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Not one without the other

Realigning deterrence and arms control
in a European quest for strategic stability

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Executive summary

Russia's invasion of Ukraine has caused a strategic awakening in Europe. Alongside a renewed emphasis on hard-nosed policies such as deterrence signalling, attention should be paid to arms control and non-proliferation. With a global missile landscape that is more dense, diverse, advanced, and volatile – as well as more contested and less regulated – the challenges in this domain are myriad. In recent decades, missile systems have proliferated and undergone substantial technological advancements. Especially cruise missiles have spread thanks to the relative ease and low costs with which they can be produced, deployed and exported. Even if the proliferation of ballistic missiles has slowed somewhat, China's recent build-up of its ballistic missile arsenal gives ample reason for concern. Finally new adaptations, including the dual use of missiles for both conventional and strategic purposes and introduction of ever more sophisticated systems, add to the volatility of today's missile landscape.

Meanwhile, the future of the arms control regime is hanging by a thread. Key bilateral arms control treaties, such as the Intermediate-Range Nuclear Forces (INF) Treaty and the New Strategic Arms Reductions Treaty (New START), have either collapsed or become increasingly outdated in a strategic environment characterised by multipolar competition. The Missile Technology Control Regime (MTCR), which has been the most crucial missile export control regime, has suffered from the lack of enforcement mechanisms, contestation and non-compliance from outside and from within, as well as its inability to adapt to technological developments. Missing actionable enforcement mechanisms have been a scourge to other arms control agreements such as the Wassenaar Arrangement or the Hague Code of Conduct (HCoC).

Arms control and its demise are often framed as an issue pertaining predominantly to the United States, Russia, and increasingly also China, as these three are driving most of the technological and military-strategic developments. Even so, the security implications stretch beyond today's major military powers – not least to Europe. Among Europeans, debates on arms control often proceed from technologically specific or broadly normative points of departure. Yet beyond the desire among many arms control proponents to stress the lofty goal of disarmament, officials of nuclear weapon (or advanced conventional weapon) states tend to look at arms control as a tool to create stability while maintaining deterrence, or to lock in military advantages or prevent acquiring disadvantages.

Europe will need to understand arms control as serving three potential and competing purposes: to promote disarmament, to create stability, and to lock in competitive advantages – all with the ultimate aim to prevent nuclear escalation during war. In today's tense geopolitical environment, the emphasis is shifting away from the more normative focus on disarmament that dominated during the 1990s and 2000s and towards a stability-centric and competition-driven agenda. In light of such developments, Europe should impede the proliferation of missile technology and erode adversaries' competitive edge through economic means, as well as revamp NATO's dual-track approach to enhance stability, shift strategic calculations and force adversaries to the negotiating table. Finally, it should build a stronger European knowledge base for deterrence and arms control and get the European public on board. This entails investing in both deterrence and arms control, simultaneously: the two are typically separated yet two sides of the same coin.

The emphasis is shifting away from the more normative focus on disarmament and towards a stability-centric and competition-driven agenda

1. Introduction

Arms control and its demise are often framed as an issue pertaining predominantly to the United States, Russia, and increasingly also China

With strategic competition between the great powers accelerating, prospects for missile arms control are bleak. The architecture once designed to limit the risks associated with the production, proliferation, deployment and employment of missiles and their technologies has crumbled as existing agreements were abandoned and as strategic and technological shifts rendered remaining ones increasingly inapt.¹ Even though arms control and its demise are often framed as an issue pertaining predominantly to the United States, Russia, and increasingly also China, their security implications stretch well beyond today's major military powers.² Indeed, despite a persistent lack of interest among Europeans over the past decades regarding developments in missile technology and the strategic calculus,³ their continent's security is severely affected by these developments. Therefore, and despite limited manoeuvre space for small and middle powers in this field, options must be explored for Europe to actively shape or at least participate in efforts to reinvigorate arms control and more generally stability. Indeed, even if Thucydides' notion that "the strong do what they can; the weak suffer what they must"⁴ applies rather aptly to this field, medium-size missile powers are not left entirely empty-handed.

This policy brief explores what manoeuvre space remains for Europeans; it proceeds as follows: First, it will outline current trends in missile technology, paying close attention to land-attack cruise missiles, anti-ship cruise missiles, ballistic missiles, hypersonic weapons and dual-capable systems. Second, it will examine current arms control and non-proliferation regimes, using the PPDE-framework introduced earlier this year by HCSS, highlighting main shortcomings and gaps in the arms control regime.⁵ Third, the brief will discuss the incentives and disincentives for building or upholding the missile arms control regime among the three leading missile capitals: Moscow, Washington and Beijing. After all, it is these three states that are driving most of the technological and military-strategic developments. Fourth, the brief will consider the most recent shock to the global order and its likely impact on arms control: Russia's invasion of Ukraine in February 2022. The war that continues as of this writing not only further aggravated tensions between NATO and Russia – therewith undermining any potential arms control progress – yet also caused a strategic awakening that is not trivial. The final section, having considered the erosion of arms control and today's key strategic trends, sketches a number of potential courses of action for Europeans in a world and a field dominated by three foreign powers.

Crucially, Europe will need to start understanding arms control as serving three potential and competing purposes: to promote disarmament, to create stability, and to lock

1 Paul van Hooft, Lotje Boswinkel, and Tim Sweijts, "Shifting Sands of Strategic Stability: Towards A New Arms Control Agenda" (The Hague Centre for Strategic Studies, 2022), <https://hcss.nl/report/arms-control-shifting-sands-of-strategic-stability/>.

2 Arvid Bell, "Why Europe Matters: The Case for an Arms Control Negotiation Campaign" (Center for Strategic & International Studies, 2020), <https://www.csis.org/blogs/post-soviet-post/why-europe-matters-case-arms-control-negotiation-campaign>.

3 Nick Witney, "Nothing to See Here: Europe and the INF Treaty – European Council on Foreign Relations," *ECFR* (blog), August 5, 2019, https://ecfr.eu/article/commentary_nothing_to_see_here_europe_and_the_inf_treaty/.

4 Thucydides, Martin Hammond, and P. J. Rhodes, *The Peloponnesian War*, Oxford World's Classics (Oxford; New York: Oxford University Press, 2009), liii.

5 van Hooft, Boswinkel, and Sweijts, "Shifting Sands of Strategic Stability."

in competitive advantages – all with the aim to ultimately prevent war.⁶ In today's tense geopolitical environment, the emphasis is shifting away from the more normative focus on disarmament and towards a stability-focused and competition-driven agenda. In light of such developments, a number of policy recommendations are to be considered: Europe should impede the proliferation of missile technology and erode adversaries' competitive edge through the use of economic statecraft to impede access to advanced technologies. Simultaneously, it should revamp NATO's dual-track approach to enhance stability, shift strategic calculations, and force adversaries to the negotiating table. Finally, it should build a stronger European deterrence and arms control knowledge base and get European publics on board of stability-enhancing measures – when it comes to both deterrence and arms control. If this latter one is unsuccessful, Europeans are at a disadvantage vis-à-vis their undemocratic adversaries.

6 John D. Maurer, "The Purposes of Arms Control," *Texas National Security Review*, November 14, 2018, <https://tnsr.org/2018/11/the-purposes-of-arms-control/>.

With regard to the central concept of arms control, this policy brief refers the broader definition suggested by Thomas Schelling and Morton Halperin who defined it as "all the forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it."⁷ Arms control here thus refers to more than legally binding and verifiable quantity-based treaties, and also includes non-proliferation regimes and confidence-building measures that seek to promote communication and decrease risks of misinterpretation. These may include dialogues on doctrines and postures, information exchanges, hotlines, and pre-notifications.⁸

7 Thomas C. Schelling, Morton H. Halperin, and Donald G. Brennan, *Strategy and Arms Control*, 1st ed. (New York: Twentieth Century Fund, 1961).

8 Névine Schepers and Oliver Thränert, "Arms Control Without Treaties," *Policy Perspectives*, Policy Perspectives, 9, no. 3 (March 2021): 1–4.

2. Missile proliferation: strategic and technological trends

A variety of technological developments shape today's missile environment. They include the proliferation and advancement of traditional systems such as ballistic and cruise missiles, as well as the development of new or adjusted technologies such as hypersonic missiles. Many of these missile systems are also dual-capable, potentially increasing the chances of misperception and undermining strategic stability.

Over the last decades, missile systems have spread, diversified, and advanced. In 1987, only the United States, the Soviet Union and the United Kingdom possessed land-attack cruise missiles (LACM) with ranges over 500 km; today twelve states produce such missiles while another eleven countries and one non-state actor have acquired them. The popularity of cruise missiles is not difficult to explain: compared to ballistic missiles, their manufacture and export is easier,⁹ their costs lower, their reliability higher, and their interception difficult due to their manoeuvrability.¹⁰ Recent advances in survivability, accuracy and speed, and the spread of enabling technologies have further stimulated widespread interest in these missiles.¹¹ Proliferation of shorter-range (up to 300 km) anti-ship cruise missile (ASCM) has similarly exploded since the early 1970s. Dozens of states now possess them, deeply undermining the survivability of ships at sea.¹²

In contrast to cruise missiles, ballistic missile proliferation – which blossomed after the collapse of the Soviet Union – has slowed since the early 2000s, in part thanks to increasingly restrictive export regimes. Still, today 31 states and non-state actors Hezbollah and the Houthis¹³ are in the possession of ballistic missiles, and more states are developing or have developed domestic production capacity, including Iran and Syria. Vertical proliferation also remains a major concern, with China's unprecedented ballistic missile build-up over the last two decades being especially worrisome.¹⁴ Indeed, even if maritime patrols have rendered the illegal shipment of missile systems increasingly risky, the proliferation of immaterial

9 Sidharth Kaushal, "Lessons from the Houthi Missile Attacks on the UAE," RUSI, March 2, 2022, <https://rusi.org/explore-our-research/publications/commentary/lessons-houthi-missile-attacks-uae>.

10 Katarzyna Kubiak, "Missile Control: It's Not Rocket Science.," Policy Brief, Global Security Policy Brief (European Leadership Network, 2019), <https://www.jstor.org/stable/resrep22121>.

11 William Alberque and Timothy Wright, "Revitalizing the Missile Technology Control Regime | Arms Control Association," *Arms Control Association* (blog), December 2021, <https://www.armscontrol.org/act/2021-12/features/revitalizing-missile-technology-control-regime>.

12 Jonathan D. Caverley and Peter Dombrowski, "Cruising for a Bruising: Maritime Competition in an Anti-Access Age," *Security Studies* 29, no. 4 (2020): 671–700.

13 "Non-State Actors," Missile Defense Advocacy Alliance, *Missile Threat and Proliferation* (blog), accessed July 18, 2022, <https://missiledefenseadvocacy.org/missile-threat-and-proliferation/todays-missile-threat/non-state-actors/>.

14 Joris Teer, "China's Military Rise and European Technology" (The Hague: The Hague Centre for Strategic Studies, April 2022), <https://hcss.nl/wp-content/uploads/2022/04/Chinas-Military-Rise-and-European-Technology-Policy-Debate-in-Netherlands-April-2022Teer.pdf>.

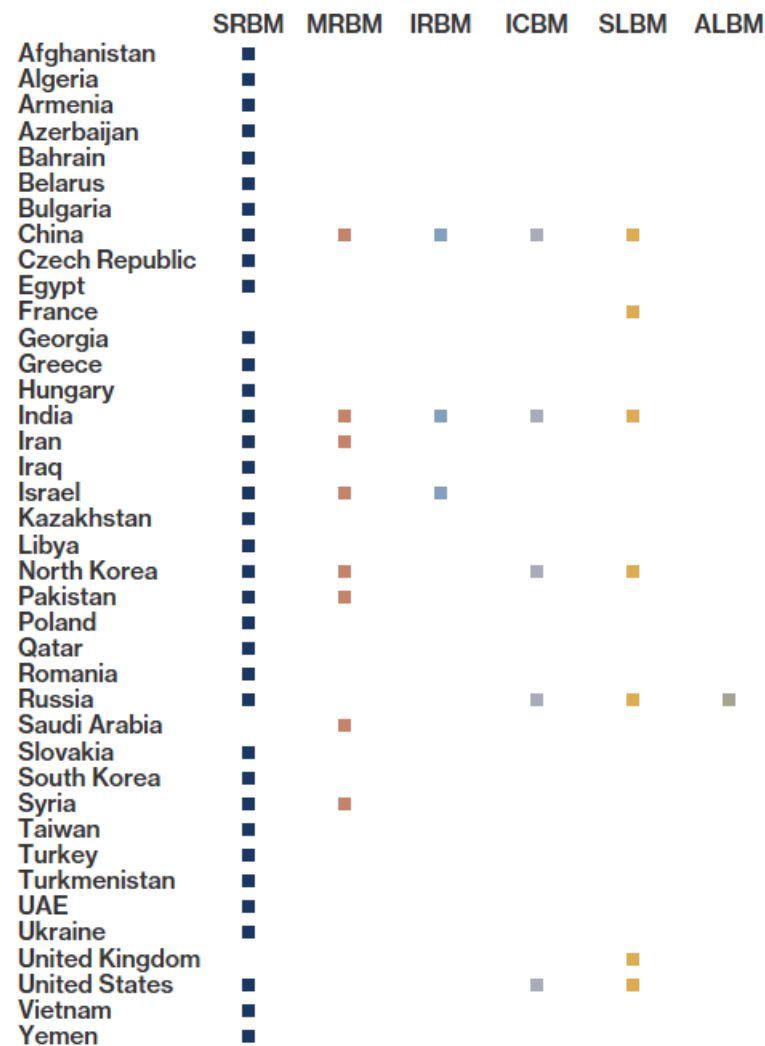
Missile systems have spread, diversified, and advanced

technology has continued.¹⁵ Crucially, technological advancements such as improved decoys – as was demonstrated during Russia's war against Ukraine – have added to their ability to circumvent defence systems.¹⁶ Yet, the war has also underlined how difficult it remains to truly master precision weapons, making the case for increasing the difficulty to access such technologies and the components needed to make them work.

Figure 1. Worldwide possession of ballistic missiles (state actors only)



Types refer to range: short-range (SRBM), medium-range (MRBM), intermediate-range (IRBM), intercontinental (ICBM); as well as platform: air-launched (ALBM) and submarine-launched (SLBM)



Source: CSIS Missile Threat and Arms Control

¹⁵ Lauriane Héau and Emmanuelle Maitre, "Current Trends in Ballistic Missile Proliferation," *The Hague Code of Conduct* (blog), September 20, 2020, <https://www.nonproliferation.eu/hcoc/current-trends-in-ballistic-missile-proliferation/>.

¹⁶ John Ismay, "Russia Deploys a Mystery Munition in Ukraine," *The New York Times*, March 15, 2022, sec. U.S., <https://www.nytimes.com/2022/03/14/us/russia-ukraine-weapons-decoy.html>.

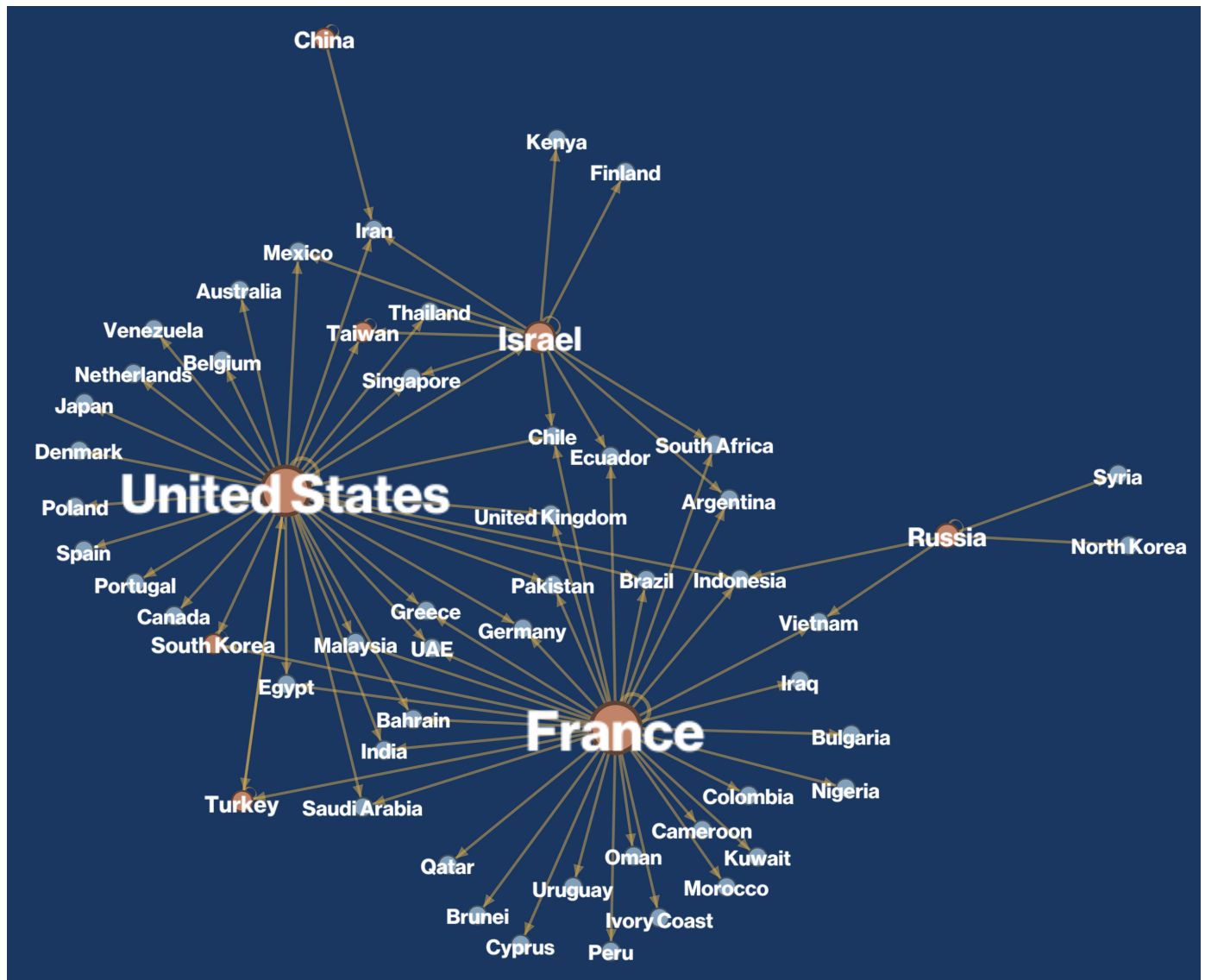
Figure 2. Worldwide production and possession of land-attack cruise missiles (state actors only)



| | Has only air-launched LACMs | Only possesses | Produces and possesses |
|----------------|-----------------------------|----------------|------------------------|
| Algeria | | | |
| Australia | | | |
| China | | | |
| Egypt | | | |
| Finland | | | |
| France | | | |
| Germany | | | |
| Greece | | | |
| India | | | |
| Iran | | | |
| Israel | | | |
| Italy | | | |
| Norway | | | |
| Pakistan | | | |
| Poland | | | |
| Russia | | | |
| Saudi Arabia | | | |
| South Korea | | | |
| Spain | | | |
| Taiwan | | | |
| UAE | | | |
| United Kingdom | | | |
| United States | | | |
| Vietnam | | | |

Source: CSIS Missile Threat

Figure 3. Proliferation of anti-ship cruise missiles (ASCMs), sellers in orange, buyers in blue



Major military powers have additionally scrambled to develop hypersonic missile technology. Hypersonic missiles are highly manoeuvrable space vehicles and cruise missiles that fly at speeds of at least Mach 5. They fall into two main categories: unpowered hypersonic glide vehicles, which are launched from rockets at the edge of space and glide to targets from high altitudes; and hypersonic cruise missiles, which are powered by high-speed airbreathing engines after initial launch from a rocket.¹⁷ In a nutshell, hypersonic technology promises to add another level of speed and unpredictability to missile technology, rendering interception ever more complex. Still, due to hypersonic missile technology's complexity, immaturity, and significant R&D costs, production remains mostly limited to the United States, Russia and China, with India, France, Japan, Australia, Germany, Israel and Iran pursuing more modest

¹⁷ Kelley M. Saylor, "Hypersonic Weapons: Background and Issues for Congress," CRS Report (Washington D.C.: Congressional Research Service, September 7, 2021), <https://fas.org/sgp/crs/weapons/R45811.pdf>.

research programmes.¹⁸ Cooperation and transfer of technology is taking place to varying extents between these states.

The strategic effects of missile proliferation are not to be underestimated. In short, ballistic missiles are fast and difficult to intercept, but predictable; cruise missiles can make use of terrain and manoeuvre; and hypersonic weapons can do a bit of both and are highly flexible in terms of deployment. In addition, as a result of qualitative improvements, there is increasing overlap between conventional and nuclear domains: conventional and nuclear missile systems now use similar (or the same) supporting intelligence, surveillance, reconnaissance (ISR) infrastructure, and advanced conventional can accomplish similar tasks as previously only nuclear weapons could accomplish.¹⁹

In addition to qualitative improvements, missile technology has developed in a number of other ways. First, while previously the distinction between conventional and nuclear missiles was more clearcut, today this distinction is eroding – not just because conventional systems are improving but also because nuclear and conventional systems have been mixed. While in the past nuclear payloads were mainly mounted on ballistic missiles and bombers, today several nuclear weapon states field nuclear-capable cruise missiles, including the US, Russia, France, Israel, Pakistan and India. Most of these systems are LACMs but Russia fields nuclear-tipped ASCMs too. What is more, conventional and nuclear systems are becoming increasingly entangled. Russia's dual-capable arsenal allegedly consists of the ground-launched Iskander and Tochka short-range ballistic missiles, the intermediate range SSC-8 ground-launched cruise missile, the Kalibr sea-launched cruise missiles and the SS-N-26 ASCM deployed on its nuclear powered attack submarines.²⁰ China's DF-21 (or CSS-5) ballistic missile meanwhile is not a strictly dual-capable system as it is fielded in both nuclear and conventional variants that are typically not co-located; yet its intermediate-range ballistic missile DF-26 (or CSS-18) is typically classified as dual-capable.²¹ China's land-attack cruise missiles are likely conventional only.²² Smaller missile powers also field dual-capable systems, often for efficiency reasons. Pakistan is developing the Ra'ad II system, an allegedly dual-capable air-launched cruise missile,²³ but in fact all of the country's missiles are thought to be dual-capable.²⁴ While for North Korea, it is unclear whether the country possesses dual-capable missiles,²⁵ India's first indigenously produced cruise missile, the Nirbhay missile system, is almost certainly nuclear-capable.²⁶

While previously the distinction between conventional and nuclear missiles was more clearcut, today this distinction is eroding

18 Richard H. Speier et al., "Hypersonic Missile Nonproliferation: Hindering the Spread of a New Class of Weapons," September 27, 2017, 22–33, https://www.rand.org/pubs/research_reports/RR2137.html.

19 Paul van Hooft and Lotje Boswinkel, "Surviving the Deadly Skies: Integrated Air and Missile Defence 2021-2035" (The Hague Centre for Strategic Studies, 2021), <https://hcss.nl/report/surviving-the-deadly-skies/>.

20 Hans M. Kristensen and Robert S. Norris, "Russian Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 3 (May 4, 2018): 185–95, <https://doi.org/10.1080/00963402.2018.1462912>.

21 Kristensen, "China's New DF-26 Missile Shows Up At Base In Eastern China"; Panda, "Introducing the DF-17".

22 "Ballistic and Cruise Missile Threat" (US Air Force National Air and Space Intelligence Center (NASIC), 2020), https://media.defense.gov/2021/Jan/11/2002563190/-1/-1/1/2020%20BALLISTIC%20AND%20CRUISE%20MISSILE%20THREAT_FINAL_20CT_REDUCEDFILE.PDF.

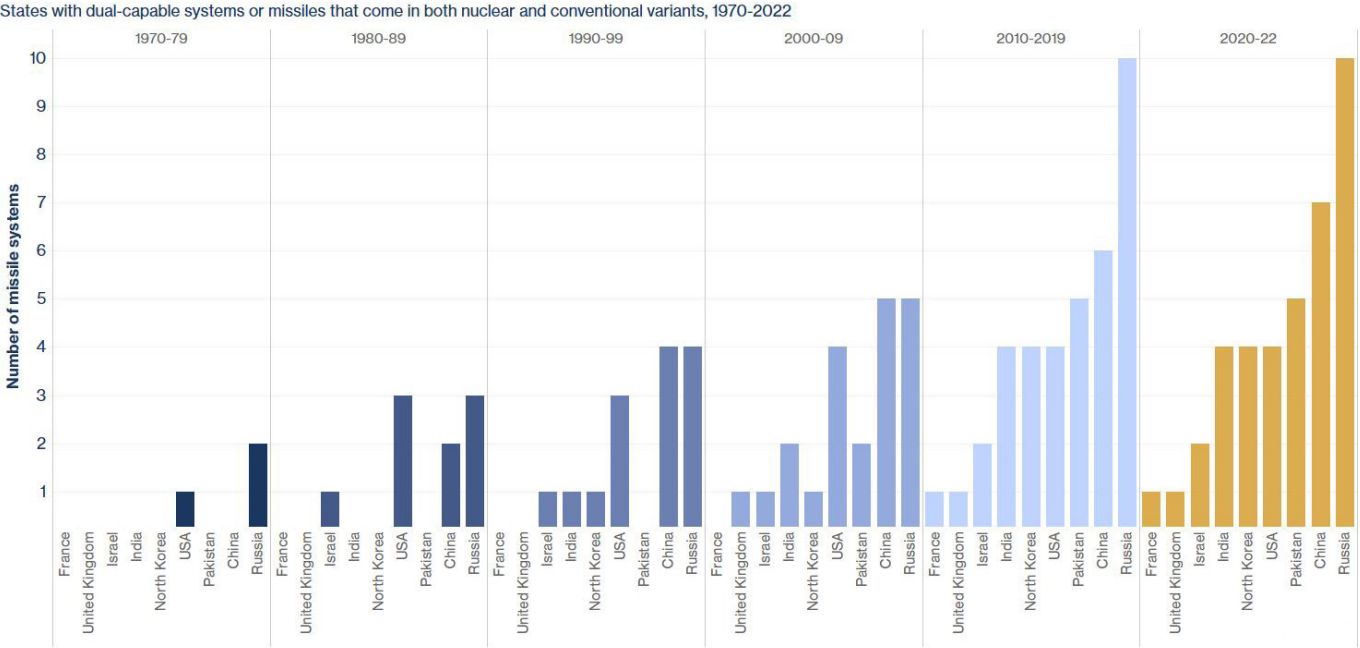
23 Nasima Khatoon, "The Maiden Test of Pakistan's Ra'ad II Cruise Missile: An Overview," CAPS in Focus (Centre for Air Power Studies - Forum for National Security Studies, March 24, 2020), <http://www.capsindia.org/files/documents/882329cf-997a-48ca-a86f-c9a3db5f74e0.pdf>.

24 Kristensen Kristensen Hans M., "Pakistan's Evolving Nuclear Weapons Infrastructure," *Federation Of American Scientists* (blog), November 16, 2016, <https://fas.org/blogs/security/2016/11/pakistan-nuclear-infrastructure/>; Hans M. Kristensen, Robert S. Norris, and Julia Diamond, "Pakistani Nuclear Forces, 2018," *Bulletin of the Atomic Scientists* 74, no. 5 (August 31, 2018): 348–58, <https://doi.org/10.1080/00963402.2018.1507796>.

25 James M. Acton, "Appendix: France, India, Pakistan and North Korea," in *Is It a Nuke? Pre-Launch Ambiguity and Inadvertent Escalation* (Washington D.C.: Carnegie Endowment for International Peace, 2020), 55–57, https://carnegieendowment.org/files/Acton_NukeorNot_final.pdf.

26 Hans M. Kristensen and Matt Korda, "Indian Nuclear Forces, 2020," *Bulletin of the Atomic Scientists* 76, no. 4 (2020): 217–25, <https://doi.org/10.1080/00963402.2020.1778378>.

Figure 4. Proliferation of dual-capable missile systems



Sources: CSIS and Nautilus

To sum up, the proliferation of missile technology is worrisome. Over the last decades, especially cruise missiles have spread thanks to the relative ease and low costs with which they can be produced, deployed and exported. Even if the proliferation of ballistic missiles has slowed somewhat, China's recent build-up of its ballistic missile arsenal gives ample reason for concern. Meanwhile new adaptations, including the dual use of missiles for both conventional and strategic purposes, and introduction of exotic systems add to the volatility of today's missile landscape.

China's recent build-up of its ballistic missile arsenal gives ample reason for concern

3. Missile arms control: remnants of an outdated system

One useful way to disentangle the variety of arms control and non-proliferation regimes relevant to missile technology is to use the production-proliferation-deployment-employment (PPDE)-framework that has been previously introduced by HCSS.²⁷ In order to assess possibilities for arms control, the framework breaks down the stages through which weapon technologies are brought into use, and assesses the ease with which technologies can be produced, spread, deployed and employed:

- In the **production phase**, countries indigenously develop and produce a weapon technology. As this is contingent on specialised knowledge and skills, testing facilities, and access to materials, the number of states producing weapon technology is typically more limited, especially when it comes to more complex technology such as advanced missile technology and especially so with hypersonic missiles.
- In the **proliferation phase**, states acquire technologies and materials from other states or non-state actors. The ease with which weapons spread depends on detectability, the ease of transport, and whether it concerns a strictly military technology or entails commercial applications – in which case it is referred to as a dual-use technology. With missile technology, ballistic missile proliferation has for instance proven more complex than cruise missile proliferation.
- In the **deployment phase**, missile technology is being positioned and often readied for use. Deployment necessitates specific infrastructures and launch platforms, as well as enabling systems such as C4ISR for missiles. Again, to compare ballistic and cruise missiles, platform requirements are typically significantly simpler for the latter type.
- Finally, the **employment phase** refers to the actual use of weapon technology. The ease with which technologies are being employed depends on organisational structures, training of personnel, restraining norms and doctrine. While arms control and non-proliferation policy measures are aimed at countering the production, the proliferation and the deployment of such capabilities, deterrence but also international norm-setting and confidence-building seek to prevent their actual employment.

For each different missile system, the ease and feasibility of production, proliferation, deployment and employment can be assessed (see Table 1) according to the criteria that are summarised in Annex A. When a technology is labelled *high* or *medium* in a particular phase, there is more reason for concern from a global arms control, non-proliferation and disarmament perspective. The production of hypersonic missiles and to a lesser extent ballistic missiles is more complex given the technologies' complexity and significant research and development costs. Such weapons are currently only within the reach of great and some middle military powers. The production of cruise missiles is more straightforward, therefore

27 van Hooft, Boswinkel, and Sweijs, "Shifting Sands of Strategic Stability."

allowing some small military powers and even non-state actors to produce such technology – even if some require significant outside help to do so. Finally, for countries already producing both conventional and nuclear systems, the production of dual-capable systems is actually cost-effective. Limiting the production of cruise missiles and dual-capable systems is therefore more complex. When it comes to proliferation, particularly cruise missiles (and therewith many dual-capable systems) spread with relative ease – raising the stakes for export control efforts while the detectability of other missile technologies hampers their spread. It should be added that the proliferation of dual-capable systems is evidently limited to nuclear powers only, therefore somewhat obscuring the assessment. Moving on to the deployment phase, there is reason for concern. Relatively few barriers exist to deploy most systems – with the exception of ballistic missiles – as these missiles do not require highly advanced supporting infrastructures. Disincentives to employ these technologies are even more limited: relatively few norms warrant against their use. Because of the relatively ease with which systems can be deployed and employed, creative measures need to be found to discourage states from using such weapons and limit the risks of escalation. Otherwise, given the increased access of more actors to more advanced weapons, there is a risk of crossing tipping points beyond which it will be difficult to reverse.

Table 1. Assessment of the feasibility of the production, proliferation, deployment and employment of missile technologies



| | Production | Proliferation | Deployment | Employment |
|-----------------------|------------|---------------|------------|------------|
| Cruise missiles | Medium | Medium | Medium | High |
| Ballistic missiles | Low | Low | Low | High |
| Hypersonic weapons | Low | Low | Medium | High |
| Dual-capable missiles | Medium | Medium | Medium | Medium |

Arms control, or what remains of it

Today, missile technology is mainly “controlled” in the proliferation and employment phases, with the Missile Technology Control Regime (MTCR) the most important export control regime limiting the technology’s spread and The Hague Code of Conduct (HCoC) the most important instrument discouraging the development, testing and deployment of some types of missiles.

Originally an export regime solely intended to restrict the proliferation of ballistic missiles able to deliver a 500 kg warhead over a distance of at least 300 km, today the MTCR extends to all subsystems and delivery mechanisms of weapons of mass destruction (WMD), including drones and cruise missiles.²⁸ Joining the regime displays a state’s commitment to non-proliferation, which may help legitimise the member’s existing long-range missile capabilities in the eyes of other signatories.²⁹ Moreover, membership entails access to discussions, exchange of information, and best practices among the signatories.³⁰ However, since the regime has no enforcement mechanisms and its provisions are non-binding, it has been consistently challenged by some of the signatories as well as non-signatories.³¹

The regime has contributed to several major arms control successes, including the abandonment of the joint Condor II ballistic missile programme by Argentina, Egypt and Iraq as well as the shelving or elimination of missile programmes by Brazil, South Africa, South Korea, Taiwan, Syria and Libya.³² Decisions to cease or restrain missile programmes were not the MTCR’s sole responsibility, but taken in conjunction with other factors such as changing security landscapes or the provision of US security guarantees. Overall, the MTCR has been most instrumental in putting together export control lists and helping states cooperate and coordinate.³³ Still, a technology embargo can only fully halt the objectives of technologically very weak states (Libya and Syria in the 1990s); in other cases “such barriers mainly hinder, delay, and raise the costs of missile programmes, and during these delays, political pressures critically influence national missile decisions.”³⁴ What is more, the impact of the MTCR is limited as the regime is not legally binding; because major missile producers such as China, Iran, North Korea, Israel, Pakistan and Taiwan are not members; and due to a variety of institutional problems such as consensus-based decision-making. The regime furthermore lacks verification and enforcement and does not impede the production and proliferation among and between members. Thus, MTCR does not prevent vertical proliferation nor force modernisation efforts.

The MTCR has been most instrumental in putting together export control lists and helping states cooperate and coordinate

28 Richard H. Speier, K. Scott McMahon, and George Nacouzi, “Penaid Nonproliferation: Hindering the Spread of Countermeasures Against Ballistic Missile Defenses” (RAND Corporation, February 26, 2014), https://www.rand.org/pubs/research_reports/RR378.html.

29 Center for Arms Control and Non-proliferation, “Missile Technology Control Regime (MTCR),” Arms Control Center, n.d., <https://armscontrolcenter.org/wp-content/uploads/2020/03/MTCR-1.pdf>.

30 “Missile Technology Control Regime (MTCR) Frequently Asked Questions,” *United States Department of State* (blog), n.d., <https://www.state.gov/remarks-and-releases-bureau-of-international-security-and-nonproliferation/missile-technology-control-regime-mtcr-frequently-asked-questions/>.

31 Zachary Keck, “China Secretly Sold Saudi Arabia DF-21 Missiles With CIA Approval,” *The Diplomat*, January 31, 2014, <https://thediplomat.com/2014/01/china-secretly-sold-saudi-arabia-df-21-missiles-with-cia-approval/>; Daryl Kimball, “U.S. Reinterprets MTCR Rules,” Arms Control Association, September 2020, <https://www.armscontrol.org/act/2020-09/news/us-reinterprets-mtcr-rules>.

32 William Alberque, “Revitalising Arms Control: The Missile Technology Control Regime (MTCR) and the Hague Code of Conduct against Ballistic Missile Proliferation (HCoC),” *Missile Dialogue Initiative* (London: The International Institute for Strategic Studies, November 2021), 11, https://www.iiss.org/-/media/files/research-papers/iiss_revitalising-arms-control-the-mtcr-and-the-hcoc_mdi-02112021.pdf.

33 Jing-dong Yuan, *The MTCR and Missile Proliferation: Moving Toward the Next Phase* (Canadian Department of Foreign Affairs and International Trade, 2000).

34 Dinshaw Mistry, *Containing Missile Proliferation: Strategic Technology, Security Regimes, and International Cooperation in Arms Control* (Seattle: University of Washington Press, 2003), 5.

The American administration decided to unilaterally revise the interpretation of the regime's provisions

China – a non-signatory but a self-declared adherent to MTCR – has been one of the largest contesters of the regime.³⁵ It has granted substantial technological assistance to Iran and North Korea in building their ballistic missile programmes.³⁶ Additionally, China has been known for violating the provisions of MTCR by transferring missile technology and UAVs to various recipients, including US allies such as Saudi Arabia, Jordan, and the UAE.³⁷ Moreover, the share of Chinese systems and technology in the UAVs market has grown, thereby increasing its influence over some of the traditional US allies and the US itself.³⁸ China's violations of MTCR and proliferation of UAVs have created an unfair advantage in Beijing's favour, whereas the US, substantially constrained by the regime in its UAVs exports, suffered financially and politically, despite not always complying with its provisions.³⁹ As some have argued, "China's exports have benefited from American export controls. The US has historically restricted foreign sales of strike-capable drones as part of its participation in regulations like the Missile Technology Control Regime."⁴⁰ In response, the American administration decided to unilaterally revise the interpretation of the regime's provisions, which would stipulate that the sales of armed drones travelling at speed of below 800km/h will be reviewed on a case-by-case basis.⁴¹ This provision would allow the US to sell MQ-9 Reaper, MQ-1 Predator, and RQ-4 Global Hawk drones to its partners and allies.⁴² The reinterpretation was well-received by some of the US allies.⁴³ Jordan, Saudi Arabia, and UAE are lining up for a chance to buy American armed drones. Romania, which, unlike the three, adheres to the regime, followed suit. However, the allies in the Middle East are expected to be the biggest beneficiaries of the unilateral revision of MTCR.⁴⁴ If the reinterpretation were executed in practice, the US would undermine the MTCR regime as it did, according to Chinese scholars, in the case of the improvement of SM-3 missiles with Japan and the transfer of Trident ballistic missiles to the UK.⁴⁵ Nevertheless, the US, Japan and European states have a high record of adhering to the provisions of the regime.⁴⁶ Some states consider MTCR a forum for enhanced cooperation between the members since the membership increases the chance of acquiring high-end missile technology from other signatories and importing American armed UAVs such as

35 Kolja Brockmann, "The Missile Technology Control Regime at a Crossroads," Stockholm International Peace Research Institute, October 1, 2021, <https://www.sipri.org/commentary/topical-background/2021/missile-technology-control-regime-crossroads>.

36 "In addition to formal members, there are three 'unilateral adherents' to the regime recognized as such by regime members: Estonia, Kazakhstan, and Latvia. Israel, Macedonia, Romania, and Slovakia have also adhered to the regime on a less formal basis. China has agreed to apply the MTCR guidelines. Its application for membership remains under review." "Missile Technology Control Regime (MTCR)," *The Nuclear Threat Initiative* (blog), n.d., <https://live-nuclear-threat-initiative.pantheonsite.io/education-center/treaties-and-regimes/missile-technology-control-regime-mtcr/>; Kelsey Davenport, "The Missile Technology Control Regime at a Glance," Arms Control Association, March 2021, <https://www.armscontrol.org/factsheets/mtcr>.

37 Davenport, "The Missile Technology Control Regime at a Glance"; Jeremy Page and Paul Sonne, "Unable to Buy U.S. Military Drones, Allies Place Orders With China," *Wall Street Journal*, July 17, 2017, sec. World, <https://www.wsj.com/articles/unable-to-buy-u-s-military-drones-allies-place-orders-with-china-1500301716>.

38 Page and Sonne, "Unable to Buy U.S. Military Drones, Allies Place Orders With China."

39 Kimball, "U.S. Reinterprets MTCR Rules."

40 "Is China at the Forefront of Drone Technology?," *ChinaPower Project* (blog), May 29, 2018, <https://chinapower.csis.org/china-drones-unmanned-technology/>.

41 Chris Cole, "Drones, Proliferation and the MTCR: US Presents Discussion Paper," Drone Wars UK, November 2, 2017, <https://dronewars.net/2017/11/02/drones-proliferation-and-the-mtcr-us-presents-discussion-paper/>.

42 Jennifer Hansler and Ryan Browne, "Trump Administration Eases Restrictions on Exporting Some Armed Drones," CNN, July 24, 2020, <https://www.cnn.com/2020/07/24/politics/mtcr-armed-drone-export-changes/index.html>.

43 David Hambling, "U.S. Could Face Unintended Consequences If It 'Reinterprets' Arms Control Pact To Sell More Drones (Updated)," *Forbes*, June 16, 2020, <https://www.forbes.com/sites/davidhambling/2020/06/16/us-to-reinterpret-arms-control-agreement-to-sell-more-drones/>.

44 Kimball, "U.S. Reinterprets MTCR Rules."

45 Z. Tong and L. Bin, "Is the United States Complying with MTCR Rules?," *The Chinese Journal of International Politics* 2, no. 1 (January 1, 2008): 5–38.

46 The International Institute For Strategic Studies, "The MTCR: Staying Relevant 25 Years On," *Strategic Comments* 18, no. 2 (March 27, 2012): 1–3.

Reapers or Predators.⁴⁷ To a certain extent, these motivations were behind the Indian intentions to join the regime.

In light of these processes, the future of MTCR does not seem to be bright. Some argue that MTCR has lagged behind technological advancements such as the development of UAVs and must be reformed to maintain its efficiency.⁴⁸ One possible solution could be to exclude UAVs and related technology from the clauses of MTCR as the present generation of drones are more similar to crewed aircrafts than to missiles.

Another agreement signed to counter missile proliferation is the Wassenaar Arrangement (WA).⁴⁹ It has been established to promote transparency and greater responsibility in transfers of conventional arms, dual-use goods and technologies to prevent destabilising accumulations. Although the Wassenaar Arrangement has not directly decreased weapon exports or imports, it has positively affected international cooperation in regulating conventional arms transfers.⁵⁰ Not unimportantly, the EU includes the WA control lists, duals use list, and the munitions list in its legislation.⁵¹ Nevertheless, the regime still struggles with determining its role in the post-Cold War world – parties to the arrangement cannot agree whether it should remain a non-binding body for voluntary compliance and information exchange, or be equipped with some form of enforcement mechanisms.⁵² Additionally, there is no agreement on to which states the trade should be limited and which transfers are deemed destabilising.⁵³ It is mainly the Western states that are signatories to the arrangement, while various significant exporters such as China and Israel do not subscribe to the norm.⁵⁴ This all makes the Wassenaar Arrangement less influential than Missile Technology Control Regime.⁵⁵

Finally, the Hague Code of Conduct was created by MTCR partners to set norms against the development, testing and deployment of ballistic missiles. HCoC contributes to risk reduction and confidence-building as it prescribes pre-launch notifications on ballistic missile and space-launch vehicle launches and test flights, as well as increases transparency over stocks and policy. While HCoC urges its 143 subscribers to “exercise maximum possible restraint in the development, testing and deployment of ballistic missiles capable of delivering weapons of mass destruction, including, where possible, to reduce national holdings of such missiles,” it first and foremost seeks to impede the employment of ballistic missiles: by building trust and transparency, it seeks to reduce the risk of inadvertent escalation through misinterpretation.⁵⁶ Crucially, HCoC does not apply to sub-ballistic boost systems and therefore does not include most hypersonic weapons.

47 “Missile Technology Control Regime (MTCR),” *Shaan Academy* (blog), July 12, 2022, <https://shaan.academy/missile-technology-control-regime-mtcr/>.

48 Paola Sartori, “The Missile Technology Control Regime and UAVs: A Mismatch between Regulation and Technology,” Text, IAI Istituto Affari Internazionali, December 20, 2017, <https://www.iai.it/en/pubblicazioni/missile-technology-control-regime-and-uavs>.

49 “About Us,” The Wassenaar Arrangement, n.d., <https://www.wassenaar.org/about-us/>.

50 Austin Lewis and Judith Goldstein, “The Effectiveness of the Wassenaar Arrangement as the Non-Proliferation Regime for Conventional Weapons,” *Stanford University, Center for International Security and Cooperation, Interschool Honors Program in International Security Studies, Theses* (2015).

51 “OSCE Forum for Security Co-Operation Nr 778 Vienna, 4 February EU Statement on Wassenaar Arrangement,” February 4, 2015, <https://www.osce.org/files/f/documents/7/3/139616.pdf>.

52 Daryl Kimball, “The Wassenaar Arrangement at a Glance | Arms Control Association,” Arms Control Association, February 2022, <https://www.armscontrol.org/factsheets/wassenaar>; Heinz Gärtner, “The Wassenaar Arrangement (WA): How It Is Broken and Needs to Be Fixed,” *Defense & Security Analysis* 24, no. 1 (March 1, 2008): 53–60.

53 Kimball, “The Wassenaar Arrangement at a Glance | Arms Control Association.”

54 Gärtner, “The Wassenaar Arrangement (WA);” “About Us.”

55 Lewis and Goldstein, “The Effectiveness of the Wassenaar Arrangement as the Non-Proliferation Regime for Conventional Weapons.”

56 Dirk Jan van den Berg, “Letter Dated 30 January 2003 from the Permanent Representative of the Netherlands to the United Nations Addressed to the Secretary-General,” Letter, June 2, 2003, https://www.hcoc.at/sites/default/files/documents/Hague-Code-of-Conduct-A_57_724-English.pdf.

HCoC does not apply to sub-ballistic boost systems and therefore does not include most hypersonic weapons

Arms control: the dead and outdated

Until recently, two key bilateral arms control regimes capped the deployment of missiles: the Intermediate-Range Nuclear Forces (INF) Treaty and the New Strategic Arms Reductions Treaty (New START). With the first dead and the second increasingly challenged, it is not inconceivable that in the near future no limits on missile deployment will remain.

The 1987 INF Treaty banned all US and Russian ground-launched ballistic and cruise missiles with 500-5,500 km ranges regardless of their conventional or nuclear payload. With their shorter ranges, early-warning is particularly complicated for these systems, thus harming strategic stability and increasing their strategic effect. As the treaty was a bilateral one, it grew increasingly outdated in a strategic environment characterised by multipolarity. Other powers, notably China, were able to develop such systems, while others were not, spurring opposition in both the US and Russia. With its demise, there is no longer any cap on the deployment of delivery systems.

Meanwhile the new strategic environment renders New START – currently negotiated until 2026 – increasingly inadequate. The bilateral treaty, first agreed on in 2010, limits US and Russian nuclear warhead delivery systems (ground-launched missiles, submarine-launched missiles, and bombers) to 800 in possession, 700 in deployment, and the strategic nuclear warhead arsenal to 1,550. It does not cover shorter-range nuclear systems that are rapidly proliferating, nor non-traditional strategic nuclear weapons such as the Poseidon transoceanic torpedo. Crucially, the treaty is designed for a bipolar world with two nuclear rivals, not multiple. Opposition to the treaty is therefore mounting, and unlikely to be stifled. For instance, one US nuclear defence policy expert recently argued:

“The numerical cap of New START won't serve US national-security interests in a world with two nuclear peer states as potential enemies—a first in the nuclear age. Because of the growth of Russian shorter-range nuclear forces in the past 10 years, New START no longer serves US security interests even in a bilateral US-Russian context”.⁵⁷

In addition to political challenges to the remaining arms control architecture, various technological developments render existing arms control treaties and non-proliferation regimes increasingly inept. Hypersonic missile technology is only partly covered by existing non-proliferation instruments. The MTCR, which regulates missile technology and delivery vehicles irrespective of their payloads, does pertain to various components of hypersonic systems, including scramjets, hydrocarbon fuels, and materials required for thermal protection.⁵⁸ Yet, not all hypersonic technologies are covered by the MTCR.⁵⁹ HCoC meanwhile prescribes pre-launch notifications (PLNs) on ballistic missile and space-launch vehicle launches and test flights, covering ballistic missile boosters used in boost-glide systems, but not the boost-glide systems themselves; nor does it specify whether PLN obligations apply to hypersonic

57 Franklin C. Miller, “Outdated Nuclear Treaties Heighten the Risk of Nuclear War,” *Wall Street Journal*, April 21, 2022, sec. Opinion, <https://www.wsj.com/articles/outdated-nuclear-treaties-new-start-treaty-russia-putin-china-xi-heighten-risk-nuclear-war-missile-test-ukraine-deterrence-11650575490>.

58 “Missile Technology Control Regime (MTCR): Annex Handbook,” Annex Handbook 2017 (Bureau of International Security and Nonproliferation, 2017), <https://mtcr.info/wordpress/wp-content/uploads/2017/10/MTCR-Handbook-2017-INDEXED-FINAL-Digital.pdf>.

59 Kelsey Davenport and Sang-Min Kim, “Missile Proliferation Poses Global Risk,” *Arms Control Association* (blog), June 2021, <https://www.armscontrol.org/act/2021-06/news/missile-proliferation-poses-global-risk>.

New START is designed for a bipolar world with two nuclear rivals, not multiple

The arms control community is left with few remaining tools

missile flight tests.⁶⁰ Conventional-tipped hypersonic missiles are neither covered under UNSCR 1540, a regime that seeks to counter the proliferation of WMD delivery vehicles to nonstate actors. Most hypersonic missiles meanwhile are not covered by New START, as the treaty applies to “a weapon delivery vehicle that has a ballistic missile trajectory over most of its flight path”, or indeed ballistic missiles. The flightpaths of hypersonic missiles are indeed distinct from ballistic ones as they glide through the atmosphere on non-ballistic trajectories. That said, Russia’s Avangard hypersonic missile is mounted on an intercontinental launch vehicle, and thus covered under New START.⁶¹

Dual-capable missiles meanwhile are covered by MTCR even if the regime does not refer to these missiles explicitly. Pertaining to all missile systems with ranges of 300 km or more, including warheads, launchers, and platforms, as well as software, MTCR theoretically covers dual-capable systems. Still, MTRC does not prevent vertical proliferation, and therefore can do little to prevent states from developing dual-capable systems. As New START limits the possession and deployment of intercontinental ballistic missiles and submarine-launched ballistic missiles, regardless of their warhead, the treaty applies to dual-capable systems.

Indeed, today’s challenges to missile arms control and non-proliferation are myriad. The arms control community is left with few remaining tools such as the MTCR, while technological and geopolitical developments are rapidly adding challenges to their effectiveness.

Table 2. Current arms control measures



| Production | Proliferation | Deployment | Employment |
|-----------------------|--|--|---|
| Cruise missiles | MTCR (all vehicles capable of delivering a payload of 500+ kg to a range of 300+ km) WA (sensors, launchers, support systems) UNSCR 1540 (WMD delivery vehicles) | | |
| Ballistic missiles | MTCR (all vehicles capable of delivering a payload of 500+ kg to a range of 300+ km) UNSCR 1540 (WMD delivery vehicles) | New START (strategic warheads) | HCoC (ballistic missile and space-launch vehicle launches) |
| Dual-capable missiles | MTCR (all vehicles capable of delivering a payload of 500+ kg with a range of 300+ km) | | |
| Hypersonic missiles | MTCR (partially) UNSCR 1540 (nuclear-tipped systems only) | New START (nuclear-tipped ballistic trajectory HGVs) | HCoC (ballistic missile boosters used in HGVs but not the boost-glide systems themselves) |

60 Kolja Brockmann, “Controlling ballistic missile proliferation Assessing complementarity between the HCoC, MTCR and UNSCR 1540” (The Hague Code of Conduct, June 15, 2020), <https://www.nonproliferation.eu/hcoc/controlling-ballistic-missile-proliferation-assessing-complementarity-between-the-hcoc-mtrc-and-unscr-1540/>.

61 Cameron Tracy, “Fitting Hypersonic Weapons into the Nuclear Arms Control Regime,” All Things Nuclear, April 1, 2020, <https://allthingsnuclear.org/ctracy/fitting-hypersonic-weapons-into-the-nuclear-arms-control-regime/>.

4. Great power perspectives: Washington, Moscow, Beijing

With a missile landscape that is more dense, diverse, advanced, and volatile due to technological sophistication – as well as more contested and less regulated – the challenges for arms control and non-proliferation are many, as the previous section underlines. Often, the debates on arms control proceed from technologically specific or broadly normative points of departure. Yet beyond the desire among many arms control proponents to stress the lofty goal of disarmament, officials of nuclear weapon (or advanced conventional weapon) states tend to look at arms control as a tool to create stability while maintaining deterrence, or to lock in military advantages or prevent acquiring disadvantages.⁶² This section examines the major strategic considerations that shape the way in which Moscow, Washington and Beijing approach arms control along the various phases of the PPDE chain. A number of areas of contestation between the leading missile capitals emerge, concerning the export of technologies; the actors involved, especially when it comes to quantity-based treaties; the technological focus of arms control; and the implementation of risk reduction. Identifying such friction points helps us disentangle potential points of engagement for the not-so-great powers, in Europe especially (see Table 3 for a summary). Indeed, should Europeans realistically consider arms control interventions, great power concerns need to be addressed alongside normative aspects. To set the scene for the key debates taking place in the major missile capitals, the broader strategic considerations on missile arms control by the United States, Russia and China should be considered:

- Because the United States has extended deterrence commitments in multiple regions towards allies threatened by Russia and China, it looks to tailor its deterrents in each region. An arms control regime of the Cold War kind, essentially a bilateral arrangement with one rival in one region, would be unwelcome now as this would hamstring Washington's ability to deter a rival in the other region. The collapse of the INF Treaty is illustrative.
- Likewise, for the US, insulating the homeland and allies as much as possible from nuclear threats by minor states, affords it with leeway to continue to make its extended deterrence commitments credible.
- Russia fears conventional inferiority vis-à-vis the United States and is looking to offset this weakness through exotic missiles and a versatile nuclear arsenal. Indeed, in this regard the US-Russian relationship has been essentially reversed since the Cold War.
- Given its limited arsenal compared to that of the United States, China eyes with suspicion arms control measures that would semi-permanently lock in such a disadvantage.
- A wide arsenal of advanced conventional weapons provides Beijing with the ability to give pause to the US willingness to come to the aid of its official allies in the Western Pacific – like Japan – and its unofficial allies – like Taiwan. With its ballistic missiles and hypersonic missiles, China can target ships, airport, and ports which the US would use to project power into China's vicinity during a crisis.
- Given its (enduring) dominance in the aerial and naval domains, the United States benefits disproportionately from limitations on land-based missile forces, while Russia and China are more reliant on such forces to counter a US threat.

⁶² Maurer, "The Purposes of Arms Control."

Identifying friction points helps disentangle potential points of engagement for the not-so-great powers, in Europe especially

Curbing proliferation: deal with export control controversies

Across the three capitals, rhetorical support for non-proliferation regimes is pronounced, yet their willingness to transform this into action is ambivalent. Strategic-industrial motivations typically dominate, as exporting technologies allows countries to maintain a competitive edge. Recent discussions on and developments in MTCR are illustrative. In 2020, the Trump administration reinterpreted the implementation of the MTCR with the goal of increasing drone sales – a move that major US manufacturers had actively lobbied for. With the reinterpretation, the US now considers a number of UAVs that fly at speeds below 800 km/h as belonging to Category II rather than Category I of MTCR, boosting US competitiveness vis-à-vis drone exporters such as China and Israel that are not members of MTCR. The move risks weakening the effectiveness of MTCR to prevent the proliferation of delivery systems, and may spur other drone-producing MTCR members to follow suit.⁶³

Russia's attitude towards MTCR is generally positive: indeed, as a leading missile power, the regime can be used to lock in Moscow's competitive advantage. As such, Moscow has reiterated its support for the regime and is a leading information contributor to MTCR, especially in areas of technology licensing and updates on the list of covered technology.⁶⁴ Moscow's chairmanship of MTCR in 2021 brought new hopes to promote Chinese involvement in the regime.⁶⁵ This notion was strengthened during the opening session in Sochi as officials emphasised the importance of reaching out to key partners of MTCR – yet the plenary meeting did not lead to concrete steps.⁶⁶

Overall, China has iterated that it is actively engaged in limiting the proliferation of missile technologies, yet its demonstrated willingness to export missiles may suggest otherwise. It is not a member to either MTCR (even though it applied in the past) but has states various times that it adheres to MTCR guidelines.⁶⁷ It has been argued that China is especially interested in the benefits that could be granted by MTCR membership, such as access to new space-based projects.⁶⁸ In the past, China has further suggested that non-proliferation guidelines should be specifically for WMDs, not their delivery systems. After all, its land-based missiles are the great equalizer in China's competition with the US. In a similar vein, China has argued that all delivery systems should be restricted, if one delivery system is restricted.⁶⁹ Overall, China appears more concerned with the proliferation of other technologies such as fighter and bomber aircraft which are not part of MTCR guidelines.⁷⁰

63 Kimball, "U.S. Reinterprets MTCR Rules."

64 TASS Russian News Agency, "Control of Missile Technologies Must Remain Technical — Russian Foreign Ministry," TASS, April 8, 2020, https://tass.com/politics/1185477?utm_source=bing.com&utm_medium=organic&utm_campaign=bing.com&utm_referrer=bing.com.

65 Kolja Brockmann, "The Missile Technology Control Regime at a Crossroads," SIPRI, October 1, 2021, <https://www.sipri.org/commentary/topical-background/2021/missile-technology-control-regime-crossroads>.

66 Brendan Murphy, "Public Statement from the Plenary Meeting of the Missile Technology Control Regime Sochi, 8 October 2021 – MTCR," October 15, 2021, <https://mtcr.info/public-statement-from-the-plenary-meeting-of-the-missile-technology-control-regime-sochi-8-october-2021/>.

67 Niels Rasmussen, "Chinese Missile Technology Control – Regime or No Regime?," DIIS Brief (Copenhagen: Danish Institut for International Studies, 2007), https://www.files.ethz.ch/isn/29608/nra_chinese_missile_technology_control.pdf. and the main strategic capability available to the country is missile technology, China has a range of ballistic and cruise missile capabilities. China's technology export or proliferation of ballistic missile technology is of particular and serious concern. China has not joined the Missile Technology Control Regime (MTCR

68 Victor Zaborovsky, "Does China Belong in the Missile Technology Control Regime?," Arms Control Association, 2004, <https://www.armscontrol.org/act/2004-10/features/does-china-belong-missile-technology-control-regime>.

69 Rasmussen, "Chinese Missile Technology Control – Regime or No Regime?" and the main strategic capability available to the country is missile technology, China has a range of ballistic and cruise missile capabilities. China's technology export or proliferation of ballistic missile technology is of particular and serious concern. China has not joined the Missile Technology Control Regime (MTCR

70 Jon Brook Wolfstahl, "Viewpoint: US and Chinese Views on Proliferation: Trying to Bridge the Gap," *The Non-proliferation Review*, December 1994, 60–64.

Strategic-industrial motivations typically dominate, as exporting technologies allows countries to maintain a competitive edge

Key take-away

The effectiveness of export control regimes is less a given with the great powers competing for influence and industrial advantage. Countries should deal with export controversies in the current missile regimes; **excluding UAVs and related technology from the clauses of MTCR could be one solution.** Non-proliferation deserves continued attention regardless. As Figure 3 demonstrates, **proliferation is not just the responsibility of the great powers.** Major missile exporters include France, Turkey, Taiwan, South Korea and Israel; while also countries such as Germany, the Netherlands and Japan are responsible for exporting critical electronic components used in for instance Russian missile technology.⁷¹ Meanwhile dual-use computer components ostensibly purchased for peaceful civilian space programmes can end up in missile production.⁷² In short, proliferation is not the sole responsibility of the great powers, and **cooperation within Europe and beyond with exporters of missile technology is becoming increasingly important.**

Limiting deployment: go multilateral and theatre-focused

Perspectives on and motivations for multilateral arms control are different in each capital. For the US, with its increased focus on the Asian theatre, engaging China is key. Bilateral agreements with Russia undermine US competitiveness in other theatres and are therefore unattractive. Russia, meanwhile, is supposedly interested in multilateral arms control, as its concern lies with stability in the European theatre that includes other significant missile powers. On Chinese engagement however, Russia is less insistent. Beijing continues to be reluctant, citing imbalances in arsenals as principal reason.

Already in 2007, Russia declared that the INF Treaty no longer served its interests as a bilateral treaty with the US and instead contended that the treaty should be globalised. This position was shared by the United States and resulted in a joint declaration at the UN General Assembly calling on member states to denounce INF systems.⁷³ Also in discussions prior to the extension of New START, Washington was largely preoccupied with moving towards a new trilateral treaty with China and Russia. While Russia was more insistent on moving the extension of New START forward, it did share similar concerns. In 2020, Ambassador Antonov argued that further limitations through treaties would only be achievable if other nuclear states were involved, specifically the members of the United Nations Security Council (UNSC).⁷⁴ Last year, Russia again signalled its preference to include other nuclear powers in discussions on arms control, especially France and the UK.⁷⁵ Recent Russian suggestions for a theatre-based arms control approach include a post-INF European missile moratorium or

71 Jack Watling and Nick Reynolds, "Operation Z: The Death Throes of an Imperial Delusion" (Royal United Services Institute for Defence and Security Studies, April 22, 2022).

72 James Wilson, "Russia Exploits Dual Use Loophole to Source Parts for Lethal Missiles," April 10, 2022, <https://www.eupoliticalreport.eu/russia-exploits-dual-use-loophole-to-source-parts-for-lethal-missiles/>.

73 Peter van Ham, "Arms Control and Regimes," Strategic Monitor 2018-2019 (The Hague: HCSS & Clingendael, 2019), <https://www.clingendael.org/pub/2018/strategic-monitor-2018-2019/arms-control-and-regimes/>.

74 TASS Russian News Agency, "New START Extension to Give Time for Talks on Future Arms Control - Russian Ambassador," TASS, December 1, 2021, https://tass.com/politics/1244079?utm_source=bing.com&utm_medium=organic&utm_campaign=bing.com&utm_referrer=bing.com.

75 Radio Free Europe and Radio Liberty, "Russia Wants Britain, France To Join Wider Nuclear Talks With U.S.," RadioFreeEurope / RadioLiberty, July 29, 2021, <https://www.rferl.org/a/russia-britain-france-nuclear-talks/31383828.html>.

Beijing continues to be reluctant, citing imbalances in arsenals as principal reason

the proposal in December last year to not deploy ground-launched intermediate- and short-range missiles in territories outside of national borders or in areas where missiles could strike Russia or NATO countries. Moscow also proposed that parties to the agreement would cease the deployment of nuclear weapons outside of their national territories, including the training of personnel from non-nuclear states in the use of nuclear weapons. In January 2022, the US and NATO signalled a willingness to discuss some of Moscow's proposals, yet Russia's invasion of Ukraine put an end to this.⁷⁶

Russian preference for internationalising arrangements has been Europe-focused, as Moscow has been ambiguous with regard to China's role in nuclear arms control. When Washington urged to include China in New START, neither Moscow nor Beijing responded favourably – the result of which the Biden administration planned to pursue bilateral agreements with China. Indeed, despite it being a member of the UNSC, Russia continues to support Chinese claims that its nuclear arsenal is still too small to participate in any treaty.⁷⁷ For Beijing, meanwhile, the imbalance with American and Russian (nuclear) arsenals drives its refusal to join any agreement similar to New START.⁷⁸ China has taken the position that it will not enter negotiations until the difference in arsenals is significantly reduced.⁷⁹ Moreover, in its own view, Beijing already actively participates in various (nuclear) arms control processes, including through signing the CTBT, promoting the No First Use agreement, participating in UN and Conference on Disarmament frameworks, and revitalising the P5 process to discuss disarmament.⁸⁰

Key take-away

Today's diverse and democratic missile environment demands a rethinking of the Cold War's bilateral focus. If anything, the emergence of China and other missile powers make arms control discussions more complex. Beijing has repeatedly stressed that it is not interested in discussing numerical caps as long as its arsenal is smaller than those of the US and Russia. And as recent discussions on the INF Treaty and New START highlight, also Moscow and Washington rapidly lose interest in bilateral quantity-based treaties. Washington specifically is concerned with how existing bilateral treaties undermine its competitiveness vis-à-vis China in the Asian theatre; while Russia would like to see nuclear powers such as the UK and France included in arms control. **Multilateral and theatre-focused arms control is thus the way forward and requires the active participation of a wide range of actors, including great and middle powers.**

76 Arms Control Association, "Russia, U.S., NATO Security Proposals," Arms Control Association, March 2022, <https://www.armscontrol.org/act/2022-03/news/russia-us-nato-security-proposals>.

77 Steven Pifer, "Russia's Shifting Views of Multilateral Nuclear Arms Control with China," Blog, *Brookings* (blog), February 19, 2020, <https://www.brookings.edu/blog/order-from-chaos/2020/02/19/russias-shifting-views-of-multilateral-nuclear-arms-control-with-china/>.

78 Tong Zhao, "Europe's Role in Promoting US-China Arms Control Cooperation" (The Hague: The Hague Centre for Strategic Studies, February 2022), <https://hcass.nl/wp-content/uploads/2022/02/AC3-Europes-Role-in-Promoting-US-China-Arms-Control-Cooperation-HCSS-2022.pdf>.

79 Steven Pifer, "The Future of U.S.-Russia Nuclear Arms Control," in *AIP Conference Proceedings*, vol. 1898 (Washington, DC, USA: AIP Publishing, 2017), 020001, <https://doi.org/10.1063/1.5009206>.

80 Tong Zhao, "The Case for China's Participation in Trilateral Arms Control," in *Trilateral Arms Control? Perspectives from Washington, Moscow, and Beijing*, ed. Ulrich Kühn, IFSH Research Report 002 (Hamburg: Institute for Peace Research and Security Policy, 2021), 68–88, <https://d-nb.info/1208657216/34#page=68>.

Russian preference for internationalising arrangements has been Europe-focused

Limiting deployment: regulate warheads instead of vehicles

In recent years, the increasing versatility and diversity in missile arsenals have provoked discussions on whether to move towards regulating warheads instead of delivery systems and their launchers. Until now, arms control has focused on the latter for verification purposes: larger physical systems are simply more detectable and thus easier to monitor. In contrast, monitoring warheads is highly controversial as countries are generally dismissive of inspection in highly sensitive storage facilities. However, with missile arsenals becoming increasingly versatile, delivery vehicle and launcher-focused regimes are no longer apt to deal with today's versatile missile environment, the US in particular has argued. Concerned with Russian non-strategic nuclear weapons, the US first suggested in 2020 moving from delivery system-based arms control to warheads-limiting arrangements.⁸¹ Discussions on New START are illustrative: in its current form, the treaty only covers certain types of strategic nuclear weapons and does not address the existing imbalance in nonstrategic nuclear weapons that benefits Russia, nor all new kinds of strategic weapons that Russia has been developing (e.g. Avangard systems are covered but Kinzhal missiles are not).⁸² Therefore, when discussing the extension of New START beyond its expiration date in 2026, the Biden administration (and before that the Trump administration) highlighted its wish to expand the treaty's coverage to include all nuclear weapons.⁸³ As Russia is especially concerned with US strategic delivery systems, a warhead-focused arms control process, addressing such asymmetric concerns, could prove fruitful.

While verification for warheads is vastly more complex, new technologies offer promising ways forward

Key take-away

Delivery vehicle and launcher-focused regimes are no longer fit to deal with today's diverse, imbalanced and versatile missile environment. Regulating warheads instead of delivery vehicles could help move discussions forward. While verification for warheads is vastly more complex, new technologies offer promising ways forward, enabling for instance remote video monitoring and movement detection or re-entry vehicle on-site inspection.⁸⁴ **Raising awareness of and building support for such techniques will be an important step ahead – and something Europe can be involved in,** as this will require dialogues and other forms of exchanges that smaller and nonnuclear powers can also engage in. Initiatives such as the French-German Exercise for Nuclear Verification in 2019 are to be encouraged and ideally undertaken with non-NATO countries too.

81 Miles A Pomper et al., "Everything Counts: Building a Control Regime for Nonstrategic Nuclear Warheads in Europe," CNS Occasional Paper (Monterey: Middlebury Institute of International Studies at Monterey, October 5, 2022), <https://nonproliferation.org/wp-content/uploads/2022/05/op55-everything-counts.pdf>.

82 US Congressional Research Service, "The New START Treaty: Central Limits and Key Provisions," CRS Report for Congress (US) (Washington, D.C.: Congressional Research Service, February 2, 2022), <https://sgp.fas.org/crs/nuke/R41219.pdf>.

83 Pomper et al., "Everything Counts: Building a Control Regime for Nonstrategic Nuclear Warheads in Europe."

84 Rose Gottemoeller, "Rethinking Nuclear Arms Control," *The Washington Quarterly* 43, no. 3 (July 2, 2020): 139–59, <https://doi.org/10.1080/0163660X.2020.1813382>.

Preventing employment: raise risk awareness

Russia's attitude towards confidence-building measures is contradictory, as it does not adhere to current obligations but does promote new ones such as in its draft agreements presented to the US and NATO in December 2021. These included the desire for increased transparency on military exercises and doctrines, additional hotlines, and reaffirmations that parties did not consider another as adversaries.⁸⁵ The US and NATO initially signalled an openness to discuss some of the proposals in the context of the Vienna Document, but evidently all discussions have now halted. At the same time, while Russia continues to signal adherence to HCoC, it failed to implement the responsibilities that come with membership.⁸⁶

When it comes to confidence-building and risk reduction, China has prioritised other technologies such as artificial intelligence and outer space technologies over missile technology.⁸⁷ On missile technology, Beijing states that it is already sufficiently transparent about its capacities and technologies. It insists on an outward image of a responsible nuclear power, based on its promotion of its no-first use policy.⁸⁸ Still, Chinese experts have progressively shown an interest in participating in HCoC activities.

Experts have suggested a general lack of awareness at the government level of new risks, such as those posed by the proliferation of dual-capable systems, referring to the country's lack of experience with nuclear crises or incidents.⁸⁹ This lack of experience is also referred to in explanations of Beijing's distrust of verification measures and the utility of arms control as a cooperative security arrangement more generally, while a military strategy of ambiguity and secrecy explains Chinese scepticism of transparency and confidence-building measures.⁹⁰

Key take-away

Each great power has different strategic incentives it is pursuing, as table 3 underlines, which requires more tailored and multilateral approaches to arms control. Ambiguity-as-policy by various actors make efforts to regulate dual-capable systems and their associated risks unlikely to succeed. Underappreciation of inadvertent escalation risks and a lack of trust in verification mechanisms is generally thought to wear off enthusiasm for confidence-building **on escalation risks in light of technological developments, growing diversity in actors, and versatility in arsenals. Especially vis-à-vis China, there is much to gain from raising awareness and knowledge on escalation risks as well as verification techniques.** For instance, European arms control research institutes could organise knowledge exchanges with Chinese counterparts or offer training programmes to Chinese experts.⁹¹

85 Arms Control Association, "Russia, U.S., NATO Security Proposals."

86 Dennis Gormley, "Making the Hague Code of Conduct Relevant," *The Nuclear Threat Initiative* (blog), July 19, 2009, <https://www.nti.org/analysis/articles/making-code-conduct-relevant/>.

87 Zhao, "Europe's Role in Promoting US-China Arms Control Cooperation."

88 Antoine Bondaz, Dan Liu, and Emmanuelle Maitre, "The HCoC and China," HCoC Research Papers (Fondation pour la Recherche Stratégique, October 25, 2021), <https://www.nonproliferation.eu/hcoc/the-hcoc-and-china/>. N.B. However, China's statements are somewhat contradictory as if China is sufficiently transparent, then it should have no issue joining and adhering to HCoC.

89 Zhao, "The Case for China's Participation in Trilateral Arms Control."

90 Tong Zhao and Bin Li, "Understanding Chinese Nuclear Thinking" (Washington, D.C.: Carnegie Endowment for International Peace, 2016), <https://carnegieendowment.org/2016/10/28/understanding-chinese-nuclear-thinking-pub-64975>; Wu Riqiang, "How China Practices and Thinks About Nuclear Transparency," *Understanding* (Carnegie Endowment for International Peace, 2016), <https://www.jstor.org/stable/resrep2690314>.

91 See Zhao, "Europe's Role in Promoting US-China Arms Control Cooperation."

A military strategy
of ambiguity and
secrecy explains
Chinese scepticism
of transparency and
confidence-building
measures

Table 3. The great powers and missile arms control



| | Advantages of existing arsenals | Disadvantages of existing arsenals | Priorities in arms control | Aspects most willing to move position on | Conditions for moving position |
|---------------|---|--|--|---|--|
| United States | Quality; advantages in naval and aerial domains | Multiple extended deterrence commitments, need for flexibility | Deter two (near)peer adversaries in two different theatres Prevent small power nuclear aggressions | Increase transparency | Verification |
| Russia | Versatility/ Flexibility | Conventional inferiority | Stability in European theatre; multilateral arms control Offsetting conventional inferiority | Verification issues | A European missile moratorium? Engaging European powers? |
| China | Quality of (land-based) missiles | Quantity of nuclear warheads | Maintaining ambiguity Obstructing US alliance commitment by maintaining conventional advantages Prevent locked-in nuclear imbalances | Export control (e.g. joining MTCR) as a way to unlock other benefits Risk reduction? | Nothing concrete expressed |

5. The war in Ukraine

While long-term effects of Russia's assault on Ukraine are hard to predict, a number of challenges to arms control emerge from the first six months of the war.

Pressure on horizontal nuclear proliferation

Since Russia's invasion of Ukraine, it has been questioned whether Russia would have attacked Ukraine had it retained its Soviet nuclear weapons – despite it being highly uncertain whether Ukraine would have been able to transform this inheritance into a credible nuclear posture.⁹² States may find a renewed interest in nuclear deterrence and states with existing programmes increasingly incentivised to pursue the bomb. The war will undoubtedly put pressure on horizontal nuclear proliferation. At the same time, some argue that the war highlights that nuclear weapons do not help aggressors seize territory nor prevent third states from providing military equipment and other forms of support. Instead, “the war in Ukraine once again reminds us (...) that usable military capabilities are worth far more than costly weapons national leaders will try very hard not to use”.⁹³ Yet again, this unlikely leads to a plea for less weapons, but does remind us of the need to integrate discussions on deterrence and arms control.

The war will put pressure on horizontal nuclear proliferation

Negative security agreements: no long credible?

Perhaps even more consequential than a potential revaluation of nuclear deterrence, the invasion of Ukraine has shown the reversibility of negative security guarantees. By signing the Budapest Memorandum in 1994, Ukraine gave up nuclear weapons in exchange for security guarantees by the United States, the UK and Russia. By invading, Moscow blatantly violated

92 Richard Ned Lebow, “Practical Ways to Avoid Superpower Crises,” *Bulletin of the Atomic Scientists* 41, no. 1 (January 1985): 22, <https://doi.org/10.1080/00963402.1985.11455890>. Joseph L. Nogee, “The Soviet Union in the Third World: Successes and Failures,” (Strategic Studies Institute, US Army War College, June 20, 1980), 3–6, <https://apps.dtic.mil/sti/citations/ADA090959>; David Binder, “Soviet Brigade: How the U.S. Traced It,” *The New York Times*, September 13, 1979, sec. Archives; Lebow, “Practical Ways to Avoid Superpower Crises.” See for instance Erik Gomez, “Soviet Nukes in Ukraine: A Bargaining Chip, Not a Deterrent,” Cato Institute, June 3, 2022, <https://www.cato.org/blog/soviet-nukes-ukraine-bargaining-chip-not-deterrent>; Nathan Vanderklippe, “Ukraine’s Decision to Remove Nuclear Arsenal ‘Huge Mistake,’ Former Commander Says, as Russia Deploys Troops,” *The Globe and Mail*, February 23, 2022, <https://www.theglobeandmail.com/world/article-ukraine-nuclear-weapons-russia/>; Målfrid Braut-Hegghammer, “Should Ukraine Have Kept Soviet Nuclear Weapons? – PRIO Blogs,” Blog, PRIO, August 3, 2022, <https://blogs.prio.org/2022/03/should-ukraine-have-kept-soviet-nuclear-weapons/>; William J. Perry, “Did Ukraine Make a Mistake by Giving Up Nuclear Weapons?,” *At the Brink*, n.d., <https://www.belfercenter.org/publication/did-ukraine-make-mistake-giving-nuclear-weapons>.

93 Michael Krepon, “Arms Control Implications of the War in Ukraine (I),” *Arms Control Wonk*, *Arms Control Wonk* (blog), May 4, 2022, <https://www.armscontrolwonk.com/archive/1215382/arms-control-implications-of-the-war-in-ukraine-i/>.

the agreement, setting a dangerous precedent for the future. Negative security guarantees are essential global nuclear non-proliferation tools, having been successfully deployed times and times again by major nuclear powers.⁹⁴ In an environment that is increasingly uncertain, any undermining of the credibility of such guarantees is highly problematic.

A conventionally weaker Russia

Russia's military losses are turning the military balance of power in Europe to its detriment. It could move in two distinct directions. With conventional stocks evaporating in today's war⁹⁵, Russia may find itself increasingly reliant on its (tactical) nuclear stockpile. Incentives to engage in potentially arsenal-limiting talks or agreements therewith lower. Conversely, those engaged in costly and stock-depleting wars may see themselves forced to engage more actively in arms control talks to avert costly arms races. In the case of today's war, this potential dynamic applies to Russia but less so to other major parties to arms control discussions, who may see their conventional advantages rise as Russian arsenals empty.

Further delays to arms control talks

Aggressors need to be punished, not rewarded with arms control. The US and its NATO allies are likely less inclined to give in to Russian arms control demands, such as those pronounced in the Ukraine-related demands made in December 2021. In the past, the arms control process has suffered from similar tensions. After lengthy SALT II negotiations, the treaty ultimately fell through as the US-Soviet détente ended in the late 1970s through a series of events. The Soviet Union's invasion of Afghanistan in 1979, its military involvement in Africa, and the discovery of a Soviet combat brigade in Cuba led to growing American distrust, the result of which President Carter was forced to withdraw the SALT II agreement from the Senate.⁹⁶

Today, kick-starting the arms control process risks letting Russia off the hook for its actions in Ukraine as well as for its previous violations of existing agreements. Arms control talks are therefore unlikely to commence until a peace process over the current war in Ukraine is fully underway, including the withdrawal of Russian forces from Ukrainian territory. Thus, the war in Ukraine very much slows the process.⁹⁷

94 Francesca Giovanni, "Negative Security Assurances After Russia's Invasion of Ukraine" (Arms Control Association, August 2022).

95 Henry Foy and Felicia Schwartz, "Russia Running Short of Precision Missiles, Say Western Officials," *Financial Times*, April 29, 2022; Douglas Barrie and Joseph Dempsey, "Russia's Missile Inventories: KITCHEN Use Points to Dwindling Stocks," *Military Balance Blog* (blog), July 12, 2022, <https://www.iiss.org/blogs/military-balance/2022/07/russias-missile-inventories-kitchen-use-points-to-dwindling-stocks>.

96 Joseph L. Nogee, "The Soviet Union in the Third World: Successes and Failures." (Strategic Studies Institute, US Army War College, June 20, 1980), 3–6, <https://apps.dtic.mil/sti/citations/ADA090959>; David Binder, "Soviet Brigade: How the U.S. Traced It," *The New York Times*, September 13, 1979, sec. Archives; Richard Ned Lebow, "Practical Ways to Avoid Superpower Crises," *Bulletin of the Atomic Scientists* 41, no. 1 (January 1985): 22–28, <https://doi.org/10.1080/00963402.1985.11455890>.

97 This point was reiterated by Rose Gottemoeller during a panel discussion in April 2022.

With conventional stocks evaporating, Russia may find itself increasingly reliant on its (tactical) nuclear stockpile

A definite end to no first use and sole purpose pledges?

Deterrence is once again prominent. Efforts to diminish the role of nuclear weapons in American strategy will likely erode, and considerations of a no-first-use or sole-purpose nuclear policy abandoned.⁹⁸ Deterrence and reassurance of allies and partners need to be reinforced, and while ambiguity is inherently part of effective deterrence, it will become increasingly important for the US to signal its willingness to use nuclear weapons to stave off a conventional attack against, for instance, Japan.

Deterrence and reassurance of allies and partners need to be reinforced

⁹⁸ For a discussion on no-first-use and sole-purpose, see: Ankit Panda and Vipin Narang, "Sole Purpose Is Not No First Use: Nuclear Weapons and Declaratory Policy," War on the Rocks, 2021, <http://warontherocks.com/2021/02/sole-purpose-is-not-no-first-use-nuclear-weapons-and-declaratory-policy/>.

6. Conclusion:

What Europe can do

For small and middle powers, the already limited manoeuvre space in the field of arms control is shrinking even further

Today’s missile landscape is ever more complex. Long before Russia invaded Ukraine, relations between the US and Russia had deteriorated and competition with China had grown. Today’s war has put deterrence-by-denial and deterrence-by-punishment firmly back on the agenda, and it is key to seek the right mix of deterrence, arms control, and non-proliferation measures. While further horizontal nuclear proliferation should be avoided at all costs, conventional missile arsenals are likely to be expanded. For Russia, which sees part of its conventional inventories evaporate as the war drags on, reliance on non-strategic nuclear weapons may increase – adding complexity to conventional-nuclear dynamics.

In an environment of intensifying strategic competition between Washington, Russia and Beijing, arms control is in peril. Any potential progress will be tied to the strategic consideration of whether an agreement would help these powers gain advantages over their adversaries or forge stability. Disarmament as a purely normative goal has become unlikely. For small and middle powers, the already limited manoeuvre space in the field of arms control is shrinking even further. In addition to the more technical takeaways and recommendations for Europe laid out in section 4, this policy brief warrants three higher-level recommendations for small and middle powers. Europe should impede the proliferation of missile technology and erode adversaries’ competitive edge through economic statecraft directed at limiting their access to advanced technologies and their components. It should simultaneously revamp NATO’s dual-track approach to enhance stability, shift strategic calculations and force adversaries to the negotiating table. Finally, it should build a stronger European deterrence and arms control knowledge base and get the European public on board of stability-enhancing measures. Table 4 summarises key findings (and policy recommendations) from sections 4 and 5 and the policy implications for Europe.

Table 4. The political strategic-environment and implications for Europe



| | Great power challenges | Russo-Ukrainian war challenges | Policy implications for Europe |
|---------------|--|---|---|
| Production | Limited appetite to restrain themselves in today’s competitive environment | Declining stocks on all sides | Economic warfare to limit spread of high-end technologies and machinery |
| Proliferation | Strategic-industrial considerations to maintain national industrial base as well as to support allies and partners | Additional motives for horizontal nuclear proliferation | Economic warfare to limit spread of high-end technologies and machinery |
| | | Undermining negative security guarantees | Adapt remaining export regimes to latest technological developments, e.g. exclude UAVs from MTCR regulations |
| Deployment | Difficult to move from bilateral to multilateral arms control Versatility and diversity in arsenals | Increased tensions and a conventionally weaker Russia that may be more reliant on nuclear weapons | Promote new non-invasive verification techniques Move from limiting delivery vehicles to limiting warheads |
| Employment | Intentional ambiguity | The end of no first use and sole purpose pledges; nuclear sabre-rattling | Dual-track approach Track 1.5 or 2.0 diplomacy on escalation risks |

1. Doubling down on instruments of economic statecraft

With interventions at the deployment and employment stages unlikely in today's tense international environment, European governments should double down on preventing the production of missile technology. Since the collapse of the Soviet Union, the Russian defence industry has grown increasingly reliant on foreign imports, with estimations running as high as 80-85%.⁹⁹ Since 2014, this share has declined sharply, as the annexation of the Crimea put an end to intensive Russian-Ukrainian defence cooperation and as Western sanctions began to target Russian imports of advanced technology components of both military and dual-use goods.¹⁰⁰ Subsequently, Russian access to basic electronics subsystems became restricted, impeding the production of most complex weapon platforms including radar sets, seeker heads, avionics and electronic warfare systems.

In the current war, industry-related problems indeed appear to play a role. Over the summer, US assessments report that Russian precision-guided weapon stocks were already running low.¹⁰¹ Its replenishments are dependent on specialist components manufactured abroad; a recent study of the war in Ukraine suggests that for instance the 9M727 cruise missile (fired from the Iskander-K) is highly dependent on US-produced software; meanwhile the Iskander-M, Kalibr cruise missile, Kh-101 air-launched cruise missile all rely on a British-designed oscillator in the computer controlling the radar. It is concluded that almost all Russian military hardware depends on complex – sometimes dual-use – electronics imported from foreign, often Western countries including the US, the UK, Germany, the Netherlands and Japan.¹⁰² Yet, despite sanctions in place, many items were successfully shipped to Russia post-2014. One crucial reason is the difficulty that comes with regulating civilian dual-use components.¹⁰³

European states should aim to counter the Russian replacement of foreign supply-dependent ammunitions but even more importantly micro-electronic components required for complex weapon systems. This should be done through a thorough assessment of EU-Russian military and civilian supply flows, and extensive cooperation among member states thereto, but also through cooperation with third countries to prevent companies here from replenishing Russian supplies.¹⁰⁴

99 Elena Gregova, Irina Tulyakova, and Victor Dengov, "Actual Problems and Limiting Factors in the Development of the Russian Military-Industrial Complex," ed. T. Kliestik, *SHS Web of Conferences* 92 (2021): 07021, <https://doi.org/10.1051/shsconf/20219207021>.

100 Reuben Johnson, "Russia's Defense Industry Might Not Survive an Invasion of Ukraine," *Breaking Defense* (blog), January 13, 2022, <https://breakingdefense.com/2022/01/russias-defense-industry-might-not-survive-an-invasion-of-ukraine/>.

101 "Senior Defense Official Holds a Background Briefing," U.S. Department of Defense, accessed July 28, 2022, <https://www.defense.gov/News/Transcripts/Transcript/Article/2973395/senior-defense-official-holds-a-background-briefing/https%3A%2F%2Fwww.defense.gov%2FNews%2FTranscripts%2FTranscript%2FArticle%2F2973395%2Fsenior-defense-official-holds-a-background-briefing%2F>.

102 Watling and Reynolds, "Operation Z: The Death Throes of an Imperial Delusion."

103 Reuben Johnson, "Russian Attempts to Restock Its Military May Be Doomed to Failure," *Breaking Defense* (blog), May 19, 2022, <https://breakingdefense.sites.breakingmedia.com/2022/05/russian-attempts-to-restock-its-military-may-be-doomed-to-failure/>.

104 Identified countries include Czech Republic, Serbia, Armenia, Kazakhstan, Turkey, India and China. Watling and Reynolds, "Operation Z: The Death Throes of an Imperial Delusion," 15.

Russian replenishments are dependent on specialist components manufactured abroad;

2. Revamping the dual-track approach: treating arms control and deterrence holistically

Europe should reassess the relation between arms control and deterrence and treat them holistically: efforts in each of the two tracks should reinforce the other and vice versa. For decades, Europeans have treated Europe deterrence and arms control as two opposites, with deterrence increasing armaments and arms control reducing them. Policy debates have therewith come to take place within different communities and spaces. In essence, deterrence and arms control are two sides of the same coin, as both strands of effort seeking to prevent war by forging stability between potential adversaries. Deterrence seeks to prevent war and provide stability in a world where effective defence by denial is impossible, even if significant effort and resources have been channelled towards achieving the opposite. To discourage adversaries from launching a war, a (perceived) degree of parity in pain-inflicting capabilities thus needs to be achieved. Here, arms control comes in: it essentially serves deterrence by *reshaping* military incentives and capabilities through cooperative efforts.¹⁰⁵ Deterrence is thus contingent on arms control, yet the opposite is also true when armaments are being used to force an adversary to the negotiating table.

In the past, deterrence and arms control have been deployed to serve one another. During the 1980s, NATO pursued a dual-track policy whereby American intermediate-range missiles capable of striking Soviet territory were deployed in Europe in a quest to convince Soviet leaders to abandon their ground-based intermediate-range nuclear forces. This strategy is widely considered to have contributed to the ultimate conclusion of the 1987 INF Treaty.¹⁰⁶ Through a dual-track approach that combines competition and arms control, the US achieved a total elimination of weapons it was not very interested in for deterrence-purposes to begin with, while its adversary was; while maintaining its competitive advantage in air- and sea-based deterrent forces.¹⁰⁷

As this brief has highlighted, major missile powers today, if interested in arms control at all, would pursue talks to lock in advantages or further stability. In this light, Europeans should advance a dual-track strategy in a bid to advance asymmetric negotiations. For instance, through European investments in INF-range ground-based missile forces, Russia could be pressured to negotiate on the versatility of its arsenal in stability-enhancing talks.

¹⁰⁵ Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 2008).

¹⁰⁶ "The Dual-Track Approach: A Long-Term Strategy for a Post-INF Treaty World," War on the Rocks, April 10, 2019, <https://warontherocks.com/2019/04/the-dual-track-approach-a-long-term-strategy-for-a-post-inf-treaty-world/>.

¹⁰⁷ Andreas Lutsch, "The Zero Option and NATO's Dual-Track Decision: Rethinking the Paradox," *Journal of Strategic Studies* 43, no. 6–7 (November 9, 2020): 957–89, <https://doi.org/10.1080/01402390.2020.1814259>; Maurer, "The Purposes of Arms Control."

Arms control serves deterrence by reshaping military incentives and capabilities through cooperative efforts

3. Invest in expert and public knowledge

Russia's invasion of Ukraine in February 2022 has awoken the wider political and public European community to the danger of today's renewed strategic competition between major military powers. Therewith, it has the potential to put deterrence and arms control firmly back on the European policy agenda. Also in the past, crises and conflict helped mobilise public support for arms control.¹⁰⁸ This function of crises and wars is not trivial, as in recent years, experts have warned of an "unprecedented" lack of attention paid by the great powers to the unravelling of arms control.¹⁰⁹ In Europe, too, such a lack of attention has been persistent, with very little attention devoted to for instance the demise of INF.¹¹⁰ Bringing Europeans back on board in both arms control and deterrence discussions is needed, since the continent continues to be a region of contestation. Firmly embedded in NATO and with various major missile powers, it has an important role to play in arms control.

Yet equally important, the current war can serve to increase support for deterrence measures. Vis-à-vis non-democratic adversaries, democracies are typically at a disadvantage when it comes to pursuing effective deterrence signalling as they are put under pressure by civil society to disarm. Studies suggest that when faced with serious threats, the public will support more hard-nosed strategic policy choices such as deterrence signalling.¹¹¹ Effective engagement with civil society on stability, deterrence and arms control purposes can help create support for sometimes costly measures.

Finally, it is key for Europe to rebuild a strong and integrated deterrence and arms control community. Strategic interests on each side of the Atlantic are not always aligned,¹¹² and a robust expert community is needed to define and promote European interests.

Key takeaway

In short, neither arms control nor deterrence can be considered without the other. This policy brief has underlined, however counterintuitive it may seem to Europeans, that investments in robust deterrence – whether by strengthening European conventional capabilities or by using economic instruments to deny the access of others – also provide powerful bargaining leverage to engage on arms control. Such leverage is more necessary in a world where arms control is no longer largely bilateral, but instead increasingly multipolar. Greater attention needs to be paid to diverse strategic incentives for different great powers to understand the options for arms control, and for that, arms control and deterrence communities in Europe need to be reinvigorated.

¹⁰⁸ Lebow, "Practical Ways to Avoid Superpower Crises."

¹⁰⁹ Alexey Arbatov, "An Unnoticed Crisis: The End of History for Nuclear Arms Control?" (Carnegie Endowment for International Peace, June 2015), <https://carnegiemoscow.org/2015/06/16/unnoticed-crisis-end-of-history-for-nuclear-arms-control-pub-60408>.

¹¹⁰ Witney, "Nothing to See Here."

¹¹¹ For discussions on public support for nuclear weapons policy, see for instance Doreen Horschig, "Israeli Public Opinion on the Use of Nuclear Weapons: Lessons From Terror Management Theory," *Journal of Global Security Studies* 7, no. 2 (May 27, 2022): ogac006, <https://doi.org/10.1093/jogss/ogac006>; Janina Dill, Scott D. Sagan, and Benjamin A. Valentino, "Kettles of Hawks: Public Opinion on the Nuclear Taboo and Noncombatant Immunity in the United States, United Kingdom, France, and Israel," *Security Studies* 31, no. 1 (January 1, 2022): 1–31, <https://doi.org/10.1080/09636412.2022.2038663>.

¹¹² The negotiations for the INF treaty serve as an example: Lutsch, "The Zero Option and NATO's Dual-Track Decision."

When faced with serious threats, the public will support more hard-nosed strategic policy choices such as deterrence signalling

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