

The Possible Expiration of the New START, the Last Nuclear Bilateral Treaty Between the United States and the Russian Federation

Daniel Puentes, Matthew J. Kuhn, Chelsie Boodoo, Kylie R. Smith, Nicholas T. Young

MSU SciComm, Michigan State University, East Lansing, MI

Corresponding author: puentes2@msu.edu

Keywords: nuclear arms control; New START; extension; Russia; United States

Executive Summary: As the world returns to an era of great-power conflict, past treaties and agreements have unraveled. The New Strategic Arms Reduction Treaty (START) is the last bilateral arms control treaty that still exists between the United States (US) and the Russian Federation after the US exited the 1987 Intermediate-Range Nuclear Forces Treaty on August 2, 2019. New START places caps on the number of deployed nuclear warheads and the number of deployed and non-deployed delivery systems for these warheads for both states. New START is set to expire on February 5, 2021 unless both executive leaders agree to a five-year extension. The fate of New START results in three options: extension for five years, immediate replacement with another treaty or agreement, or expiration.

I. Introduction

Since 2018, the United States (US) has faced rising tensions over the regulation of nuclear armaments between sovereign states across the globe, straining long-standing arms agreements. These long-standing agreements, focused on limiting the weapons arsenals of world superpowers, have prevented arms races such as those seen during the Cold War. The most scrutinized relationship among nuclear superpowers is that of the US and Russian Federation. A failure to comply with international legal stipulations by nations such as the Russian Federation and the Islamic Republic of Iran has led to the early termination of two of the three major nuclear arms treaties and agreements involving the US and the Russian Federation in the 21st century. Without an extension of the New Strategic Arms Reduction Treaty (New START), the third and final of the major nuclear arms treaties, will expire in 2021, potentially leaving the US and the Russian Federation without an arms agreement for the first time since 1972.

In order to establish an effective arms treaty between the US and the Russian Federation and prevent

unimpeded nuclear proliferation, a firm understanding of previous arms control treaties before the START era is necessary.

i. Previous arms control treaties

The United States and the Union of Soviet Socialist Republics (USSR) entered into the Cold War following the conclusion of World War II in 1945. From then until the late 1960s, the two nuclear superpowers continued to grow their nuclear arsenal in both power and numbers. Following the entrance of the Nuclear Non-Proliferation Treaty, the US and USSR began negotiations for nuclear arms control (Nuclear Threat Initiative 2019). This first set of conferences was known as the Strategic Arms Limitation Talks (SALT) I, which eventually resulted in the Anti-Ballistic Missile (ABM) Treaty and an interim agreement known as the SALT I Treaty in 1972 (Office of the Historian n.d.). These treaties were signed by US President Richard Nixon and Soviet General Secretary President Leonid Brezhnev. Shortly after signing, negotiations began for SALT II throughout the 1970s. However, due to Soviet invasion of Afghanistan in 1979, the SALT II deliberations were dropped (Kimball 2019a). This

was not the end for arms control between the two nuclear superpowers, however.

The Intermediate-range Nuclear Forces (INF) treaty marked a turning point in the Cold War as a bilateral agreement aimed at limiting the proliferation of nuclear weapons between the world's leading superpowers at the time. Signed in 1987 and implemented in 1991, the first-of-its-kind INF treaty required the destruction of ground-launched ballistic and cruise missiles with ranges of 500-5,500 km and banned future production and testing of such weapons. A crucial aspect of the INF treaty was the implementation of compliance inspections, which verified that both countries had eliminated the weapons of interest to become compliant at the implementation date (Kimball 2019b). Unfortunately, in the early 2000s, the global climate began to disrupt the nuclear security environment. Following the 9/11 attacks, the Bush Administration began the procedure to exit from the ABM treaty with the Russian Federation (Neilan 2001). This raised doubts about the future viability of the INF treaty, with more serious concerns beginning in 2014 foreshadowing an eventual unilateral termination by the US in 2019.

The US State Department began filing violation reports in 2014 regarding the testing and deployment of Russian cruise missiles with ranges falling within those set by the INF treaty ban. Although Moscow has refuted each claim, if Russia has indeed stayed within the precise confines of the treaty, their weapons testing pushes the treaty boundaries and edges ever further into a grey zone of violation. Speaking on such INF treaty violations, then US Director of National Intelligence, Daniel Coats, stated, "Russia conducted the flight test program in a way that appeared purposefully designed to disguise the true nature of their testing" (Henderson 2018, 14). Counter to this, the Russian Federation has made retaliatory accusations, claiming that the implementation of US missile defense systems in Europe violates treaty language (Ryabkov 2017).

Lastly, both countries have raised concerns over the specter of China's nuclear growth. Without an agreement that involved the People's Republic of China, both the US and Russian Federation were placed at a disadvantage. For these reasons, President Donald Trump declared in February 2019 that the US would be suspending its obligations to the INF treaty

and ultimately pulled out of the agreement six months later, on August 2, 2019 (Kimball 2019b).

II. New START

New START is a treaty that was signed between the Russian Federation and the US in 2010 and entered into force in 2011. The treaty places caps on the number of deployed and non-deployed nuclear warheads and their delivery systems. The treaty has a monitoring and verification regime in place that allows either side to perform short-notice inspections of each other's arsenals, with each side allotted eighteen inspections per year. Both nations began reducing their nuclear arsenals since 2011 and have reach compliance with the treaty limits in February 2018 (Kristensen 2018). Now, the treaty is in danger of expiring in February 2021, ending the period of nuclear arms control between the two nuclear superpowers. The inspiration for the treaty came from a previous nuclear arms treaty from the 1990s, START I.

i. START I

The START I was negotiated between the United States' President, Ronald Reagan, and the USSR President, Mikhail Gorbachev, in the late 1980s (Federation of American Scientists 1998). START I was signed on July 31, 1991 after a decade of negotiations. Despite this positive step in arms negotiations, the USSR was dissolved five months after the signing of START I which prolonged its implementation until December 5, 1994 (Kimball 2019c). The fall of the USSR meant that newly independent states inherited nuclear weapons of the late USSR. To ensure the safety of the region and world as a whole from new nuclear powers, the Lisbon Protocol was organized between the US, Russia, and the three newly formed states of Belarus, Kazakhstan, and Ukraine.

The purpose of the Lisbon Protocol was to have all three new states forfeit and transfer their nuclear stockpile to Russia (Kingston 2017). The Protocol was signed on May 23, 1992 with the expectation that the transfer process would begin immediately. By 1996, with all nuclear weapons from the three states transferred, obligations to the Lisbon Protocol were met by all states. Following the conclusion of the Lisbon Protocol negotiations and concurrent with the associated weapons transfer process, START I entered into force in 1994. Provisions of START I

covered limits on delivery systems, such as Intercontinental Ballistic Missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and heavy bombers. START I also covered the number of deployed warheads with counting rules (Federation of American Scientists 1998). The deadline to meet the treaty requirements was met by all five states by the December 5, 2001 deadline and was available for renewal.

ii. History of New START

Before the development of New START, negotiations had begun to create a START II. The goal of START II was to complement START I with advanced reductions in strategic missiles and counting the total number of warheads in a bomber rather than counting the bomber itself as a single warhead. START II was signed by both the US and Russian leaders in 1993 but never entered into force (Nuclear Threat Initiative 2011). This was due to Russian withdrawal from the treaty as a response to the US exit of the Anti-Ballistic Missile Treaty in 2002 and the US's inability to ratify the 1997 extension protocol in the US Senate (Kimball 2019d). As a result, the Strategic Offensive Reductions Treaty was signed between the US and Russia. START I expired on December 5, 2009 as a precursor for the New START (Kimball and Reif 2017).

In April 2009, Russian President Dmitriy Medvedev and US President Barack Obama began discussions of reconceptualizing the 1990s era START I treaty (The White House 2009a). Both states agreed to begin negotiations regarding modifications to START I and developing what would become the New START in July 2009. It was agreed that the treaty would not address ballistic missile defense. Throughout 2009, Rose Gottemoeller with the US State Department and Anatoly Antonov with the Russian Ministry of Foreign Affairs met and agreed on reductions for a range of warheads (the yield they produce) and delivery systems for nuclear arsenals (Baker 2010). The Presidents also discussed how verification would be accomplished, including when done on short notice (The White House 2009b). The design of New START allowed both sides to select what mix of delivery systems could be used (Woolf 2019). Unlike START I, the updated New START was formed during a time of calm international relations, which led to a well-thought-out, realistic and concrete framework. One example is how the monitoring and verification

regime is cheaper and easier to operate compared to START I. New START was signed by Russia and the United States on April 8, 2010, and went into effect on February 5, 2011, replacing the START I Treaty of 1991.

iii. Differences Between START I and New START

The purpose of New START is to reduce strategic nuclear weapons arsenals in a verifiable manner. Aspects of START I which were relevant to existing concerns considering strategic use of nuclear arms were maintained in New START, with new components added to cover topics previously overlooked. Additionally, the system to verify compliance within the limitations imposed by New START has been simplified for ease of use and reflection of current strategies such as warhead counting, while topics not relevant to current strategies such as sea-launched cruise missiles with range limits, were removed from consideration.

START I required open, extensive sharing of telemetry data, or missile-generated flight-test data, to monitor missile development. Under START I, missiles were also not directly limited in order to monitor the development of new missiles. However, since New START does not monitor new types of ballistic missiles, sharing this type of data is no longer warranted or required. Nonetheless, to promote transparency, New START does require an exchange on recordings of missile tests or related telemetry on up to five missile tests per country per year. The methods of verification were different between the two treaties as well. One example of verification in START I included allowing Russian planes to fly over the Arizona area to verify that heavy bombers, the B-52 Stratofortress, were disassembled over a period of ninety days (Rotstein 1994). Section II. *iv.* elaborates more on the verification methods in New START. At the time, this form of verification was necessary. With the fall of the USSR, it was important for national security reasons to track more relevant information by formal adversaries of the US to ensure that nefarious actions aren't taken up by the newly formed Russian Federation.

New START further modified requirements regarding missile use and ownership, imposed a specific limit on the number of permissibly deployed warheads and required lists exchanges detailing the number of warheads deployed on individual missiles. Both

parties are permitted to conduct on-site inspections to ensure that each is operating within the treaty's guidelines. Russia has a history of concern regarding the US's conversion of silos to ICBM storage centers. New START negotiations prohibited this conversion in efforts to alleviate Russian concerns making the inspection of silos neither necessary nor allowed. New START also does not include stipulations regarding stockpiled, non-deployed nuclear warheads, research and development, and testing of new nuclear delivery system technologies, ballistic missile defense programs, or conventional weapons

(Vaddi, Blanchette, and Hink n.d.). New START has proven that it is successful in guiding nations to arms reduction in a manner comfortable by both nuclear states, with both parties reaching the treaty limits after seven years into force in February 2018. Ever since then, inspections by both states have also proven that nuclear arms control can be successful in the 21st century through dedicated compliance. The treaty was written to extend ten years from its signing, expiring in February 2021 unless extended, withdrawn from, or antiquated by a new agreement (Reif 2018).

	START 1	New START
<i>Number of signed countries</i>	5	2
<i>Telemetry data</i>	Mandatory to share for new missiles	Can only share up to 5 missile test data per year
<i>Treaty limits</i>	1,600 deployed delivery systems, 6,000 accountable warheads, limit on lifting power	700 deployed delivery systems, 800 deployed and non-deployed delivery systems, and 1,550 deployed warheads
<i>Counting rules</i>	Did not count re-entry vehicles, but rather counts the number of missiles with a certain number of warheads	Number of warheads is exactly the number of re-entry vehicles for treaty limits

Table 1: The differences between START I and New START for different attributes of each treaty.

iv. Monitoring and verification

New START warhead caps

Under New START, there are various caps on nuclear warhead delivery systems that play a role in each state's arsenal. This includes a limit of 700 deployed ICBM, SLBM, and heavy bombers containing nuclear armaments. Additionally, the total number of both deployed and undeployed ICBM, SLBM, and nuclear-armed heavy bombers cannot exceed 800. It is important to note two caveats. First, heavy bombers, while capable of carrying sixteen to twenty warheads, are counted as a single warhead and are typically undeployed. Second, advancements in technology have allowed ICBM and SLBM to now carry more than one warhead, known as multiple independently targetable reentry vehicles. Each missile is now, as opposed to the original START I treaty, counted according to the number of reentry

vehicles it contains for which there is one per warhead (Reif 2018). Each state is capped at a maximum of 1,550 deployed nuclear warheads in the field.

New START verification

Inspections of arms storage and deployed facilities were foundational to the initial success in arms reduction of the now defunct INF treaty. Inspection and open communication of the weapons locations and armaments have remained a core tenet of New START, and the verification regime put into place has seemingly worked for the last eight years. In February 2018, Russia and the US reported compliance with the limitations imposed by New START. Verification of treaty limits is maintained by national technical means of verification, a set of monitoring techniques agreed upon by both

signatories used to ensure verification to New START and other treaties.

New START includes eighteen short-notice, annual on-site inspections. Of these eighteen permitted inspections, ten are Type One inspections and eight are Type Two inspections. Type One inspections are those conducted on Deployed ICBM bases, submarine bases, and air bases, whereas Type Two inspections refer to verification of facilities that hold non-deployed delivery systems (Reif 2018). Recent data from July 2019 shows that both parties are in agreement with the limitations imposed by New START. Reports show that the US leads in the number of deployed ICBM, deployed SLBM, deployed heavy bombers, and launchers for each missile type. However, Russia's quantity of warheads deployed on ICBMs and SLBM is greater than that of the United States. Russia additionally shows more nuclear warheads counted for deployed heavy bombers. Data of this kind is collected every six months. In addition to on-site inspections, a focus of the New START is the open disclosure of data including flight test data for missiles, the number of deployed and non-deployed warheads at all times, and locations of such warheads (Reif 2018).

Inspections can be announced with as little as thirty-two hours of notice before an inspection team is set

to arrive at a given location. Inspections can include a variety of activities including inspecting missiles or recording radioactive data to confirm that the missile is nuclear. Additionally, the number of delivery systems in a specific location can be compared to records to match what has been declared by the state. Over 300 inspections have taken place between the US and Russia since New START entered into force, showing the consistent compliance that both states have made towards the treaty (Vaddi, Blanchette, and Hink 2019).

Warhead Delivery Systems

ICBM and SLBM work on the same principle. The missile is launched into the atmosphere during the boost phase with the assistance of solid fuel. After the fuel has been used, the missile will have entered sub-orbital space flight during the mid-course phase. Finally, the missile will reenter the atmosphere and strike its target using gravity as the driving accelerator during the terminal phase. Strategic bombers can fire air-to-surface missiles or drop gravity bombs on an intended target. Both states have the right to mix and match how many of each delivery system each state has, so long as both remain compliant by the treaty limits. Data detailing each of these forms of delivery systems is updated regularly (Table 1) (US Department of State 2019).

Table 2: Declared numbers of warheads and vehicles for armaments regulated by the New START.¹

	United States	Russian Federation	Treaty Limits
<i>Deployed ICBM, SLBM, and heavy bombers</i>	656	524	700
<i>Warheads on Deployed ICBM, SLBM and heavy bombers²</i>	1365	1461	1550
<i>Deployed and non-deployed launchers of ICBM, SLMB and heavy bombers</i>	800	760	800

¹ Updated as of July 1, 2019 (US Department of State 2019).

²Heavy bombers are counted as a single warhead regardless of how many warheads in the aircraft.

III. Discussion

New START was signed on February 5, 2011. Although the treaty's duration is ten years, it can be renewed for another five years without needing Senate approval for ratification. In February 2021, New START would expire. If New START is not renewed, this would be the first time since 1972 without a legally binding limit on nuclear arms between Russia and the US. By extending New START,

US allies can assert that the US is not interested in hostile nuclear arms control. There have been ideas of renegotiating the contents of New START during the extension period.

New START also does not take into consideration the new technologies that have been developed since it was signed. For example, there are now hypersonic glide vehicles and intercontinental, nuclear-armed,

nuclear-powered, undersea autonomous torpedoes. By allowing New START to expire without initiating another treaty, the US would not be able to verify what types or how many nuclear weapons Russia has in its stockpile. Allowing New START to expire without renewal would enable both of the strongest nuclear states to develop their stockpiles and technologies without restraints. If expiration seems inevitable, there has also been discussion of the Moscow Treaty being reenacted but there are no monitoring or verification provisions in place through the Moscow treaty so there would be no way to monitor the cap on deployed strategic nuclear weapons (DeYoung 2018).

With less than a year until New START's expiration, Federal leaders have been voicing their opinions about New START. The ex-US National Security Advisor, John Bolton, has been a large opponent of extending New START, arguing that the treaty doesn't cover tactical, or non-strategic nuclear arsenals (Taheran and Kimball 2019). Eight Senate and House leaders, however, sent a letter of support to President Donald Trump, encouraging him to extend New START in June 2019. Since then, legislation has been introduced in both the US House of Representatives and the Senate for congressional support to extend New START (Lugar and Tauscher 2019a; Lugar and Tauscher 2019b). Details about the legislation are elaborated in Section IV.

Only three options remain for the future of the New START: let New START expire, extend New START, or replace New START with another treaty. Letting New START expire would be a major disadvantage to US foreign policy, setting the stage for a modern era arms race. Without New START, the US will have to spend tax dollars on managing covert missions to determine Russian nuclear capabilities. If New START expires, it will also mean that the Russian Federation is unrestricted in growing its nuclear arsenal and delivery systems to Cold War highs. Russia is already signaling that it wants to extend New START but is warning that time is running out to begin discussions for the extension (Reif and Bugos 2020).

The US could decide to pursue the replacement of New START with another treaty. Strategists, however, argue that it is too late to make this happen. The US has proposed this path due to the specter of other emerging powers in the world which it feels

should face similar regulations as those of the US and Russia. The issue that prevents the US from persuading other states, however, is the sheer size difference in the nuclear stockpile. Besides Russia, every other country in the world in possession of nuclear weapons has a least an order of magnitude less than the US. This reason, as well as many others, is why a replacement is unlikely to occur.

If an extension were to occur, there is a likelihood that the US would want to include the People's Republic of China in the development of a new treaty. This would be ill advised due to the nature of China's nuclear forces. Although the true number of warheads owned by China is unknown, estimates place their weapons capacity between 250-350 nuclear warheads, significantly trailing the stockpiles of the US and Russia (Kristensen 2019). A trilateral treaty or agreement would be ineffective unless China agreed to a strict cap on the number of nuclear warheads in possession. The US and Russia would need to take dramatic steps towards denuclearization of their arsenal down to the level of China's to have an expectation that China would participate in arms reduction protocols. In the current global climate, any arms reductions treaties should exist between the two nuclear superpowers, with a total of over 10,000 warheads in stockpile and deployed.

IV. Current legislation

There are currently two articles of legislation that have been introduced to both the House of Representatives and Senate. Passing H.R.2529 and S.2394 would show to the US President that there is bi-partisan support for an extension of New START. Both bills have similar structure and include provisions such as a report that will be required by the President to appropriate committees about why New START wasn't extended, and certification that the extension wasn't in the US's national security interest (Lugar and Tauscher 2019a; Lugar and Tauscher 2019b). Other provisions in the bill include the creation of a report that contains a full assessment of China's and Russia's nuclear forces by the Director of National Intelligence at the time. So far, the number of Federal officials have co-sponsored the two bills, but notable ones include Senator Rand Paul and Representative William R. Keating.

V. Policy recommendations

- 1) The United States and the Russian Federation should agree to extend New START for years while negotiating a new agreement.
 - a. The extension will allow the nations to maintain the status quo while a new agreement can be negotiated.
 - b. The new agreement should be adapted to incorporate technological advances and the changes in international political dynamics.
- 2) The United States should refrain from entering a trilateral nuclear treaty or agreement with the Russian Federation and the People's Republic of China.
 - a. China could increase its nuclear arsenal while maintaining compliance with a reduction treaty, which would counter state proliferation.
 - b. A trilateral agreement/treaty can only be reached if China agreed to a full-stop of nuclear warhead production during a US-Russian reduction period.
- 3) The US Department of State should include ballistic missile defense and non-strategic weapons when considering a replacement for New START's eventual expiration.
 - a. Ballistic missile defense has been shown to only work 50% of the time, averaging over all the tests conducted with interceptors (Grego 2017; Grego and Wright 2019).
 - b. Non-strategic weapons also signal Russia's commitment to arms control and the Nuclear Non-Proliferation Treaty.
- 4) US House Representatives and Senators should support and co-sponsor 2019's H.R.2529 and S.2394 currently introduced in Congress.

VI. Conclusion

The security environment is becoming more dangerous as arms control crumbles from the pressure of the return to great power conflict. With the exit of 1987 INF, New START is the last nuclear treaty followed by the US and Russia. New START was inspired by previous treaties including its predecessor, START I. New START provides the US a way to verify the number of deployed number warheads and delivery system without the need for espionage. Since both states came into compliance with the treaty in February 2018, Russia has continued to demonstrate their commitment to treaty stipulations. However, the treaty will expire in less than a year, on February 5, 2021. The only action that needs to occur for an extension is a signed agreement by the US President and Russian President Putin. This will buy the two states another five years to maintain the status quo of nuclear arms control. An extension will also provide both states time to negotiate terms for a new treaty to replace New START in 2026.

References

- Baker, Peter. 2010. "Twists and Turns on Way to Arms Pact With Russia." *The New York Times*, March 26, 2010.
<https://www.nytimes.com/2010/03/27/world/europe/27start.html?pagewanted=all>
- DeYoung, Karen. 2018. "Bolton And His Russian Counterpart Discuss Arms Control, Syria And Iran." *The Washington Post*, August 23, 2018.
https://www.washingtonpost.com/world/national-security/bolton-and-his-russian-counterpart-discuss-arms-control-syria-and-iran/2018/08/23/626eb772-a6f6-11e8-a656-943eefab5daf_story.html
- Federation of American Scientists. 1998. "The Treaty Between The United States Of America And The Union Of Soviet Socialist Republics On The Reduction And Limitation Of Strategic Offensive Arms And Associated Documents." Last updated December 23, 1998.
<https://fas.org/nuke/control/start1/text/>
- Grego, Laura. 2017. "No, Missile Defense Will Not Work 97% of the Time." *Union of Concerned Scientists: All Things Nuclear*, October 13, 2017.
<https://allthingsnuclear.org/lgrego/missile-defense-will-not-work-97-percent>
- Grego, Laura, and David Wright. 2019. "Broken Shield: We Can't Count on Missile Defense to Defeat Incoming Nukes." *Scientific American*, June 1, 2019.
<https://www.scientificamerican.com/magazine/sa/2019/06-01/>
- Henderson, Jaclyn. 2018. "Director of National Intelligence Daniel Coats on Russia's INF Treaty Violation." *Office of the Director of National Intelligence*. Published November 30, 2018.
<https://www.dni.gov/index.php/newsroom/speeches-interviews/item/1923-director-of-national-intelligence-daniel-coats-on-russia-s-inf-treaty-violation>

- Kimball, Daryl. 2019a. "U.S.-Russian Nuclear Arms Control Agreements at a Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/USRussiaNuclearAgreements>
- Kimball, Daryl. 2019b. "The Intermediate-Range Nuclear Forces (INF) Treaty At A Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/INFtreaty>
- Kimball, Daryl. 2019c. "START I at a Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/start1>
- Kimball, Daryl. 2019d. "START II and Its Extension Protocol at a Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/start2>
- Kimball, Daryl and Kingston Reif. 2017. "The Strategic Offensive Reductions Treaty (SORT) At a Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/sort-glance>
- Kristensen, Hans M. 2018. "After Seven Years of Implementation, New START Treaty Enters Into Effect." *Federation of American Scientists*, February 8, 2018.
<https://fas.org/blogs/security/2018/02/newstart-ineffect/>
- Kristensen, Hans M. 2019. "DIA Estimates For Chinese Nuclear Warheads." *Federation of American Scientists*, May 31, 2019.
<https://fas.org/blogs/security/2019/05/chinese-nuclear-stockpile/>
- Lugar, Richard G. and Ellen O. Tauscher. 2019a. "H.R.2529 - Richard G. Lugar and Ellen O. Tauscher Act to Maintain Limits on Russian Nuclear Forces." *US Congress*, May 5, 2019.
<https://www.congress.gov/bill/116th-congress/house-bill/2529/text>
- Lugar, Richard G. and Ellen O. Tauscher. 2019n. "S.2394 - Richard G. Lugar and Ellen O. Tauscher Act to Maintain Limits on Russian Nuclear Forces." *US Congress*, July 31, 2019.
<https://www.congress.gov/bill/116th-congress/senate-bill/2394/text>
- Neilan, Terence. 2001. "Bush Pulls Out of ABM Treaty; Putin Calls Move a Mistake." *The New York Times*, December 13, 2001.
<https://www.nytimes.com/2001/12/13/international/bush-pulls-out-of-abm-treaty-putin-calls-move-a-mistake.html>
- Nuclear Threat Initiative. 2011. "Treaty between the United States of America and the Union of Soviet Socialist Republics on Strategic Offensive Reductions (START II)." Last updated October 26, 2011.
<https://www.nti.org/learn/treaties-and-regimes/treaty-between-united-states-america-and-union-soviet-socialist-republics-strategic-offensive-reductions-start-ii/>
- Nuclear Threat Initiative. 2019. "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)." Last updated July 2, 2019.
<https://www.nti.org/learn/treaties-and-regimes/treaty-on-the-non-proliferation-of-nuclear-weapons/>
- Office of the Historian, Foreign Service Institute. n.d. "Strategic Arms Limitations Talks/Treaty (SALT) I and II." *US Department of State*. Accessed on February 25, 2020.
<https://history.state.gov/milestones/1969-1976/salt>
- Reif, Kingston. 2017. "The Lisbon Protocol At a Glance." *Arms Control Association*.
<https://www.armscontrol.org/node/3289>
- Reif, Kingston. 2018. "New START At A Glance." *Arms Control Association*.
<https://www.armscontrol.org/factsheets/NewSTART>
- Reif, Kingston and Shannon Bugos. 2020. "Putin Invites U.S. to Extend New START." *Arms Control Association*.
<https://www.armscontrol.org/act/2020-01/news/putin-invites-us-extend-new-start>
- Rotstein, Arthur H. 1994. "U.S. Air Force Turns B-52 Bombers Into Scrap Metal : Arizona: To Carry out an International Arms Treaty, America Is Dismantling the Planes That Were Once the Backbone of Its Nuclear Arsenal." *Los Angeles Times*, September 11, 1994.
<https://www.latimes.com/archives/la-xpm-1994-09-11-me-37109-story.html>
- Ryabkov, Sergey. 2017. "Deputy Foreign Minister Sergey Ryabkov's comment on anti-Russia attacks by the US over the INF Treaty." *The Ministry of Foreign Affairs of the Russian Federation*. Published December 9, 2017.
http://www.mid.ru/en/web/guest/kommentarii-predstavitelja/-/asset_publisher/MCZ7HQuMqBY/content/id/2983745
- Taheran, Shervin, and Daryl G. Kimball. 2019. "Bolton Declares New START Extension 'Unlikely'." *Arms Control Association*.
<https://www.armscontrol.org/act/2019-07/news/bolton-declares-new-start-extension-unlikely>

- US Department of State. 2019. "New START Treaty Aggregate Numbers of Strategic Offensive Arms." Published July 1, 2019. <https://www.state.gov/new-start-treaty-aggregate-numbers-of-strategic-offensive-arms-10/>
- Vaddi, Pranay, Nicholas Blanchette, and Garrett Hink. n.d. "New START: The Last Nuclear Arms Treaty." Accessed on November 7, 2019. <https://carnegieendowment.org/publications/in-teractive/new-start>
- Vaddi, Pranay, Nicholas Blanchette, and Garrett Hink. 2019. "What Happens If the Last Nuclear Arms Control Treaty Expires?." Carnegie Endowment For International Peace, September 5, 2019. <https://carnegieendowment.org/2019/09/05/what-happens-if-last-nuclear-arms-control-treaty-expires-pub-79782>. <https://www.journalofcosmology.com/Mars144.html>
- The White House. 2009. "Joint Statement by President Dmitry Medvedev of the Russian Federation and President Barack Obama of the United States of America." Published April 1, 2009. <https://obamawhitehouse.archives.gov/the-press-office/joint-statement-president-dmitriy-medvedev-russian-federation-and-president-barack>
- The White House. 2009. "The Joint Understanding for The Start Follow On Treaty." Published July 8, 2009. <https://obamawhitehouse.archives.gov/the-press-office/joint-understanding-start-follow-treaty>
- Woolf, Amy. 2019. "The New START Treaty: Central Limits and Key Provisions." *Congressional Research Service*, May 30, 2019. <https://fas.org/sgp/crs/nuke/R41219.pdf>

Daniel Puentes is a Ph.D. candidate at Michigan State University in the College of Natural Science. He is an Executive Board member and founder of MSU SciComm and a member of the National Science Policy Network (NSPN). Daniel has interests in both nuclear weapons and nuclear energy policy, both domestic and foreign.

Matthew J. Kuhn is a veterinarian and Ph.D. candidate at the Michigan State University College of Veterinary Medicine. Matt is also an active member of the Michigan Veterinary Medical Association's Legislative Advisory Committee and specializes in agricultural policy.

Chelsie Boodoo is a Ph.D. student in the College of Engineering at Michigan State University. She is also Executive Board member and founder of MSU SciComm. Chelsie is a member of the National Science Policy Network (NSPN), and active with the Union of Concerned Scientists (UCS).

Kylie Smith is a Ph.D. student at Michigan State University in the College of Engineering. She is a member of MSU SciComm.

Nick Young is a Ph.D. candidate at Michigan State University in the Colleges of Natural Science and Engineering. He is also an Executive Board member of MSU SciComm.

Acknowledgments

We would like to thank MSU SciComm for hosting the Meta-Review on nuclear arms control treaties that provided the background for writing this manuscript. We would also like to thank the National Science Policy Network (NSPN) for facilitating the 2020 Election Initiative, for which this white paper is a product of. We thank our referees for the thoughtful comments and suggestions to improve the quality and flow of this manuscript.

Disclaimer

The opinions and statements expressed belong to the authors, and do not represent the views of the institutions with which they are affiliated.