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Russian Nuclear Modernization and Putin's Wonder-Missiles

Real Issues and False Posturing

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Abstract

The imminent breakdown of the INF Treaty (1987) has strongly intensified political and public concerns about the failure of traditional arms control and the escalation of a new nuclear arms race. The clear announcement of a start of this race was given by President Vladimir Putin in his March 2018 address to the Federal Assembly, in which he elaborated on several new weapon systems. Russia's sustained and massive investment in modernization of its nuclear arsenal challenges the meaning of strategic stability and generates a need to rethink its key parameters, as a precondition for addressing the urgent task of reforming and relaunching arms control, first of all in Europe.

This costly and comprehensive modernization has had a potentially severe impact on the basic structures of European security, and Putin's presentation of new weapon systems has brought this potentiality a step closer to reality. The Russian leadership intends, and even needs to gain political advantages from these modernized capabilities, and its assertive signals show readiness to accept high risks in the evolving confrontation. Nuclear deterrence Russian-style is not just about guaranteeing its security against external threats, but about granting it the freedom to experiment with various conventional and "hybrid" means of projecting power. As these experiments lead to mixed results, Moscow is compelled to rely more directly on nuclear instruments. What stands in the way of this nuclear revisionism and limits Russia's capacity to employ its nuclear might for political purposes more effectively than any treaties is the weakness of the economic foundation. Nevertheless, Russia's ambitions regarding the exploitation for political purposes of its presumed and real advantages in various nuclear capabilities are a serious source of threat for its European neighbors.

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Introduction

The elaborate and emotional presentation of sensational missile programs by President Vladimir Putin in his 2018 address to the Federal Assembly made a strong impression on this annual gathering of the Russian political elite and on many international audiences.[1] It was not only the government, which carefully drafted the first part of that speech focused on the proposition for economic acceleration, that was taken by surprise. The Russian Defense Ministry had to revise the 2027 State Armament program, approved in January 2018, in order to ensure funding for the "secret" projects unveiled by the Commander-in-Chief.[2] Putin returned to this matter in the 2019 address and his top brass spare no effort confirming that "wonder missiles" are real and will soon be deployed in combat units.[3]

The incompatibility of the first part of Putin's address, which envisaged a breakthrough in economic innovation, and the second part, advertising a menu of missiles, is plain obvious, and reflects a stark dilemma in Russia's economic and security policies. An economic acceleration is indeed necessary to lift Russia from the current trajectory of stagnation, but the allocation of required resources towards new missile programs would make such economic progress quite impossible. Official forecasts indicate reduced growth in both 2018 and 2019 due to feeble investment activity.[4] At the same time, Moscow has been forced to reduce budget allocations for defense-related expenditures, and will have to execute more cuts.[5] What is less obvious but perhaps more surprising is that Putin's newly revealed missile projects do not fit that well in the long-going program of modernization of Russia's strategic arsenal, as well as its non-strategic nuclear forces. As resources become scarce, hard decisions on priorities will be needed, perhaps repeatedly.

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1. "Presidential Address to the Federal Assembly", Kremlin website, 1 March 2018, http://en.kremlin.ru.
2. "Gosprogrammu vooruzhenij skorrektiruiut s uchetom poslania prezidenta Federal'nomu sobraniu" [State Armament program will be revised accordingly with the presidential address to the Federal Assembly], TASS, 20 March 2018, http://tass.ru.
3 N. MacFarquhar, "Threatening US, Putin Promises Russians both Missiles and Butter", The New York Times, 20 February 2019.
4. "Economic Development Ministry Worsens Forecasts for Russia's GDP Growth in 2018", TASS, 27 June 2018, http://tass.com.
5. The SIPRI estimate of 20% reduction in defense spending in 2017 is questionable but important; see "The Methodology Behind SIPRI's Military Expenditure Data for Russia for 2016-17", SIPRI, 15 May 2018, www.sipri.org.

This report will examine the progress (and lack of it) in the ongoing modernization of Russian strategic and non-strategic nuclear forces, focusing on the problems and shortcomings that might affect the implementation of the goals set in the 2027 State Armament Program. It will seek to assess the feasibility of the projects prioritized by President Putin, as well as of possible new additions to the list of priorities. A major problem with such assessments is the lack of reliable data, since Russian official sources are notoriously silent on hard facts and figures, while the propaganda machine spins all sorts of patriotic exaggerations. The author—as indeed all experts in this esoteric field—has to rely on evidence-based judgement and make assumptions, informed as they may be.[6] These synopses of the openly available and inevitably incomplete information provide a foundation for examining three key questions: the evolving nature of strategic stability; the future of arms control, and the consequences for European security.

6. G. Persson (ed.), *Russian Military Capability in a Ten-Year Perspective—2016*, Stockholm, FOI, December 2016; P. Podvig, Russian Strategic Nuclear Forces, http://russianforces.org.

Achievements and Setbacks in Russian Nuclear Modernization

Russia inherited from the USSR an enormous nuclear arsenal and succeeded in legitimizing its monopoly on this heritage, so that Belarus, Kazakhstan, and Ukraine had to give up the nuclear weapons deployed and stored on their territories. During the 1990s, this arsenal was reduced and seriously underfunded, and Vladimir Putin during his two presidential terms did little to halt this deterioration. In 2008, Boris Nemtsov, a leader of the democratic opposition (1959-2015), even accused Putin of undermining Russia's sovereignty with this neglect of the shrinking strategic forces.[7] Launching remarkably radical military reform in late 2008, Defense Minister Anatoliy Serdyukov left the strategic forces completely out of his plans for restructuring and downsizing the Armed Forces.[8] However, modernization of the strategic forces was made the highest priority in the 2020 State Armament program, approved in 2011. Meeting with Russian experts a week prior to his carefully orchestrated re-election as president in 2012, Putin promised to overtake the USA in modernization of strategic forces and to prove that the Russian arsenal was not just "rusty iron".[9] In hindsight, it is easy to denounce the 2020 program as far too ambitious. Indeed, it was based on the assumption of Russia's strong recovery from the 2008-2009 economic crisis, which in fact turned out to be rather feeble, stumbling into another crisis in 2014-2016—and leading to the current stagnation.

The strategic triad

The core of Russian nuclear deterrence is the traditional strategic triad: land-based inter-continental ballistic missiles (ICBMs), nuclear submarines (SSBMs) armed with ballistic missiles (SLBMs), and strategic bombers armed with long-range cruise missiles. Much information about the changes in numbers of these delivery systems and their nuclear warheads is openly

7. B. Nemtsov and V. Milov, *Putin: Itogi* [Putin: Results], Moscow, Novaia gazeta, 2008, pp. 18-19.
8. P. K. Baev, "The Continuing Revolution in Russian Military Affairs", pp. 349-370 *in* M. Lipman and N. Petrov (eds), *Russia in 2020,* Washington DC, Carnegie Endowment, 2011.
9. "Sredstva na perevooruzhenie armii sokrashchat' ne planiruetsia—Putin" [No plan for reduction of resources for rearmament– Putin], RIA Novosti, 24 February 2012, https://ria.ru.

available because of the exchange of data under the New START Treaty, concluded between Russia and the USA in April 2010.[10] The treaty fixes numerical parity between the two paramount global nuclear powers, and Russian strategic thinking places extraordinary importance on maintaining this parity. Russia had no difficulty in reaching the ceilings established by the treaty by the deadline of February 2018, because of the withdrawal from service of old weapon systems (ICBMs and SSBMs). It currently has 524 deployed delivery systems with 1,461 warheads, while the ceilings are set at 700 and 1,550, respectively.[11]

Following Soviet tradition, Russia makes the ICBMs the main element of the strategic triad, which is organized by the Strategic Rocket Forces (RVSN) command. Modernization of these forces has proceeded slowly but smoothly since the second half of the 1990s, when a new single-warhead *Topol*-M (SS-27) model was introduced; in the second half of the 2000s, it was modified to carry three warheads and redesignated as *Yars* (SS-29).[12] These solid-fueled, road-mobile missiles replace the older *Topol* (SS-25) model (some 35 remain in service), but they cannot be compared with the heavier liquid-fueled ICBMs *Voevoda* (SS-18) and *Stiletto* (SS-19). The only way to prevent a big drop in the number of warheads that the RVSN command could invent was to extend the service life of these missiles to 35 years (far beyond the planned 20-25 years), but they (46 and 30 missiles, respectively) still must be retired at the start of the new decade.[13]

The most expansive effort was directed towards modernizing the sea leg of the strategic triad, and the construction of new-generation Borei-class strategic submarines was the single most expensive project in the 2020 Armament Program. The design is from the mid-1990s, and the first submarine (*Yuri Dolgoruky*) was started in 1996 but commissioned only in 2013. Two sister-ships (*Aleksandr Nevsky* and *Vladimir Monomakh*) entered the Pacific Fleet in December 2013 and December 2014, respectively, while the first submarine of the improved *Borei*-A design (*Knyaz Vladimir*) was launched in November 2017 and is due to be commissioned in 2019. Four more subs are in different stages of

10. K. Reif, "Russian Strategic Nuclear Forces under New START", *Factsheet*, Arms Control Association, 8 March 2018, www.armscontrol.org.

11. "New START Treaty Aggregate Numbers of Strategic Offensive Arms", US Department of State, 1 March 2019, www.state.gov.

12. I. Muromskij, "Iadernyj shchit Rossii: mezhkontinental'naia raketa RS-24 'Iars'" [Russian missile shield: Intercontinental missile RS-24 Yars], Federal'noe agenstvo novostej, 14 July 2017, https://riafan.ru.

13. R. Azanov, "'Satane' na smenu: pochemu utiliziruiut samye moshchnye rakety Rossii" [Replacing Satan: Why Russia's most powerful missiles are being used], TASS, 12 March 2018, http://tass.ru.

construction at the Severodvinsk shipyard.[14] The main problem with this hugely expensive project is the reliability of the *Bulava* missile, which has a checkered record of tests and was test-fired only once in 2016 and once in 2017.[15] The unprecedented and successful four-missile salvo launch from *Yuri Dolgoruky* on 22 May 2018 was supposed to close all technical issues with the *Bulava*, but there is no guarantee against (and apparently much anxiety about) another failed test, which would revive doubts in the performance of the Russian naval deterrent.[16]

Long-range aviation is the weakest leg of the Russian nuclear triad, and it has not seen any modernization for the last three decades, except for overhaul and modifications of the 66 bombers. President Putin has discovered its high value in demonstrating Russia's strategic reach (he flew in the Tu-160 bomber in August 2005), but the 2020 Armament Program delivered only one Tu-160M (using the airframe produced in the 1980s) to replace two Tu-95MS bombers that crashed in summer 2015.[17] The project for a new-generation PAK DA bomber encountered serious setbacks at the Tupolev design bureau, and its implementation has been repeatedly postponed—currently to the middle of the next decade.[18]

Overall, the sustained effort in modernizing the Russian strategic triad has delivered significant improvements in key capabilities, particularly sea platforms; however, a further increase in this effort is necessary to complete the half-accomplished projects (including five submarines) and advancing the necessary new projects, first of all regarding air platforms. President Putin's justification of cuts in defense expenditures by claiming that "the main expenses in new weapon systems were made in previous years" is plain misleading, since both production and research & development are set to be more expensive.[19]

14. Z. Keck, "Russia's Nuclear Submarine Force Is Back (Maybe)", *The National Interest*, 17 November 2017, http://nationalinterest.org.
15. N. Litovkin, "What Is Wrong with Russia's New Bulava Missile?", Russia Beyond the Headlines, 3 October 2017, www.rbth.com. For the full record of tests, see "Bulava Missile Test History", Russian Strategic Nuclear Forces, 23 May 2018, http://russianforces.org.
16. A. Savitsky, "Russian Navy Tests Four Bulava SLBMs in Salvo", Strategic Culture, 27 May 2018, www.strategic-culture.org.
17. "President Vladimir Putin Flew on Tu-160 Strategic Bomber", Kremlin website, 16 August 2005, http://en.kremlin.ru. On the crashes in 2015, see D. Cenciotti, "Yet Another Iconic Russian Tu-95 Bear Strategic Bomber Has Crashed. Is the Russian Air Force Falling Apart?", The Aviationist, 14 July 2015, https://theaviationist.com. On the newly-built Tu-160, see L. Hairemdinov, "'Belye lebedi' obretaiut novuiu zhizn' v Kazani" [White swans get a new life in Kazan], *Krasnaia Zvezda*, 26 January 2018, http://archive.redstar.ru.
18. D. Majumdar, "Russia's New PAK DA Stealth Bomber Might Have a Fatal Flaw", *The National Interest*, 28 February 2018, http://nationalinterest.org.
19. "Vstrecha s kandidatami na dolzhnost' Prezidenta Rossijskoj Federatsii" [Meeting with the presidential candidates], Kremlin website, 19 March 2018, http://kremlin.ru.

Missile defense

US President George W Bush's decision in December 2001 to withdraw from the Anti-Ballistic Missile (ABM) Treaty (1972), which prescribed strict limits on deployment of ballistic missile defense systems, was a shock for the then-inexperienced President Putin, who keeps returning to this moment with reproach. His response to that possibly inconsiderate decision was not of a cost-efficient asymmetric character (as he often claims), but of a costly double-track nature. Moscow sought both to advance projects that would render the hypothetical US missile defense system ineffectual (as presented in Putin's 2018 address), and to build its own "anti-missile shield". The two key elements of the latter are the early warning system and the surface-to-air/space missile systems.

The land-based component of the early warning system was strengthened by the introduction in 2009 of the new *Voronezh*-M/SM/DM radar, seven of which are currently operational, while two are under construction, and one is planned for Crimea.[20] The space-based component of this system, however, has deteriorated to the degree that it is barely functional.[21] Russian satellites have limited technological capacity and short orbit life-time, so more space launches are necessary to keep their grouping operational, but failures with these launches have become alarmingly frequent, while the new *Angara* space rocket is still not ready after 20 years of research and redesign.[22] In the mid-2015, the Space Forces command was subordinated to the Air Force, so that the new Air-Space Forces were inaugurated as a new branch of the Russian Armed Forces, but this only aggravated the problems with resource allocation toward military space projects.[23] The first early warning satellite of the new generation (EKS or *Tundra*) was launched in November 2015 (and has since expired), and the second one in May 2017, but the full deployment of this grouping is

20. A. Iuriev, "Kosmicheskie vojska poluchili tri novejshikh radara 'voronezh'" [Space forces received three new Voronezh radars], RIA Novosti, 20 December 2017, https://ria.ru; A. Stanavov, "Prikrytie s iuga: Rossiia ustanovit v Krymu novejshij vysokotochnyj radar" [Cover for the South: Russia will build in Crimea a new high-precision radar], RIA Novosti, 15 August 2017, https://ria.ru.
21. E. Babicheva and E. Kudryavtseva, "Orbital'naia stagnatsiia: Chto ostalos' u Rossii ot bylogo liderstva v kosmose" [Stagnation in the orbit: What is left from Russia's former leadership in space], *Kommersant*, 25 September 2017, www.kommersant.ru; M. Aliberti and K. Lisitsyna, *Russia's Posture in Space: Prospects for Europe*, Bern, Springer Publishing, 2019.
22. V. Egorov, "Zvezdnye vojny: mozhet li raketa-nositel' 'Angara' stat' konkurentom Falcon 9" [Star wars: Can Angara rocket become a competitor for Falcon 9], Forbes.ru, 17 May 2018, www.forbes.ru.
23. I. Safronov, "Kosmicheskaia karta: Rossiia sozdaet novyj vid vojsk" [Space map: Russia creates a new branch of armed forces], *Kommersant*, 27 June 2

uncertain, mostly because of lack of technologies, which cannot be imported due to the sanctions regime.[24]

The missile defense system around Moscow (A-135 *Amur*) was built in the mid-1970, and despite modifications (the latest in 1995) is seriously obsolete, particularly regarding nuclear warheads.[25] The plan for upgrading it to the level designated as A-235, which would combine high-altitude (53T6M *Nudol*) and short-range interceptor missiles, has been postponed into the 2020s.[26] The main relevant project in the 2020 Armament Program was the deployment of the S-400 *Triumph* surface-to-air missile (upgrade of the S-300 models) and the development of the new generation S-500 *Prometheus* missile system capable of intercepting ICBM warheads and reaching targets on lower space orbits.[27] The first regiment (16 mobile S-400 launchers and 64 missiles) was deployed near Moscow in 2009, and, at the end of 2017, 23 regiments were operational (including one deployed to the Khmeimim airbase in Syria), with five more planned for 2018. The performance of the Russian early warning/missile defense system in the Far East was not exactly stellar during the North Korean missile tests.[28] In Syria, Russian air defenses were not engaged to prevent Western missile strikes or Israeli air strikes; Moscow also insisted, far beyond the boundaries of common military sense, on the Syrian air defense intercepting at least 71 out of 105 missiles in the US, UK and French strike on 14 April 2018.[29]

Overall, Russia has made impressive strides in building strategic defenses. The setbacks in maintaining the space echelon are compensated for by the construction of new radars and deployment of modern air/space defense systems, particularly the S-400. Further upgrades, including the

015, https://www.kommersant.ru 24. "Russia's Soyuz Launches EKS Missile Warning Satellite, Ends Year-Long Military Launch Gap", SpaceFlight101.com, 25 May 2017, http://spaceflight101.com.

25. K. Mizokami, "If America Ever Tries to Nuke Moscow, Russia Has a Missile 'Shield' that Would Stop It", *The National Interest*, 21 November 2016, http://nationalinterest.org.

26. According to most reports, the A-235 system will be non-nuclear, and based on explosive rather than kinetic intercepts; see N. Surkov and A. Ramm, "Moskva poluchit novuiu protivoraketnuiu zashchitu" [Moscow will get new anti-missile defense], *Izvestia*, 21 February 2018, https://iz.ru.

27. M. Bennetts, "New Russian S-500 Prometheus Missile Flies Further than Ever Before", *The Times*, 26 May 2018, www.thetimes.co.uk.

28. V. Dvorkin, "Chem grozit miru raketno-iadernyj potentsial Severnoj Korei" [The global threat from the North Korean nuclear-missile capabilities], *Nezavisimoe voennoe obozrenie*, 8 September 2017, http://nvo.ng.ru.

29. "Nachal'nik Glavnogo operativnogo upravleniia General'nogo shtaba Vooruzhennykh Sil RF general-polkovnik Sergej Rudskoj provel brifing dlia zhurnalistov po situatsii v SAR" [General-Colonel Sergei Rudskoy, head of the Main Operational Directorate of the General Staff of the 29. "Nachal'nik Glavnogo operativnogo upravleniia General'nogo shtaba Vooruzhennykh Sil RF general-polkovnik Sergej Rudskoj provel brifing dlia zhurnalistov po situatsii v SAR" [General-Colonel Sergei Rudskoy, head of the Main Operational Directorate of the General Staff of the Armed Forces of the Russian Federation, briefs journalists on the situation in Syria], Russian Defense Ministry website, 25 April 2018, https://function.mil.ru.

introduction of the S-500 and A-235 missile systems, are in the works; they will demand sustained allocation of substantial resources.

The non-strategic nuclear forces

There is little reliable data on the Russian non-strategic nuclear forces, which also include land (tactical missiles and surface-to-air missiles), air (bombs and missiles) and a wide range of sea components, but there are good reasons to believe that the total number of warheads is only slightly less than that for strategic forces. However, if 1,550 warheads are defined in the official information as "deployed" with strategic delivery systems, none of the non-strategic warheads is deployed.[30] They are stored in 12 central storage facilities under the control of the 12th Main Directorate of the Ministry of Defense (12th GUMO), and only in a so-called "threatening period" would they be transferred to 34 base-level storage facilities.[31] Moscow insists on following the Presidential Nuclear Initiatives (PNIs, 1991-1992), so that three-quarters of the non-strategic warheads are destroyed and the rest are concentrated in the central storage facilities.[32] From what is known, there is no training of troops for the use of tactical nuclear weapons or for operating on a nuclear battlefield; the Navy is also not training for handling nuclear depth bombs or torpedoes. Only a few staff exercises involved scenarios with detonation of a nuclear munition, and the much-debated Zapad-2017 strategic exercises had no nuclear component.[33]

Two major missile projects have direct relevance for the non-strategic forces because they are designed to carry a low-yield nuclear warhead. The first one is the *Kalibr* (3M-54 or SS-N-27 *Sizzler*) long-range cruise missile developed originally in the mid-1980s primarily for naval platforms, including diesel submarines and frigates/corvettes.[34] This missile attracted much international attention when four ships of the Caspian Flotilla delivered an 18-missile salvo on targets in Syria on 20 November 2015. Since then, on at least 13 occasions, Russian ships deployed in the Eastern

30. SIPRI estimate gives 1,600 warheads as deployed, and the total number of warheads in Russian possession as 4,350, some 1,830 of which are counted as non-strategic. See the section "Russian Nuclear Forces" in *SIPRI Yearbook 2018*, Stockholm, 2018, pp. 244-251.
31. P. Podvig and J. Serrat, "Lock Them Up: Zero-Deployed Non-Strategic Nuclear Weapons in Europe", *UNIDIR Resources*, 2017, www.unidir.org.
32. "Kommentarij Departamenta informatsii i pechati MID Rossii v sviazi s publikatsiej novoj iadernoj doktriny SSHA" [Foreign Ministry comment on the publication of the new US nuclear doctrine], Russian Foreign Ministry website, 3 February 2018, www.mid.ru.
33. M Kofman, "What Actually Happened During Zapad 2017", Russian Military Analysis, 22 December 2017, https://russianmilitaryanalysis.wordpress.com.
34. S. Roblin, "Why Russia's Enemies Fear the Kalibr Cruise Missile", *The National Interest*, 22 January 2017, http://nationalinterest.org.

Mediterranean fired these missiles targeting rebels in Syrian provinces.[35] With this missile, Russia has gained the capability to project power onshore from sea over distances of up to 1,400 km with reasonably high precision, though not as yet on a massive scale.[36]

The second high-profile project is the short-range ballistic missile *Iskander*-M (SS-26 *Stone*), which was designed in the 1990s and started to arrive with combat units, replacing the obsolete *Tochka* (SS-21 *Scarab*), in the mid-2000s. The most politically controversial issue with this high-precision missile, which has the operational range of 500 km with a conventional warhead, was its deployment to the Kaliningrad region, first announced in 2008 and finally confirmed in early 2018, when all Russian missile brigades were re-equipped with *Iskander*-M.[37] The deployment of this missile system in Crimea is unconfirmed, but nuclear warheads have not been moved there, and not to Kaliningrad either. A major problem with this weapon system is that the mobile launcher can be modified (and was actually tested) for operating a long-range cruise missile SSC-8 (*Novator* 9M729) similar to the *Kalibr*, which constitutes a clear violation of the Intermediate-Range Nuclear Force (INF) Treaty (1987).[38]

Overall, while abiding to the rule of keeping all non-strategic nuclear warheads in central storage, Russia has invested strongly in modernizing its delivery systems (which include also the sub-strategic Tu-22M3 bombers) and has achieved a qualitative improvement in short and long-range high-precision strike capabilities.

35. T. O'Connor, "Russia Says Missile Ships Will Stay near Syria, Challenging US in Middle East and Europe", Newsweek, 16 May 2018, www.newsweek.com.
36. N. Sokov, "Russia's New Conventional Capability: Implications for Eurasia and Beyond", *PONARS,* No. 472, May 2017, www.ponarseurasia.org.
37. S. Sukhankin, "The End of 'Hide-and-Seek': Russian Iskanders Permanently in Kaliningrad", *Eurasia Daily Monitor*, Vol. 15, No. 28, 23 February 2018, https://jamestown.org.
38. P. Podvig, "Did the United States Just Change Its Theory of INF Violation?", Russian Strategic Nuclear Forces, 19 February 2019, http://russianforces.org.

The Nuclear Priorities in the 2027 State Armament Program

The new State Armament Program was supposed to be approved in 2015 and had 2025 as the target date; however, the severe disruption of Russian state finances caused several delays, so that it was approved only in early 2018, with 2027 as the new ten-year framework, which implies that a new program will come into force in 2022. Unlike the previous program, it is based on the assumption of slow growth in the next five years, and so envisages only a modest increase of expenditures on procurement of new weapon systems, with significant cuts in many ambitious projects favored by all branches of the Armed Forces.[39] Its guidelines for modernization of nuclear forces are a logical follow-up to the projects half-implemented in the previous program, with only a few new ones based on well-developed technological designs.[40] Putin's 2018 address to parliament departs far from this logic, both in prescribing an acceleration of economic growth, and in presenting missile projects of a completely new character (with one exception). Putin keeps talking about cuts in the military budget—and simultaneously about new weapons systems "that are expected to improve Russia's potential several-fold".[41] This casts doubts on the feasibility of the multiple priorities in building up Russia's nuclear forces.

The ongoing projects

In all three parts of Russia's nuclear arsenal—the strategic triad, strategic defense, and non-strategic nuclear capabilities—there are advanced projects that demand sustained and expanded funding for implementation. The issue of their prioritization is seriously complicated by Putin's new demands.

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39. R. Connolly and M. Boulegue, "Russia's New State Armament Program: Implications for the Russian Armed Forces and Military Capabilities to 2027", Chatham House, 10 May 2018, https://www.chathamhouse.org.
40. T. Malmløf, "Russia's New Armament Program–Leaner and Meaner", *FOI Briefing*, No. 42, March 2018, www.foi.se.
41. "Reception in Honour of Graduates of Military Academies", Kremlin website, 28 June 2018, http://en.kremlin.ru.

In the strategic triad, the naval leg is set to remain the most expensive as the imperative to replace the ageing submarines of the *Typhoon*, *Delta*-III and *Delta*-IV classes necessitates an expansion of shipbuilding. Five *Borei*-A submarines have to be completed with construction and testing, and six more keels have been ordered to be laid; they were supposed to be an improved *Borei*-B design, which is now cancelled as cost-inefficient, but sticking to the basic design will lead to only a minor saving.[42] In the Strategic Rocket Forces, the steady implementation of the *Topol*-M/*Yars* project is sufficient for replacing the old *Topol* ICBM—but not for filling the gap in capabilities created by the retirement of the heavy SS-18 and SS-19.[43] The solution is found in the new *Sarmat* (SS-X-30) ICBM, which after many delays has recently passed three ejections tests—and has made it to Putin's list of "wonder missiles".[44] There is, in fact, nothing particularly remarkable about this missile, except for the possibility to equip it with the hypersonic *Avangard* warhead (which makes a separate entry on this list), but even with priority funding, it is improbable that it will be ready for combat deployment in 2020, as Putin keeps promising.[45] The most difficult situation has arisen in the air leg of the triad, since it is no longer possible to postpone retirement of the old *Bears* (Tu-95MS), but the "next generation" PAK DA project is still nowhere near readiness.[46] The decision to resume production of modernized Tu-160M2 bombers at the Kazan plant (the original project was discontinued in 1992) needs huge investment and faces serious technological challenges, particularly in manufacturing of the engines.[47] The plan to start serial production (three planes per year) in 2021 is therefore entirely unrealistic.

In the further upgrades of strategic defense, the work on constructing the system of new *Voronezh* radars is nearly completed, but the problems in the space industry keep piling up, so that the task of building a useful grouping of military satellites becomes insurmountable. The *Energiya*

42. "Istochnik: Rossiia postroit eshchio shest' atomnykh strategicheskikh podlodok klassa 'Borej-A'" [Source: Russia will build six more nuclear strategic submarines of the 'Borei-A class'], TASS, 21 May 2018, http://tass.ru.

43. The plan for deploying the Yars in a rail-mobile modification (*Barguzin*) is cancelled as cost-inefficient; see S. Ptichkin, "Rakety na rel'sy ne vstanut" [Missiles will not get on rails], *Rossijskaia gazeta*, 12 December 2017, https://rg.ru.

44. It is not clear why three ejection tests were needed; for official presentation of the project, see "Key Facts about Russia's Advanced Sarmat ICBM System", TASS, 1 March 2018, http://tass.com.

45. F-S. Gady, "Russia's Strategic Rocket Force to Receive RS-28 Sarmat ICBM by 2020", The Diplomat, 23 May 2018, https://thediplomat.com.

46. A. Sharkovskij, "Nuzhna li iadernaia triada" [Is the nuclear triad necessary?], *Nezavisimaia gazeta*, 4 April 2018, www.ng.ru. For official information, see "Sekrety PAK DA i Tu-160M2: kakim budet krylatyj shchit Rossii" [Secrets of PAK DA and Tu-160M2: What Russia's air shield will look like], TASS, 22 December 2017, http://tass.ru.

47. M. Starchak, "Russia's Tu-160 Strategic Bomber Faces Development Problems", *Eurasia Daily Monitor*, Vol. 14, No. 49, 10 April 2017, https://jamestown.org.

corporation and the Khrunichev Center—two leading units in *Roscosmos*—are in dire financial straits, and the expiration of contracts with the USA will leave them more dependent on support from the state budget.[48] The *Angara* space rocket, for which the Defense Ministry is the main customer, is bedeviled with setbacks and can become a useful vehicle only beyond the time scope of the 2027 Armament Program, even if Putin has ordered extra efforts to be made.[49] The appointment of Dmitri Rogozin, known more for political extravagance than for management skills, as the head of *Roscosmos* hardly bodes well for the huge corporation (which employs some 240,000 workers), and his promise to rid it of "idlers and intriguers" was not exactly a morale booster.[50]

This stagnation of the traditionally strong space program makes Moscow more interested in developing a range of anti-satellite weapons that can also double as anti-ballistic missile systems.[51] Besides the S-500 surface-to-air missile, one of the already tested weapon systems is the *Nudol* missile, which is supposed to constitute the main element of the upgraded A-235 missile defense system around Moscow.[52] It is unclear how these projects (with overlapping characteristics) can be combined with the laser weapon system *Peresvet*, presented in Putin's 2018 address as ready for deployment with combat units. There is little information about its characteristics, or indeed physical existence, but the assumptions about a possible anti-satellite function are plausible.[53]

As for the non-strategic weapons, one important project is the modernization of the Tu-22 bombers (of some 500 produced from the mid-1970s to 1993, 63 are still in service) to the Tu-22M3M modification, which inevitably clashes with the plan to resume production of the Tu-160 bombers

48. A. Borisov, "Vse nizhe I nizhe: 'Roskomos' umiraet. Nuzhny novye milliardy i drugie zhertvy" [Ever lower: 'Roscosmos' is dying. It needs new billions and other sacrifices], Lenta.ru, 21 May 2018, https://lenta.ru.

49. N. Vedeneeva, "Rossijskaia sverkhtiazhelaia raketa startuet v kosmos cherez 10 let" [Russian super-heavy rocket will launch into the cosmos in 10 years], *Moskovskij Komsomolets*, 27 February 2018, www.mk.ru; "Vladimir Putin poruchil uskorit' rabotu nad razvitiem raket 'Angara'" [Vladimir Putin has ordered acceleration in work on the 'Angara' rocket project], *Kommersant*, 18 July 2018, www.kommersant.ru.

50. "Rogozin poobeshchal izbavit' 'Roskomos' ot 'bezdel'nikov i intrigantov'" [Rogozin promises to rid 'Roscosmos' of 'idlers and intriguers'], *Vedomosti*, 28 June 2018, www.vedomosti.ru.

51. S. Erwin, "US Intelligence: Russia and China Will Have 'Operational' Anti-Satellite Weapons in a Few Years", Space News, 14 February 2018, http://spacenews.com.

52. R. Azanov, "'Nudol" na smenu 'Amuru': kakoj budet novaia protivoraketa Rossii" ['Nudol' to replace 'Amur': What Russia's new anti-missile is like], TASS, 4 April 2018, http://tass.ru.

53. T. O'Connor, "Russian Military Has Laser Weapons That Can Take out Enemies in Less than a Second", Newsweek, 12 March 2018, www.newsweek.com.

at the same Kazan plant.[54] One new plan is to equip the Tu-22M3 with the *Kinzhal* missile, presented by Putin in his 2018 address, which would effectively turn this bomber into a strategic weapon system.[55] Another, potentially important project is the deployment of the *Zircon* (SS-N-23) hypersonic anti-ship missile, which was successfully tested in 2017, allegedly to the 400 km range.[56] Russian experts assume that this missile, deployed on naval platforms, including submarines, and onshore, with the *Bastion-P* coastal defense system, would have a profound impact on naval warfare.[57] It is unclear why the *Zircon* didn't make it onto Putin's list of "wonder missiles", but such omission may signify a delay in its deployment due to technical flaws. The adaptation of the *Kalibr* cruise missile for land-based launchers remains subject to complicated political maneuvering around the future of the INF Treaty.

In the next five years, Russia plans to make further advances in modernizing all key elements of its nuclear arsenal, which would require a substantial increase in resource allocation. The construction of the *Borei*-class submarines will remain the most expensive project in the 2027 Armament Program, but quite a few other projects (the *Sarmat* ICBM, the Tu-160 bomber, several space-related projects) require sustained infusion of new funding, with demand tending to appreciate in the course of implementation. Postponements and cuts in budget allocations might result in the deterioration of capabilities perceived as crucial, such as early warning, GLONASS satellites or the air platforms.

Putin's new weapon systems

One of the striking features of the "missile" part of Putin's 2018 address to the Federal Assembly was that it departed far from the firmly established plans to modernize Russian nuclear forces. The single exception is the *Sarmat* ICBM, which has been developed for about 10 years. Placing the emphasis on sensationally new weapon systems, Putin refrained from presenting the well-known missile projects that were presumed to be ready for progressing to implementation, like the *Nudol* or the *Zirkon*. At the same time, he didn't

54. N. Protopopov, "Istrebitel' avianostsev. Chem uluchscennye Tu-22M3 mogut ugrozhat' flotu SSHA" [Aircraft carriers' destroyer: How the modified Tu-22M3 could threaten US Navy], RIA Novosti, 7 June 2018, https://ria.ru.

55. "Istochnik: dal'nost' primeneniia 'Kinzhala' uvelichitsia na 1000 km s bombardirovshchikom TU-22M3" [Source: the range of 'Kinzhal' will increase by 1000 km with the Tu-22M3], TASS, 18 July 2018, http://tass.ru.

56. R. Beckhusen, "Imagine Almost Every Russian Warship with Hypersonic Missiles", War Is Boring, 11 October 2017, http://warisboring.com.

57. O. Vladykin, "U avianostsev net zashchity ot 'Tsirkonov'" [Aircraft carriers have no defense against 'Zirkon'], *Nezavisimaia gazeta*, 18 April 2017, www.ng.ru.

mention several missile designs that are rather unconventional but perhaps not confirmed for execution. One of them is the ICBM *Skif*, which is supposed to be based on the sea bottom in special containers.[58] Another one is the intermediate-range ballistic missile RS-26 *Rubezh*, which is a curtailed version of the *Yars*, and can be quickly produced and deployed after the breakdown of the INF Treaty.[59] Instead, Putin added to the shortlist of missiles the combat laser *Peresvet*, about which almost nothing is known, but did not mention combat robots or long-range strike drones, which are fashionable topics for strategic discussions.[60] Leaving out the laser weapon and the *Sarmat*, Putin's list includes four weapon systems.

Two of these projects are the results of long research on hypersonic weapons, and Russia quite possibly has indeed achieved an advantage in developing this technology.[61] The *Avangard* supersonic glide vehicle is essentially a warhead for the *Sarmat* ICBM (or, for now, the SS-19), capable of high-speed (Mach 20) evasive maneuvers, which adds little to Russia's strategic capabilities except for the ability to penetrate a hypothetic strategic missile defense system.[62] The *Kinzhal* missile is an air-launched ballistic missile with an estimated range of between 1,000 and 1,500 kilometers. It is carried by a modified MiG-31K interceptor, which gives it the necessary acceleration for the aero-ballistic trajectory, in which it maneuvers with the speed of 10 Mach.[63] Experts concur on the opinion that it is actually a version of the land-based *Iskander* missile, developed specifically for breaking through air defenses around US aircraft carriers and protected land targets.[64] Russian Air-Space Forces have moved fast with deployment of this weapon system, which was demonstrated in the May 9 parade on Red Square and is operated in "test-combat" mode with a squadron of MiG-31K, based in the Southern Military District.[65] Plans have also been announced to put *Kinzhal*

58. V. Tuchkov, "Raketa 'Skif': Dlia SShA i Anglii eto strashnee 'Tsirkona'" ['Skif' missile is more dangerous than 'Zirkon' for USA and England], *Svobodnaia Pressa*, 24 November 2017, http://svpressa.ru.
59. "By Cancelling RS-26 Russia Keeps its Options Open", Russian Strategic Nuclear Forces, 2 April 2018, http://russianforces.org.
60. A. Stanavov, "Zheleznaia gvardiia: samye opasnye boevye roboty Rossii" [Iron guard: most dangerous Russian combat robots], RIA Novosti, 15 October 2017, https://ria.ru.
61. S. Bryen, "Why China, Russia and America Are Obsessed with Hypersonic Weapon", *The National Interest*, 1 May 2018, http://nationalinterest.org.
62. O. Koryakin, "Stali izvestny nositeli i moshchnost' giperzvukovogo bloka 'Avangard'" [The delivery systems and the yield of the Avangard hypersonic bloc are known], *Rossijskaia gazeta*, 20 March 2018, https://rg.ru.
63. V. Tuchkov, "Russkaia 'otvetka': 10 'Kinzhalov' na 10 avianostsev SShA" [Russian 'response': 10 'Kinzhals' for 10 US aircraft carriers], *Svobodnaia Pressa*, 8 May 2018, http://svpressa.ru.
64. T. Demerly, "Russia Test Fires New KH-47M2 Kinzhal Hypersonic Missile", The Aviationist, 12 March 2018, https://theaviationist.com.
65. "Ekipazhi VKS prodemonstriruiut aviatsionnyj raketnyj kompleks 'Kinzhal' vo vremia voennogo parada na Krasnoj ploshchadi" [Air-Space Forces crews will demonstrate air missile system 'Kinzhal' in the Red Square parade], Russian Defense Ministry website, 3 May 2018, https://function.mil.ru.

on the Tu-22M3 bomber, which has just received an upgraded Kh-32 missile, so the gain in capabilities is uncertain.[66]

Two other projects are based on the highly questionable technological breakthrough of constructing a compact nuclear reactor that serves as an engine driving unmanned vehicles travelling extra-long distances. This design was crudely developed back in the early 1960s for aircraft but abandoned as too heavy and risky.[67] Putin asserted that a cruise missile (named *Burevestnik*) had been successfully tested, but this claim is far from convincing.[68] Another project with the same propellant is an underwater drone (named *Poseidon*), which is presumably a different weapon system from the torpedo, with a 10-megaton nuclear warhead (*Status*-6) intended to cause underwater explosions and tsunami, which was revealed in 2015.[69] Such a "doomsday weapon" makes for exciting imagery, but little strategic sense.[70] The idea of an autonomous underwater drone (UUV) doesn't sit well with the strong emphasis in Russian naval strategy on upgrading and strengthening the submarine forces, including the new *Yasen*-class nuclear attack submarines, and the next generation *Husky*-class platforms.[71] These sophisticated ships become redundant; what is needed instead is a transport submarine that could carry several UUVs, which are supposed to be capable of automatic target selection and maneuvering.

Overall, Putin's presentation of new weapon systems covers a range from well-established projects to fanciful designs, with important and inexplicable omissions in each category. The Defense Ministry duly focuses attention on tests and fine-tuning of the six weapons systems prioritized by the Commander-in-Chief.[72] The new guidelines add new priorities and increase demand for the resources needed to advance the already overloaded nuclear modernization program.

66. "New Kh-32 Anti-Ship Missile Becomes Operational in Russia", Navy Recognition, 26 March 2018, www.navyrecognition.com.
67. V. Sychev, "Raketa, o kotoroj nikto ne znal" [The missile that nobody knew about], Meduza, 4 March 2018, https://meduza.io.
68. A. Macias, "Putin Claimed a New Nuclear-Powered Missile Had Unlimited Range–but it Flew Only 22 miles in its Most Successful Test Yet", CNBC, 21 May 2018, www.cnbc.com.
69. "'Tsar'-torpeda' vozvrashchaetsia: delo Sakharova zhivet" [Tsar-torpedo comes back: Sakharov's project is resurrected], Gazeta.ru, 25 June 2018, www.gazeta.ru.
70. D. Mosher, "Putin's Nuclear 'Doomsday Machine' Could Trigger 300-Foot Tsunami", Business Insider, 3 January 2018, https://nordic.businessinsider.com.
71. "Latest Details on Russia's Fifth-Generation Husky Submarine", Navy Recognition, 18 June 2018, www.navyrecognition.com.
72. "Minoborony RF obnarodovala VIDEO ispytanij 'neuiazvimykh' giperzvukovykh raket i bespilotnoj podvodnoj torpedy" [Defense Ministry presents VIDEO of tests of 'invincible' hypersonic missiles and underwater drone], Newsru.com, 19 July 2018, www.newsru.com.

The New Features of Nuclear Deterrence

Putin's 2018 address has reinforced the trend of prioritizing means over aims in Russia's modernization of its nuclear arsenal. The 2027 Armament Program is shaped by the struggle of various lobbies to get funding for their labor-intensive and resource-consuming projects, and Putin shows a propensity to put weapon systems first, and to adjust the strategic guidelines accordingly. This trend was typical of the USSR in the 1970s and 1980s, when the influence of the defense-industrial complex prevailed over the preferences of the top brass. In Putin's Russia of the late 2010s, the pronounced worry about falling behind in global competition shifts political attention to new technological designs, which interferes with the half-implemented projects, particularly in a situation where available resources are dwindling. This industry and technology-driven decision-making has an incoherent and often uninformed impact on the transformation of the nuclear deterrence strategy.

The changing meaning of strategic stability

The upholding of strategic stability is defined in Russian official documents as a "fundamental proposition in ensuring national security", but the meaning of this key notion remains vague.[73] Typically, it is the US development of a missile defense system that is defined as the main challenge to strategic stability, which reflects more the shock from the collapse of the ABM Treaty in late 2001, than any recent concerns about progress achieved by the USA in this area. Another challenge is seen in the US Prompt Global Strike capability-building, which is seriously misinterpreted as an effort to obtain the capacity to deliver a disarming conventional strike.[74] The militarization of space and cyber-attacks are other challenges, while it is notable that Moscow never officially describes the rapid strengthening of China's strategic nuclear potential as a security

73. "Ugrozy strategicheskoj stabil'nosti – mnimye i real'nye" [Threats to strategic stability: imaginary and real], RIAC, 28 April 2018, pp. 7-29, http://russiancouncil.ru.
74. A. Polunin, "Global'nyj udar: SShA unichtozhat Rossiiu za 60 minut" [Global strike: USA would destroy Russia in 60 minutes], *Svobodnaia Pressa*, 13 October 2017, http://svpressa.ru.

issue.[75] Erosion of the non-proliferation regime is also included in the menu of potential challenges.

Russian responses to these challenges are forceful, extensive and remarkably counter-productive. This is most obvious in the strategy of countering the US missile defense build-up, which is both misguided and logically flawed. The former deficiency stems from the characteristic over-estimation of the real scale of US efforts invested in building a comprehensive missile defense system. These efforts have been expanded, but even the maximum possible investment in a "missile shield" initiated by President Trump would not correspond to Russia's pre-emptive massive investments in crashing this defense.[76] In fact, most of the current Russian projects in upgrading the capabilities of strategic forces can be traced back to the early 1980s when Soviet design bureaus worked hard on producing a set of responses to the US "Star Wars" initiative. The fact that in the past 35 years the US research and experiments have not progressed much does not prevent Russian industrial lobbies from promoting updated versions of the old designs, while the arguments of independent experts about the guaranteed sufficiency of the existing grouping of Russian strategic forces for breaking through any prospective US "anti-missile shield" fail to register with the Kremlin.[77] Putin asserted with sincere triumphalism that the new weapon systems would render the US missile defense irrelevant and thus restore global stability.[78]

Moscow also argues that deployment of missile defense systems in every theatre—from South Korea to Europe—is a destabilizing development. What constitutes a logical contradiction with this proposition is the commitment to build Russia's own missile defenses, first of all around Moscow, but also in many key locations, such as the Kaliningrad enclave, the Crimea, or the Kola Peninsula. Strictly speaking, there is no specific concept of "anti-access/area denial" (A2/AD) in Russian military strategy, but the aim of establishing air dominance over strategically pivotal positions is firmly established—and now it is enriched with the task of protecting these positions against missile strikes.[79] While the official discourse mostly

75. V. Kashin, "Razvitie iadernykh sil Kitaia: nachalo glubokoj transformatsii" [China's nuclear forces development: the beginning of deep transformation], *Kontury Globalnyh Transformatsyj*, Vol. 9, No. 4, 2016, www.ogt-journal.com.

76. F. A. Rose, "Will the Upcoming Missile Defense Review Maintain the Current Course or Plot a New Direction?", *Order from Chaos*, Brookings, 11 June 2018, www.brookings.edu.

77. A. Arbatov, "Vyzov broshen" [The challenge is given], *Kommersant*, 12 March 2018, www.kommersant.ru.

78. N. Protopopov, "Iadernyj 'Avangard'. Kak Rossiia vosstanavlivaet global'nyj balans sil" [Nuclear 'Avangard': How Russia restores the global balance], RIA Novosti, 23 May 2018, https://ria.ru.

79. S. Sukhankin, "From 'Bridge of Cooperation' to A2/AD 'Bubble': The Dangerous Transformation of Kaliningrad Oblast", *Journal of Slavic Military Studies*, Vol. 31, No. 1, 2018, pp. 15-36.

refrains from elaborating on Russia's strategic defense efforts, many publications in the mainstream media praise the alleged effectiveness of the upgraded anti-missile "shield".[80] The planned introduction of such weapon systems as the S-500 would make it possible to integrate air/missile defenses of particular high-value positions into one centralized system. Putin did not specify, for that matter, the intended use of the *Peresvet* laser weapon system, but experts speculate that it could intercept incoming ballistic warheads, even if the technical feasibility of such performance is very doubtful.[81] It is impossible to reconcile the argument that the US plans for building missile defense are a major threat to strategic stability with the implicit proposition that Russia's more extensive efforts ensuring integration of theatre-level and strategic defenses are not.

Another threat to strategic stability is found in the prospect of deploying strike or anti-ICBM weapon systems on space orbits, and President Trump's decision to create the Space Force is interpreted as a major step in this direction.[82] There is certainly no acknowledgement of the fact that Russian projects for building anti-satellite weapons (including the so-called "inspector satellite") also constitute a form of militarization of space.[83] Cyber-attacks that can disrupt the rigidly centralized system of control over the Armed Forces are seen as another fast-developing threat to strategic stability, and Russia's bold experiments in executing such attacks are only increasing its own vulnerability.[84] Defense Minister Sergei Shoigu takes pride in building a new command center in Moscow for controlling every military garrison, but the system of control over the strategic assets remains basically unchanged from Soviet times.[85] This conservatism makes a stark contrast with the emphasis on incorporating cutting-edge technologies into new weapon systems and perfecting their target acquisition with elements of artificial intelligence.[86] The assumption behind this reluctance to modernize the top level of the command system is that the old communication technology ensuring the launch of missiles (known as

80. S. Ptichkin, "Raketa letit bystree puli" [Rocket flies faster than bullets], *Rossiiskaia gazeta*, 19 October 2017, www.rg.ru.
81. P. Ivanov, "Svet v kontse poleta" [Light at the end of the flight], *Voenno-Promyshlennyi Kur'er*, 12 March 2018, https://vpk-news.ru.
82. R. Bosikov and A. Gromov, "'Zvezdnyj put' Donal'da Trampa: ot kosmicheskikh vojsk do osvoeniia Marsa" [Star trek of Donald Trump: From space forces to colonization of Mars], TASS, 20 June 2018, http://tass.ru.
83. "Russian Inspector Satellite Sets out on Orbital Endeavors", SpaceFlight101.com, 28 August 2017, http://spaceflight101.com.
84. V. Shcherbakov, "Zavtra Pentagon naneset udar po Rossii" [Tomorrow Pentagon will deliver a strike on Russia], *Nezavisimoe voennoe obozrenie*, 6 November 2018, http://nvo.ng.ru.
85. A. Golts, "Kazarmennyj uklon" [Barracks style], *The New Times*, 27 November 2017, https://newtimes.ru.
86. "'Zhelezo s mozgami': kakoe oruzhie Rossii umeet 'dumat'" ['Iron with brains': Russian weapons that can 'think'], TASS, 13 June 2018, http://tass.ru.

Perimeter) is invulnerable to cyber-attacks.[87] Putin made a point of personally launching four missiles during a recent strategic exercise, but it is unclear how this command was delivered—and whether the antiquated system is really reliable.[88]

The current Russian interpretations of strategic stability are essentially self-serving and aimed at justifying the uniquely broad range of projects being implemented in the modernizing of Russia's nuclear arsenal. This parochial approach to a fast-evolving problem causes setbacks in the official Russia-US talks on strategic stability, and renders fruitless the efforts to set "second track" channels between experts and think-tanks.

The prospects for Russia-US arms control

Russia's efforts to modernize its nuclear arsenal are so expansive that the question about its interest in setting new limitations on this through arms control agreements might appear unreasonable. Indeed, the existing treaties are in danger of unravelling, and various Russia-US talks, including high-level ones, have been adding to the controversies rather than resolving them. Expert opinions about a possible breakdown of the traditional mechanism of arms control, therefore, appear well-informed.[89] Nevertheless, there are good reasons to assume that the Russian leadership is preparing the ground for several new breakthroughs in negotiating meaningful limitations to strategic and non-strategic nuclear weapons, and the much-debated Putin-Trump summit in Helsinki in July 2018 has supplied evidence that validates this view. There was no meeting of minds on the arms control matters, but Putin's interest is documented.[90] Indeed, opening several channels of bilateral bargaining with the USA on cuts in redundant armaments is the best way to establish Russia's "great power" status in the global arena. In his 2018 address, Putin was careful to avoid any breaches of existing obligations, and shrewdly offered Washington new incentives to engage in talks.[91]

87. A. Khrolenko, "'Perimetr': kak ustroena rossijskaia sistema otvetnogo iadernogo udara" [The 'Perimeter': How the Russian system of retaliatory nuclear strike works], RIA Novosti, 21 August 2017, https://ria.ru.
88. "Putin lichno zapustil chetyre ballisticheskie rakety na ucheniiakh" [Putin personally launched four ballistic missiles in exercises], RIA Novosti, 27 October 2017, https://ria.ru.
89. E. Rumer, "A Farewell to Arms...Control", *US-Russia Insight*, CEIP, 17 April 2018, https://carnegieendowment.org.
90. B. Bender, "Leaked Document: Putin Lobbied Trump on Arms Control", *Politico*, 7 August 2018, www.politico.com.
91. V. Baranovskij, "Idu na vy – v ramkakh obiazatel'stv" [Giving challenge within limits], *Russia in Global Affairs*, 6 March 2018, www.globalaffairs.ru.

The obvious place to start for Moscow is the prolongation of the New START Treaty, which is set to expire in 2021. Putin raised this issue in his first telephone conversation with Trump, and elaborated on it in Helsinki.[92] Russian reservations about the US implementation of its provisions are more an invitation to take this simple step than an obstacle to it.[93] From this point of departure, several avenues for negotiations on a significantly reshaped successor to the New START Treaty might open. Putin allegedly suggested dealing with "destabilizing" weapon systems, without going into detail. Russian commentators suggest that the emphasis is placed on space-based weapons.[94] A renewed commitment on non-militarization of space seems easy, but that clashes with Trump's ambition to build a new space branch of the US armed forces, so some compromises and even unilateral concessions might be necessary in order to advance this agenda. One innovative initiative could be a ban on laser weapon systems. It would not be a major sacrifice for Putin to cancel the rather dubious *Peresvet* project. Another proposal could be a ban on developing cruise missiles propelled by nuclear reactors, which remains a technically dubious proposition.[95] Nuclear-propelled under-water drones could also be a topic for discussion, particularly since Russia is interested in bringing naval platforms into the calculus of increasingly fluid balances.

Putin may be disappointed by Trump's indifference to arms control, so he may try to get him interested in proposals involving demonstrable compromises on the Russian side, knowing that his mercurial counterpart is not keen to supervise hard negotiation work on calculated compromises but is eager to achieve quick successes. This may help in clearing the first hurdle, which is a matter of attitude: Trump remains reluctant to embrace the New START Treaty, seeing it as a part of President Barack Obama's heritage. A more serious problem is the predictable but still shocking announcement of US withdrawal from the INF Treaty, made by President Trump at an election rally and elaborated by his National Security Advisor John Bolton in no uncertain terms.[96] Russia had expected the mutual blame game concerning violations to continue for many months to come, and kept marshalling evidence so as to deflect US accusations with counter-claims, but now it has

92. A. Antonov, "Posol RF v SSHA: Putin i Tramp podderzhali sokhranenie dogovorov ob SNV i RSMD" [Russian ambassador to US: Putin and Trump support the preservation of the START and INF treaties], TASS, 18 July 2018, http://tass.ru.

93. P. Podvig, "New START Controversies", Russian Strategic Nuclear Forces, 15 April 2018, http://russianforces.org.

94. V. Muhin, "SShA vtiagivaiut Rossiiu v gonku vooruzhenij" [USA pulls Russia into a new arms race], *Nezavisimaia gazeta*, 9 August 2018, www.ng.ru.

95. R. Pickrell, "Russia Apparently Can't Afford Putin's Problematic Nuclear-Powered Cruise Missile", *Business Insider*, 25 March 2019, www.businessinsider.com.

96. P. Baev, "Russia Reconsiders Consequences of INF Treaty Breakdown", *Eurasia Daily Monitor*, Vol. 15, No. 153, 29 October 2018, https://jamestown.org.

to get serious about the consequences of collapse of this crucial pillar of the arms control system.[97] Technologically and operationally, Russia is well prepared for this breakdown, but the calculus of strategic risks contains too many independent variables, so the Kremlin cannot be confident in gaining any political leverage from deploying land-based "Euro-missiles".

The dualism in Moscow's position on arms control, signaling to the USA its interest in engaging in new talks and demonstrating readiness to break free from constraints, is supposed to provide room for diplomatic and strategic flexibility.[98] The combined impact of massive modernization of nuclear forces and bragging about new weapon systems is, however, so strong that Russia proceeds with momentum toward a posture where old frameworks become irrelevant and new initiatives fail to address so many gaps in the damaged structures of mutual restraint.

The issues for European security

Russia's sustained investment in upgrading its nuclear arsenal has multiple consequences for European security, even if most new weapon systems advertised by Putin have global reach and are supposed to impress the USA first and foremost. The pronounced desire of the Kremlin to interact bilaterally with the Trump administration in setting a new strategic balance presents a challenge for the Europeans, who are uncertain as to what degree their interests are being taken into account. Putin's persistent courting of Trump is aimed at exacerbating tensions within the North Atlantic Treaty Organization (NATO), and the sequence of summits in July 2018 provided a perfect illustration for that. Arms control for Moscow is not only a way to boost Russia's international profile, but also a means of deepening trans-Atlantic disagreements, in which the nuclear arms race has become a major issue. One particular tool here is asserting Russia's commitment to the nuclear deal with Iran, which the European Union (EU) seeks to preserve.[99] The Europeans have reasons to worry about Washington's lack of interest in arms control, but Moscow's attempts to show such interest are far from convincing.

97. A. Arbatov, "The Danger of Withdrawing From the INF Treaty", *Comments*, Carnegie Moscow Center, 26 October 2018, https://carnegie.ru.
98. I. Subbotin, "Iadernye arsenaly daiut Rossii i SShA shans na razriadku" [Nuclear arsenals give Russia and USA a chance for détente], *Nezavisimaia gazeta*, 9 August 2018, www.ng.ru.
99. V. Inozemtsev, "Vektor otchuzhdeniia: pochemu konflikt s SShA ne podtolknet Evropu k Rossii" [The estrangement vector: Why the conflict with the US will not push Europe toward Russia], *RBC*, 3 July 2018, www.rbc.ru.

An issue of pivotal importance for European security is the breakdown of the INF Treaty.[100] NATO supported the US position that Russia was in violation (even if Washington never bothered to present compelling evidence) and demanded return to full compliance, but currently it is unable to take any stance, while the EU insists on preserving the INF Treaty.[101] The influential lobby in Washington, which advocates withdrawal from the treaty due to its proven unenforceability, has scant concerns about the balance of forces in the European theatre.[102] This step fits the pattern of US unilateral actions, but clashes with the preferences of the allies, who have to face the fact that Russia is well prepared to deploy intermediate-range missiles and NATO is not.[103] Moscow might find it useful not to rush such deployment but to demonstrate self-restraint, assuming that such capacity for creating a direct threat would suit its political interests better than actual escalation. By means of propaganda, Moscow is persistently targeting the objections in many segments of European public opinion to the storage of some 150 US nuclear bombs in four European countries and Turkey, and seeks to exploit the spreading anti-nuclear sentiments, much like the USSR did in the early 1980s.[104]

In wielding the nuclear instruments of policy, Moscow has recently shown greater caution in the Baltic theatre, where NATO is focusing its attention, but more recklessness in the Black Sea theatre. The assumption probably is that Turkey is not at all eager to be a part of NATO activities on this flank, while the annexation of Crimea grants Russia a major strategic advantage. Six new *Varshavyanka*-class submarines of the Black Sea Fleet gained combat experience in firing their *Kalibr* missiles at targets in Syria.[105] The squadron of MiG-31 fighters equipped with *Kinzhal* missiles is based in the Southern district, constituting a "response" to the US missile defense base in Deveselu, Romania. Defense Minister Shoigu asserted that the

100. N. Sokov, "The INF Treaty Crisis: Filling the Void with European Leadership", *Arms Control Today*, Vol. 49, No. 2, March 2019, pp. 20-24.
101. P. Baev, "European Angst about Trump's INF Treaty Withdrawal", *Order from Chaos*, Brookings, 29 October 2018, www.brookings.edu.
102. M. Dodge, "Time to Withdraw from the Intermediate-Range Nuclear Forces Treaty", *Real Clear Defense*, 30 March 2017, www.realcleardefense.com.
103. I. Anthony, "European Security after the INF Treaty", *Survival*, Vol. 59, No. 6, 2017, pp. 61-76.
104. "Russia Condemns US Nuclear Bombs Plans", *BBC News*, 3 February 2018, www.bbc.com; J. Borger, "US Wasting Billions on Nuclear Bombs That Serve no Purpose and Are Security Liability–Experts", *The Guardian*, 15 February 2018, www.theguardian.com.
105. G. Visan, "Growing Submarine Threat in the Black Sea", *Eurasia Daily Monitor*, Vol. 15, No. 8, 19 January 2018, https://jamestown.org.

"unique grouping" of Russian forces in Crimea would leave no chances to any potential enemy.[106]

The combination of improved air defense and long-range high-precision strike capabilities grants Russia the ability to project power deep into NATO territory. A theatre where Russia has gained a position of dominance based on such a combination, and can also bring its nuclear capabilities into play, is the Arctic.[107] The concentration of strategic submarines in the Kola bases is covered by batteries of the newest surface-to-air and anti-ship missiles, but these conventional capabilities could be used in support of an aggressive move with the grouping of marine and Arctic brigades because the presence of nuclear assets can actually deter NATO from executing counter-measures. The Svalbard archipelago, over which Norway has limited sovereignty, makes an attractive target for such projection of power or a subtler "hybrid" operation covered by nuclear superiority.[108] Reckless attempts to disrupt NATO *Trident Juncture* 2018 exercises by performing missile tests inside its area and patrols by strategic bombers over the Barents and Norwegian seas demonstrated Russia's readiness to deploy nuclear delivery platforms.[109]

Overall, the sustained modernization of Russia's nuclear arsenal has had a significant and potentially severe impact on the basic structures of European security, and Putin's presentation of new weapon systems has brought this potentiality a step closer to reality. The Russian leadership intends, and even needs to gain political advantages from these modernized capabilities, and its assertive signals show readiness to accept high risks in the evolving confrontation.

106. "Gruppirovka vojsk v Krymu ne ostavit vragu ni edinogo shansa–Shojgu" [Grouping of forces in Crimea would leave not one chance to the enemy–Shoygu], Federal'noe agenstvo novostej, 20 June 2018, https://riafan.ru.

107. A. Finne, "Norwegian Intelligence Services: Arctic high on the Russian agenda", *High North News*, 6 March 2018, www.highnorthnews.com.

108. P. K. Baev, "Russia's Ambivalent Status Quo/Revisionist Policies in the Arctic", *Arctic Review on Law and Politics*, 2018 (forthcoming).

109. T. Nilsen, "Russia Announces Rocket Shooting Just Outside Finnmark in the Final Days of NATOs Trident Juncture", The Barents Observer, 31 October 2018, https://thebarentsobserver.com.

Conclusion: Can Russia Turn into a Nuclear Revisionist Power?

Russia is not a typical revisionist power, which seeks to break the constraints of a particular international order by relying on its growing strength, because the economic foundation of Russia's military might is far from solid. Proceeding along the path of confrontation with the West, Moscow enacts a rare revisionism from a position of weakness, and it is the steady modernization of its nuclear arsenal that makes this performance possible. Nuclear deterrence Russian-style is not just about guaranteeing its security against external threats, but about granting it freedom to experiment with various conventional and "hybrid" means of projecting power. As these experiments lead to mixed results and much trouble, Moscow is compelled to rely more directly on nuclear instruments.

Since the start of this decade, the Russian leadership has invested so much resources in modernizing all components of its strategic and non-strategic nuclear forces that, in a situation where the economy is increasingly affected by the sanctions regime, it becomes necessary to get maximum returns on these investments. Any military use of nuclear munitions remains a powerful taboo, but Moscow must find ways to turn nuclear capabilities into more useful instruments of policy. Arms control talks with the USA are one such way, but this path has so far remained blocked, and President Trump's policies and attitudes make it less than promising.

Various implicit threats and high-profile exhibitions, such as Putin's 2018 address to the Federal Assembly, generally fail to make the desired impression or turn out to be counter-productive. The Kremlin seeks to restore the centrality of nuclear weapons in international relations, and the development of the crisis driven by the nuclear and missile tests in North Korea proved that Russia stands to gain from greater focus of Western concerns on nuclear issues. One drastic means of aggravating these concerns could be the resumption of nuclear testing, which could have already started with the extremely low-yield munitions.[110] Russia certainly denies any

110. J.E. Barnes and W.J. Broad, "Russia Has Restarted Low-Yield Nuclear Tests, US Believes", *The New York Times*, 29 May 2019, https://www.nytimes.com.

wrongdoing of this sort and reminds that the Comprehensive Test Ban Treaty has not actually entered into force because the USA (as well as China) has not ratified it.[111] There are good technical reasons for testing the ageing nuclear warheads, but as far as reputational damage from such drastic breach of norms of international behavior is concerned, Moscow may well conclude that it has little to lose. The old nuclear test site on Novaya Zemlya in the Arctic is currently used for explosions simulating nuclear impacts and for test-flights of nuclear-propelled cruise missiles; it will not take much effort to prepare it for a low-yield underground nuclear detonation.[112]

What stands in the way of this nuclear revisionism and limits Russia's capacity to employ its nuclear might for political purposes more effectively than any treaties is the weakness of the economic foundation. The military-industrial complex fails to deliver on many ambitious tasks and is affected by the same problems of mismanagement, embezzlement and corruption that bedevil Russia's money-making oil-and-gas sector.[113] Many prioritized nuclear-related projects in the 2027 State Armament program are affected by delays and technological setbacks, and the cuts in allocation of resources are not only causing further delays but also increasing the risks of technical accidents. Failures of space launches are generating bad publicity and some financial losses, and the loss of the largest dry dock could hamper the modernization of the Navy, but a nuclear accident could produce far worse consequences.[114]

Russia's ambitions regarding the exploitation of its presumed and real advantages in various nuclear capabilities for political purposes are a serious source of threat for its European neighbors. Russian top brass perceive as a significant strategic advantage the ability to take risks that are assessed by the US and NATO authorities as unacceptable. Such ambitions and risk assessments give rise to a disinclination and even inability to manage the nuclear arsenal responsibly—and this could beget an even greater threat.

111. A. Baklitskij, "Nevidimye vzryvy: zachem SShA obvinili Rossiiu v novykh iadernykh ispytaniiakh" [Unseen explosions: Why US accused Russia in new nuclear testing], RBK, 20 June 2019, www.rbc.ru.
112. "Rossiia ukrepit voennoe prisutstvie na arkticheskikh ostrovakh" [Russia will strengthen its military presence on the Arctic islands], Interfax, 14 February 2018, www.interfax.ru.
113. A. Golts, "Dmitrij Rogozin kak zerkalo OPK" [Dmitri Rogozin as a mirror of the defense-industrial complex], *The New Times*, 28 May 2018, https://newtimes.ru. An investigation of corruption in the Tactical Missile Armaments corporation (KTRV) is presented in R. Anin, R. Kulistikova, D. Velikovsky, "Podnialis' na iadernom shchite" [Lifted on the nuclear shield], *Novaia gazeta*, 7 November 2018, www.novayagazeta.ru.
114. A. Staalsen, "Sunken Dry Dock Could Trouble Modernization of the Navy", The Barents Observer, 30 October 2018, https://thebarentsobserver.com.

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