U.S. defense planning. For example, strategic arms control agreements like New START, by bounding the threat and providing transparency and predictability, have enabled U.S. defense planners to design and deploy with confidence an effective deterrent that can survive a first strike by an adversary. And don't take my word for it, here's what General John Hyten, commander of the U.S. Strategic Command, said about New START: "I've stated for the record in the past, and I'll state again, that I'm a — a big supporter [of the treaty]. … When it comes to nuclear weapons and nuclear capabilities, that bilateral, verifiable arms control agreements are essential to our ability to provide an effective deterrent."[31] Extending New START will also provide time for the United States and Russia to think about what a new framework for U.S.-Russia strategic stability might consist of, especially given further bilateral nuclear reductions appear increasingly unlikely.

[30] U.S. Department of the Treasury, "Treasury Sanctions Russian Federal Security Services Enablers," press release, June 11, 2018, https://home.treasury.gov/news/press-releases/sm0410

[31] Steven Young, "New START is a Winner," *All Things Nuclear*, March 16, 2017, https://allthingsnuclear.org/syoung/new-start-is-a-winner

Beyond, New START, we should consider the role future arms control agreements could play in helping manage the return of great power competition in the nuclear sphere. This, however, this will require us to think differently about arms control than we have since the end of the Cold War. Over the past 20 years, nuclear arms control has been primarily focused on reducing the *numbers* of nuclear weapons, and less focused addressing on what strategist Thomas Schelling called the *character of a weapon*, or stability considerations, i.e., limiting the deployment of weapons that were considered destabilizing and could be used in a potential first-strike.

This trend is clearly evident in the decision by the United States to move away from its long-standing arms objective of eliminating "heavy" ICBMs like the Russian SS-18 missile that holds 10 warheads, which we view as highly destabilizing. Land-based MIRVed ICBMs were reduced in the START I Treaty, and ultimately eliminated in START II. However, the United States abandoned this principle in the subsequent Moscow and New START treaties, in large part because we believed that the fundamental political relationship with Russia had changed; therefore, the composition of the Russia strategic forces mattered much less than it previously had. Unfortunately, we were wrong. In this era of renewed great power competition, the priority of any future agreement should be to enhance stability, not necessarily to reduce the number of weapons.

I believe former Secretary of Defense Les Aspin got it right when he stated in 1985: "The whole point of arms control is to take away any incentives to strike first…If we can reduce the numbers of warheads or reduce defense budgets that is frosting on the cake. But the real meat and potatoes of nuclear arms control is to reduce the chance of nuclear war from breaking out."[32]

Engage Russia and China in bilateral stability dialogues

In this area of great power competition, it is vital that the United States maintain open channels of communications with Russia and China, especially in the military-to-military sphere. Therefore, the Trump administration should continue the strategic stability talks that began in 2017. However, these talks should be focused on enhancing deterrence, reducing the risks of miscalculation, and promoting stability -not for the purposes of achieving further nuclear reductions.

With regard to China, the NPR recommends that the United States and China begin a "meaningful dialogue" on nuclear policy, doctrine, and capabilities. This would be a positive step. While China has traditionally been reluctant to engage in a robust government-to-government dialogue on strategic issues, during the last several years of the Obama administration, China did show a willingness to engage more actively in fora such as the U.S.-China Strategic Security Dialogue and the U.S.-China Space Security Talks. The Trump administration should build on this foundation. Recognizing Russia and China's increasing investment in counterspace and offensive cyber capabilities, and the implications of those

[32] Peter Ross Range, "Aspin's Ambition," The Washington Post, May 26, 1985, https://www.washingtonpost.com/archive/lifestyle/magazine/1985/05/26/aspins-ambition/adf67264-d1ef-4536-94d5-76799b5131fe/?utm_term=.35080c06aa56

capabilities on strategic stability, these bilateral dialogues should include a discussion of these and other emerging technology issues.

Advance a broader international conversation about strategic stability

While the United States, Russia, and China have tended the dominate that debate on nuclear weapons and strategic stability issues, other nations, including France, the United Kingdom, India, and Pakistan also impact strategic calculations. For example, Russia has argued any future nuclear arms control discussions must be multilateral, and include all five permanent members (P-5) of the United Nations Security Council. In addition, the nuclear equation in South Asia almost certainly impacts China's calculations.

Therefore, a mechanism should be established to enable a broader discussion on global strategic stability that brings the major players to the table. One place to begin may be in restarting the P-5 process, which was initiated in 2009 to serve as a coordinating mechanism for the P-5 in advance of the 2010 Nonproliferation Treaty (NPT) Review Conference. Through 2015, the P-5 process was primarily focused on advancing arms control and nonproliferation initiatives. In 2015, the members of the group began a broader discussion on nuclear policy and doctrine, resulting in the first P-5 seminar on nuclear policy and doctrine held in New York in October 2016. Surprisingly, all P-5 states found the seminar to be incredibly useful, and agreed to hold additional events. Unfortunately, no additional events have been scheduled since October 2016.

The P-5 process could also be expanded to include states like India and Pakistan at the appropriate time. Indeed, the P-5 has previously met with India and Pakistan in the P-5 + format, focused on finding ways to initiate negotiations on a fissile material cut-off treaty in the Conference on Disarmament.

Develop norms of behavior for emerging domains such as space and cyber

While emerging domains like space and cyber are increasingly impacting stability, we lack effective international norms of behavior to help manage competition. International norms are important for several reasons. First, it's very difficult to identify irresponsible behavior when if you fail to define it. Second, norms can help reduce the risk of miscalculations and accidental conflict between potential adversaries. During the Cold War, the United States and the Soviet Union developed a number of norms such as the 1972 Incidents at Sea Agreement, designed to reduce the risk of accidents between the U.S. and Soviet navies, and the 1988 ICBM/SLBM Launch Notification Agreement, designed to reduce the risk of nuclear war as a result of misinterpretation, miscalculation, or accident.

Developing norms of behavior for emerging domains such as space and cyber could help manage competition between great powers and help mitigate the risk of strategic miscalculation. For example, both the Bush and Obama administration pursued the development of bilateral and multilateral norms of behavior in outer space. And since taking office, senior Trump administration officials have spoken in favor of the need for norms in outer space. In a December 13, 2017 speech at the Eilene Galloway Space Law Symposium, Dr. Scott Pace, executive secretary of the National Space Council stated:

> The Administration seeks to develop non-binding international norms that are complementary to the existing legal regime through both "bottom-up" best practices developed cooperatively with other space actors, and "top-down" non-legally binding confidence-building measures.[33]

Secretary of the Air Force Heather Wilson has also repeatedly expressed support for the development of norms of behavior for outer space.[34] While norms by themselves are not a panacea, they could play an important role in helping manage competition and reduce miscalculations in emerging domains.

Organizing the U.S. government to address great power competition in the strategic domain

Finally, the key point that I've tried to emphasize in my testimony today is the increasing interconnections between the various strategic domains (e.g., nuclear, space, and cyber). This leads to the question of whether the U.S. government is effectively structured to operate in this new and challenging strategic environment, especially at the critically important assistant secretary-level where the vast majority of policy is made. In my opinion, it is not.

The Obama administration got off to a strong start in this area by establishing the Office of the Assistant Secretary of Global Strategic Affairs (ASD/GSA), which brought together under one assistant secretary most of the key strategic capabilities: nuclear forces, missile defense, combating weapons of mass destruction, cyber, and outer space. Unfortunately, this position was eliminated in 2014 for a variety of most bureaucratic reasons. This was a mistake, and I would urge the Trump administration consider reestablishing ASD/GSA or a similar organization at the Department of Defense.

I would also urge the Administration to review whether the State Department is organized effectively to address these cross domain challenges. Responsibility for strategic capabilities are currently resident in a number of functional and regional bureaus within the Department, which in my view, may be an impediment to effective policy implementation.

Conclusion

Mr. Chairman, we have returned to an era of great power competition in which the United States, Russia, and China are competing for the future of the international order. As part of that competition, Russia and China are not only modernizing their nuclear forces, but also developing new and disruptive capabilities such as counterspace and offensive cyber. In this new environment, the United States must find a way to effectively address this challenge in a way that deters potential adversaries, maintains strategic stability, and reduces the risk of nuclear use.

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[33] Scott Pace, "Space Development, Law, and Values," remarks delivered at the IISL Galloway Space Law Symposium, December 13, 2017.

[34] Scott Maucione, "Air Force has a long to do list for space operations, Wilson says," Federal News Radio, October 5, 2017, https://federalnewsradio.com/air-force/2017/10/air-force-has-long-to-do-list-for-space-operations-wilson-says/

Meeting these goals will require the United States to ***complete*** the modernization of its strategic nuclear forces; ***enhance*** the resiliency of its space and cyber infrastructure; ***maintain*** the cohesion and effectiveness of its alliances; ***engage*** Russia and China in bilateral dialogues on the future of strategic stability; ***pursue*** pragmatic arms control initiatives focused enhancing stability and predictability; ***begin*** a larger international dialogue on global strategic stability that includes a broader set of actors (i.e., the members of the P-5, India, Pakistan); and ***deve*lop** norms of responsible behavior for emerging domains such as outer space and cyber.