

WMD in Asia-Pacific

Edited by

*Peter Hayes, Tanvi Kulkarni,
Chung-in Moon & Shatabhisha Shetty*

Chapter 2



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A Looming Strategic Arms Race in the Asia-Pacific Region: From a Chinese Perspective

Luo Xi

Introduction¹

Nuclear weapons have become integral to Russia's reclamation of its major power role after the collapse of the former Soviet Union. It began a nuclear modernization program in the late 1990s, which is still ongoing. According to President Vladimir Putin's report in late 2019, modernized equipment now accounts for eighty-two percent of Russia's nuclear triad.² Russia's declaratory policy is to develop and deploy nuclear weapons to deter and, if necessary, prevail in a regional war—a strategy known as “escalate to de-escalate.”

Russia's strategic modernization program has three elements. First, it is routinely replacing aging warheads and delivery systems with new, more advanced ones. Russia's nuclear triad consists of land-based intercontinental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs), and strategic bombers. The land-based component of the strategic triad includes two versions of the SS-27: Mods 1 and 2. The focus of the current and larger phase of Russia's modernization is the SS-27 Mod 2 ICBM (known in Russia as RS-24 Yars), which is equipped with four multiple independently targetable reentry vehicles (MIRVs). Russia is also developing

¹ This paper was prepared for the Weapons of Mass Destruction (WMD) in the Asia-Pacific Workshop, organized by the Asia-Pacific Leadership Network for Nuclear Non-proliferation and Disarmament (APLN) in December 2020. A version of this paper was published in the *China International Strategy Review* in June 2021 under the title, “Competition between great powers and a looming strategic arms race in the Asia-Pacific.”

² Russian Federation Defence Ministry, “Supreme commander-in-chief of the Russian Federation Attends Extended Session of the Russian Defence Ministry Board Session.” *Press Release*, December 18, 2018, http://eng.mil.ru/en/news_page/country/more.htm?id=12208613@egNews

the heavy multiple-warhead ICBM (SS-X-29), known as Sarmat, which will replace the SS-18 in 2021.³ As for the sea-based component of its nuclear triad, Russia has already announced a plan to build five and purchase two more new Borei class submarines (Project 955A) to replace the older Delta IV SSBNs (Project 667BDRM) after 2023.⁴ Russia has also resumed production of the Tu-160 aircraft in 2019 and is expected to field the first ten Tu-160M2s before 2027.

Second, Russia has begun to modernize its tactical nuclear weapons. As of early 2020, Russia is estimated to have a stockpile of about 4,310 nuclear warheads that are assigned to long-range strategic launchers and shorter-range tactical nuclear forces.⁵ Of these, about 1,870 are nonstrategic warheads.

Third, Russia has begun to develop, test, and produce new “exotic” types of nuclear weapons. In March 2018, President Putin listed five new nuclear-capable weapons systems:

1. a nuclear-armed, maneuvering hypersonic glide vehicle (the Avangard), currently carried by a modified SS-19, and soon to be carried by an SS-29
2. a nuclear-powered, nuclear-armed cruise missile of “unlimited” range (the Burevestnik) to penetrate an adversary’s missile defense systems
3. an air-launched ballistic missile purportedly intended to target ships (the Kinzhal)
4. an SS-18 follow-on ICBM with modern features to penetrate missile defenses (the Sarmat)
5. a deep-diving, unmanned, nuclear-powered and nuclear-armed underwater delivery vehicle (the Poseidon) that is scheduled for delivery in 2027⁶

In February 2019, President Putin announced an additional nuclear-powered anti-ship hypersonic cruise missile (the Tsirkon) to the Russian nuclear weapons inventory. All these programs illustrate that Russia is determined to continue its reliance on nuclear weapons as a key element of its national security strategy. The new and “exotic” nuclear weapons provide means to augment

³ RIA Novosti, *Russia to Develop New Heavy ICBM by 2020*, December 20, 2010, <https://sputniknews.com/russia/20101220161856876/>

⁴ Hans M. Kristensen & Matt Korda, “Russian nuclear forces 2020,” *Bulletin of the Atomic Scientists*, 2020, Vol.76, No.2, pp.102-117.

⁵ Hans M. Kristensen & Matt Korda, “Russian nuclear forces, 2020,” *Bulletin of the Atomic Scientists*, Vol.76, No.2, pp.102-117.

⁶ President of Russia, *Presidential Address to Federal Assembly*, March 1, 2018, <http://en.kremlin.ru/events/president/news/56957>

existing nuclear forces with systems that are not counted under the New Strategic Arms Control Treaty (New START), now extended by the United States and Russia for five years by Presidents Biden and Putin.

These dynamics of Russian nuclear arms replacement, modernization, doctrine, and deployment—along with those of the United States—converge to suggest the new nuclear arms race between the United States and Russia will be different from that of the Cold War. In the late 1960s and early 1970s, the Soviet Union and the United States had approximate parity in the number of deliverable weapons in their nuclear arsenals. Their key strategic nuclear objectives were to obtain sufficient capacity to inflict a certain level of assured damage to the other one in a retaliatory strike. Driven by the reality of assured retaliation and near certainty of mutual annihilation in a nuclear war, the two nuclear superpowers had little incentive to pre-emptively strike the other's strategic nuclear forces. During the second half of the Cold War, Soviet leaders became uncertain of being able to indefinitely maintain a posture of guaranteed retaliation and mutual annihilation.⁷ Three decades after the Cold War ended, we find the principles which guide the numbers or size of nuclear weapons have changed. On the one hand, the United States re-emphasized nuclear deterrence, boosted its nuclear modernization, and acted skeptically towards arms control measures. Thus, the guiding principles that shape the size and type of US nuclear forces have shifted from preserving strategic stability between the nuclear great powers to countering strategic threats from nuclear adversaries, whether they be small, medium, or great powers. Conversely, Russia's nuclear modernization is still motivated in part by Moscow's strong desire to maintain overall numerical parity with the United States. For the Russian leadership the US ballistic missile defense system constitutes a real future risk to the credibility of Russia's retaliatory capability. Consequently, Russia began to research and develop new nuclear systems to counter deployment of US missile defenses. This unrestrained nuclear competition between the United States and Russia may complicate future bilateral arms control negotiation and potentially affect China's cognition of its own nuclear retaliatory capabilities.⁸

⁷ Brendan R. Green and Austin Long, "The MAD Who Wasn't There: Soviet Reactions to the Late Cold War Nuclear Balance," *Security Studies*, 2017, Vol.26, No.4, pp.606-641.

⁸ Charles L. Glaser, C. L., and Steve Fetter. 2016. "Should the United States Reject MAD? Damage Limitation and US Nuclear Strategy toward China," *International Security* 41 (1), pp.49-98.

Apart from the major powers, more regional states have undermined efforts to restrain missile-proliferation by acquiring the scientific, technological, and industrial capabilities to produce both ballistic and cruise missiles.⁹ The DPRK, India, and Pakistan have declared their possession of nuclear weapons and demonstrated their ability to use ballistic missiles. The DPRK test-fired an inter-continental range ballistic missile, which can reach at least the US West Coast, some 8,000 kilometers distant. India flight-tested a system with a range of 3,500 to 5,000 kilometers. Pakistan also has intermediate-range ballistic missiles able to carry nuclear warheads over 2,750 kilometers.¹⁰ Evidently, states will continue developing or acquiring missiles and related technologies, despite interdiction, international condemnation, sanctions, and asymmetric efforts to limit them.

The “Post-INF” Capabilities and Major Powers’ Strategic Interactions

The Intermediate-Range Nuclear Forces Treaty (INF) ended in 2019, but the issue of INF-range missiles remains. Russia’s alleged treaty violations and China’s increasing conventional and nuclear armed missile capabilities drove the United States to withdraw from the treaty. The former Trump Administration held that if the United States remained bound by the INF treaty limits, then it would be increasingly at a disadvantage with respect to Russia and China. American analysts argued that China has deployed thousands of land-based intermediate-range ballistic and cruise missiles, and ninety-five percent of them would violate the INF if China was party to it—which, of course, it is not.¹¹ After the US INF withdrawal, Russia decided to suspend its obligations under the INF treaty as a countermeasure. The current Biden Administration remains greatly concerned with Russia and China’s potential employment of nuclear and conventional armed intermediate-range ballistic and cruise missiles and may try to seek negotiations on a global treaty to ban them.¹² The termination of the treaty means that the Asia-Pacific has entered into a “post-INF” era in

⁹ Nuclear Threat Initiative, “The Delivery Systems Threat,” *Nuclear Threat Initiative*, December 30, 2015, <http://www.nti.org/learn/delivery-systems/>

¹⁰ Missile Threat, Missile Defense Project. Lasted updated July 31, 2021, <https://missilethreat.csis.org/missile/shaheen-3/>

¹¹ Jacob Stokes, “China’s Missile Program and US Withdrawal from the Intermediate-Range Nuclear Forces (INF) Treaty,” *US-China Economic and Security Review Commission Staff Research Report*, Feb.4,2019, p.2.

¹² Sharon Squassoni, “How the Biden Administration can Secure Real Gains in Nuclear Arms Control,” *Bulletin of the Atomic Scientists*, March 30, 2021, <https://thebulletin.org/2021/03/how-the-biden-administration-can-secure-real-gains-in-nuclear-arms-control/>

which, as explained below, “post-ballistic” capabilities become a priority in military planning of these states and tripolar great power strategic interactions become more complex.

The “post-ballistic” capabilities arise from emerging technologies such as advanced guidance and stealth technology. Enhanced by these new technologies, a new generation of cruise missiles and tactical (shorter-range) ballistic missiles gained greater accuracy, reliability, and affordability than the long-range ballistic missiles. Modern cruise missiles can fly at low altitudes, which make them less visible to radars coverage and more difficult to detect and defend against. Shorter-range ballistic missiles, with their accuracy measured in meters, have become effective tools for taking out high-value, well-defended targets inside an adversary’s territory.

These attributes, however, leave target nations with very limited ability to counter the new generation of missiles in wartime. Hypersonic vehicles with speeds of Mach 5 and above, for example, can drastically reduce the timelines for attack and response. The further proliferation of hypersonic missiles and the related technologies may cause miscalculation and misperception. Hypersonic weapon systems are divided into hypersonic glide vehicles and hypersonic cruise missiles. The United States, Russia, France, Japan, China, and India are all pursuing these weapons. Russia has already deployed early versions. Furthermore, the growing popularity of dual-capable missiles, when equipped with either conventional or non-conventional warheads, are also destabilizing and could lead to devastating deterrence failures because the payload ambiguity increases uncertainty in a crisis and, thereby, the stakes of not striking first.

Russia has tested and fielded a new ground launched cruise missile system (9M729) that the United States claimed violated the INF treaty since May 2013.¹³ Over the last two decades, China has deployed several new models of land-attack and anti-ship conventional cruise missiles, which are viewed by the United States as providing what it calls “Anti-access/Area-denial” (A2/AD) capability. On 3 August 2019, the day after the United States withdrew from the INF Treaty, then US Secretary of Defense Mark Esper revealed that the United States aims to deploy INF-range missiles in the Asia-Pacific to counter China’s “A2/AD” capabilities.¹⁴ At the same time, the

¹³ US Congressional Research Service, *Russian Compliance with the Intermediate Range Nuclear Forces (INF) Treaty: Background and Issues for Congress*, 8 February 2019.

¹⁴ Robert Kobza, “Another Tool in the Toolbox: Using Intermediate-Range Missiles to Counter A2/AD in the Pacific,” *Georgetown Security Studies Review*, 2 December 2019: 11.

Pentagon initiated a study to evaluate whether the United States needed new military capabilities to offset any advantage Russia and China might acquire by deploying a ground-launched cruise missile of INF range (between 500 and 5,500 kilometers). The potential US Army and/or Marine Corps options to deploy land-based intermediate-range missiles in this region include the intermediate-range ballistic missile (IRBM) with hypersonic glide vehicle, with a range of 4,000 km; the Tomahawk ground-launched cruise missile (GLCM), with a range of less than 2,500 km; the Improved Army Tactical Missile System (ATACMS), with a range of less than 700 km; and the Precision Strike Missile (PrSM), with a range of 499 km.¹⁵

The potential deployment of the previously prohibited ground-based INF-range missiles by the United States in the Asia-Pacific region, especially in the western Pacific, may increase the complexity of trilateral great power strategic interactions. In response, some Chinese scholars have suggested that China should increase the survivability of its nuclear forces by deploying multiple warheads on missiles and experiment with hypersonic boost-glide vehicles.¹⁶ Some analysis outside China even speculated that Beijing might change its longstanding no-first-use (NFU) commitment and the minimum nuclear deterrence posture.¹⁷ Yet to date, China has upheld its NFU commitment to non-nuclear states, in spite of the speculation of some in Washington that it would amend its NFU policy in the near future.

As for Russia, President Putin announced Russia will deploy new missile systems and augment its missile defenses in its eastern regions.¹⁸ Russia also took other countermeasures that enhance Sino-Russian military ties and help China to boost its own missile defensive systems.¹⁹ The Sino-Russian military cooperation between their respective missile defense systems can be traced back to US withdrawal from the Anti-Ballistic Missile Treaty (ABM) in 2002. Driven by the potential development of the aforementioned missiles by the United States, Sino-Russian relations gained a

¹⁵ Tanya Ogilvie-White, "Post-INF Arms Control in the Asia-Pacific: Political Viability and Implementation Challenges," *The International Institute for Strategic Studies*, 30 June 2020: 3.

¹⁶ Tong Zhao, "China in a world with No US-Russia Treaty-Based Arms Control," *Carnegie-Tsinghua Center for Global Policy*, 1 April 2019.

¹⁷ Andrey Baklitskiy, "What the End of the INF Treaty Means for China," *Carnegie Moscow Center Commentary*, 2 December 2019, <https://carnegie.ru/commentary/80462>

¹⁸ Stephen Blank, "After the INF: Russia's Propaganda and Real Threats," *Eurasia Daily Monitor*, 6 September 2019, <https://Jamestown.org/program/after-the-inf-russias-propaganda-and-real-threats/>

¹⁹ "Russia is Helping China Build a Missile Defence System, Putin Says," *Guardian*, 4 October 2019.

new momentum recently, which was named a “comprehensive strategic partnership” by China²⁰ and “an allied relationship” by Russia.

Will China Join the Trilateral Arms Control Negotiation?

In early 2019, the Trump Administration began to push for a trilateral arms control that would include the United States, Russia, and China. Then-president Trump noted that “Russia and China and us are all making hundreds of billions of dollars worth of weapons which are costly and ridiculous.”²¹ In April 2020, the US State Department released a report titled, “US Priorities for Next-Generation Arms Control,” which outlined US priorities for “next-generation arms control” involving both Moscow and Beijing.²² The United States tended to cite China’s participation as a pre-condition of the extension of the New START. The treaty limits deployed US and Russian strategic nuclear forces. Additionally, it facilitates inspections and exchanges of information on the status and movements of their intercontinental ballistic missiles and heavy bombers.

At the time, US proposals to trilateralize New START appeared disingenuous given that the relatively small Chinese nuclear forces are not equivalent to those of the United States and Russia.²³ Leaving aside the quantitative and qualitative differences of China’s nuclear force, its warheads and relevant delivery systems are stored at separated locations, which means the existing counting rules in New START are not suitable to China.²⁴ Several Chinese spokespersons rejected the Trump administration’s calls officially, arguing that the two nuclear superpowers should bear the main responsibility of reducing their arsenals to lower levels.²⁵ From Beijing’s perspective,

²⁰ “China and Russia,” Ministry of Foreign Affairs of the People’s Republic of China, online, https://www.fmprc.gov.cn/mfa_eng/wjb_663304/zjzg_663340/dozys_664276/gjlb_664280/3220_664352/

²¹ Sonne P. and J. Hudson, “Trump Orders Staff to Prepare Arms-control Push with Russia and China,” *The Washington Post*, April 25, 2019, https://www.washingtonpost.com/world/national-security/trump-orders-staff-to-prepare-arms-control-push-with-russia-and-china/2019/04/25/c7f05e04-6076-11e9-9412-daf3d2e67c6d_story.html

²² Christopher A. Ford, “US Priorities for Next-Generation Arms Control,” *Arms Control and International Security Papers*, Volume 1, Number1, April 06, 2020.

²³ According to Kristensen’s assessment, Russia and the United States each maintain approximately 4,000 operational nuclear weapons, while China has around 300, cited from Kristensen H. M. and M. Korda, “Status of World Nuclear Forces”, *Federation of American Scientists*, April, 2020, <https://fas.org/issues/nuclear-weapons/status-world-nuclear-forces/>

²⁴ Leanne Quinn, “China’s Stance on Nuclear Arms Control and New START,” *Arms Control Now*, 23 August 2019, <https://www.armscontrol.org/blog/2019-08-23/chinas-stance-nuclear-arms-control-new-start>

²⁵ Director-General FU Cong’s Interview with Kommersant, Ministry of Foreign Affairs of the People’s Republic of China, October 16, 2020, https://www.fmprc.gov.cn/mfa_eng/wjbxw/t1824545.shtml

any request for a trilateral arms control dialogue from the United States is more a litmus test of its campaign of maximum pressure towards China on a range of policy issues and an excuse for its withdrawal from the treaty for non-substantive reasons. China is also worried that verification of its forces under a trilateral treaty could help to detect and weaken Beijing's limited nuclear retaliatory capabilities, which rely in part on opacity and ambiguity to compensate for its limited nuclear force.

China's negative attitude towards trilateral strategic arms control negotiation doesn't mean that China does not support the international disarmament and non-proliferation process. As a permanent member of the U.N. Security Council and a nuclear-weapon state, China has played constructive roles in other multilateral nuclear-related negotiations. In the 1990s, China actively led negotiations on military-to-military confidence building and risk reduction. It signed the multilateral 1996 Comprehensive Nuclear-Test-Ban Treaty and participated in the international monitoring systems being set up to detect nuclear explosions around the world. China pushed for a treaty preventing an arms race in outer space.²⁶ China also played a supportive role in negotiations leading to the 2015 multilateral Iran nuclear deal aimed at limiting that country's pathways to developing nuclear weapons. In the non-proliferation of missiles and their technologies, although it has not participated in any of the world's major export control mechanisms except for joining the Nuclear Suppliers Group in 2004, China joined the Hague International Code of Conduct against Ballistic Missile Proliferation (HCOG) and pledged to halt missile exports in 1992, 1994, 1998, and 2000. In August 2002, China promulgated its own missile export control regulations and lists that corresponded closely to the Missile Technology Control Regime (MTCR) guidelines.²⁷ In 2003, China applied to join in the MTCR but was blocked by the United States.

When the United States shifted its China policy from engagement to containment under the Trump Administration—a posture likely to be maintained under the Biden administration—China became even more sensitive to the United States' trilateral arms control initiative. Nonetheless, China embraces dialogue underpinned by fair, equitable, and concrete principles. China will participate

²⁶ Nancy Gallagher, "China on Arms Control, Nonproliferation, and Strategic Stability," *CISSM Working Paper*, August 2019: 2.

²⁷ Robert J. Einhorn and Gary Samore, "Ending Russian Assistance to Iran's Nuclear Bomb," *Survival*, Vol. 44, No. 2 2002: 12.

in negotiations when involved in a broader set of negotiating partners such as France and the United Kingdom with similar levels of nuclear forces rather than being singled out. All five officially recognized nuclear weapon states (the so-called “P5”) have convened and collaborated successfully on the Iran negotiations. From Beijing’s perspective, the P5 format might be more appealing than the prospect of negotiating alone with only the two nuclear superpowers. The P5 will be a good place for Beijing to negotiate confidence building measures such as the No First Use (NFU) principle. Some Chinese scholars even support the notion that China should enter into nuclear arms control dialogues rather than nuclear arms reduction negotiations because the concept of arms control is more comprehensive than arms reduction.²⁸

Reducing the Risks of Dangerous Strategic Arms Races

The rapidly worsening global security environment now exacerbated by the global pandemic has led to several missile control treaties or agreements being abandoned or facing an uncertain future. The ABM Treaty and the Conventional Forces in Europe (CFE) Treaty collapsed. The termination of the INF Treaty highlights that bilateral arms control ultimately would not curb the geographical spread and technological advancement of missiles. The former Trump administration announced its withdrawal from the Open Sky Treaty. The 2010 New START, the only remaining treaty on limiting strategic ballistic missiles and strategic bombers, was going to expire in February 2021 and was saved only at the last moment by its extension by the Biden administration. Under Trump, even nuclear testing was put back on the agenda with unfounded American claims of the resumption of Chinese nuclear testing—which would have contravened the Comprehensive Nuclear Test Ban’s “zero-yield” standard.²⁹ This reinforces just how far the negative trend went in the United States. Although many observers hope the Biden administration will reverse this trend, structural trends at the global level involving the nine nuclear-armed states, and the chaotic state of American domestic politics and nature of its foreign policy, mean that no-one can predict its stance on these issues for longer than a few years.

²⁸ Wu Riqiang, “Trilateral Arms Control Initiative: A Chinese Perspective,” *Bulletin of the Atomic Scientists*, 4 September 2019, <https://thebulletin.org/2019/09/trilateral-arms-control-initiative-a-chinese-perspective>

²⁹ US State Department, “Executive Summary of Findings on Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments,” *Bureau of Arms Control, Verification and Compliance*, April. 2020, <https://www.state.gov/wp-content/uploads/2020/04/Tab-1-EXECUTIVE-SUMMARY-OF-2020-CR-FINDINGS-04.14.2020-003-003.PDF>

China opposes arms racing outright due to its cost and potential strategic risks. From the Chinese perspective, the situation could be improved by the following measures. First, states should strengthen and enlarge the existing institutions of missile control. A combination of deteriorating great-power relations, uncertainties about the impact of emerging technologies, and the fact that some “post-INF” missiles are inherently attractive to states, with low political and legal barriers to acquisition and use, has undermined controls on missile proliferation. There is no universal norm, treaty, or agreement which governs the development, testing, production, acquisition, possession, transfer, deployment, or use of missiles. Apart from the bilateral missile control treaties, the relevant mechanisms include unilateral (export controls), coordinated among exporting states as the MTCR, or multilateral but not legally binding and far from universal measures such as the HCOC. Despite its imperfections, the MTCR—the only existing multilateral arrangement covering the transfer of missiles and missile-related equipment, material, and technology relevant to weapons of mass destruction (WMD)—has brought a significant degree of order to containing the spread of ballistic missiles. The HCOC, an offspring of the MTCR and a useful set of voluntary confidence building measures, refers only to one category of missiles.

The existing regulations covering missiles fall far short of those that would avoid a costly and potentially deadly arms competition. For those concerned and responsible states in this region, it is time to act now, or we will find ourselves bested by a destabilizing missile arms race. These existing instruments should give proper priority to cruise missiles and hypersonic missiles and even missile defense. The scope and number of their participants should be enlarged. A regional missile-limitation regime that provides prior notice of missile and satellite launches to enhance transparency and predictability would also offer great strategic benefits to all states in the region.³⁰

Second, all states—but especially the great power nuclear armed states—must do everything possible to avoid the risk of war and nuclear war. States that possess nuclear-armed missiles must ensure that no accident or incident ever happens. All the nuclear-armed states should take the famous saying “a nuclear war cannot be won and must never be fought” as a common understanding and restrain their development and employment of any nuclear ballistic or cruise

³⁰ Kurosaki Akira, “Moving Beyond Deterrence and Missile Defense,” *INESAP Briefing Paper*, No.13, November 2004, http://www.inesap.org/sites/default/files/Briefing13_04_0.pdf

missiles. Nuclear-armed states should be divided into three levels according to the quantity or quality of their nuclear weapons. Each level should have different responsibilities.

The first level is Russia and the United States which, as nuclear superpowers, have more than ninety percent of the world's nuclear warheads. The deterioration of great power relationships has increased the possibility of a nuclear arms race. Their negative attitudes toward arms control have become a major barrier to the progress of international non-proliferation. The nuclear superpowers should reduce the role of nuclear weapons in their military doctrines by rejecting preemptive nuclear strikes or declaring that the sole use of nuclear weapons is as "the last resort" to defend their national security.

The second layer includes France, Great Britain, and China, the other three permanent members of the U.N. security council. It is imperative to encourage these states to make more contributions to the international arms control process.

The third layer involves the four *de facto* nuclear states, India, Pakistan, the DPRK, and Israel, who are neither members of the P5 nor parties to the NPT. Their rights to exploit nuclear energy peacefully should be respected. Meanwhile, every effort should be made to limit and reduce the risk of a nuclear war or conflict between India and Pakistan to boost the denuclearization process of the DPRK, while guaranteeing their national security.

Last, but not the least, the new arms control and disarmament dialogue must directly address the new factors that could increase the risk of accidental or inadvertent nuclear conflict, most important, the potential destabilizing effects of new non-nuclear weapon technologies such as ballistic missile defense, anti-satellite weapons, and precision-strike missile technology. The emerging advanced technologies supplement and even enhance nuclear weapons while offering non-nuclear states capabilities with which to offset the projection of conventional and nuclear forces by the great powers. With the widespread applications of emerging technologies, non-nuclear military facilities and platforms may degrade nuclear decision-making and increase the risk of an accidental nuclear war. Thus, Track 2 dialogues on emerging technologies and some non-nuclear weapon systems might develop workable proposals to reduce the resulting risks.

The continued high alert levels of American, Russian, British, and French warheads to support "launch on warning" is another risk that deserves urgent attention. Moreover, Russia and the

United States each possess huge counterforce capabilities, which threatens not only each other but lesser nuclear adversaries with a decapitating and disarming first-strike. In contrast, China, India, and Pakistan reportedly keep their nuclear weapons un-deployed at central storage facilities on low alert levels. Their retaliatory strike capabilities are based on the principle of “launch under attack,” not “under warning.” Already in 1994, China proposed that the P5 should agree to adopt NFU, which could lay the foundation of developing codes of conduct to decrease the risks.³¹ Recognizing the NFU principle could lessen the risk arising from misperception and misunderstanding of the preemptive strike posture on the one hand and sustain the taboo against nuclear employment on the other.

³¹ Zhengqiang Pan, “A Study of China’s No-First-Use Policy on Nuclear Weapons,” *Journal for Peace and Nuclear Disarmament*, 1, No.1, 2018: 115-136.