

REDUCING THE ROLE OF NUCLEAR WEAPONS IN MILITARY ALLIANCES

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I. Introduction

This paper examines the role of nuclear weapons in military alliances, with a focus on states that do not have their own nuclear weapons but are part of the ‘extended nuclear deterrence arrangements’ of, or under a ‘nuclear umbrella’ provided by, a nuclear-armed patron. Since 2022, with the accession of Finland and Sweden to the North Atlantic Treaty Organization (NATO) and the extension of a Russian nuclear umbrella over Belarus, the number of such states has increased from 30 to 33. All of these ‘umbrella states’—which in addition to European NATO members and Belarus also include Australia, Japan and the Republic of Korea (ROK, South Korea)—accept nuclear weapons as part of the mix of military capabilities intended to create a collective deterrent effect. To increase the credibility of this kind of deterrence, the United States—whose alliance network includes most of the existing extended nuclear deterrence arrangements—routinely engages in nuclear assurance, meaning consultations, exercises and other mechanisms to convince allies of its resolve to use nuclear weapons on their behalf.¹ Given the absence of a ‘no-first-use’ policy that would limit nuclear weapon use solely to retaliation against nuclear attack, extended nuclear deterrence means readiness by the USA to use nuclear weapons, not only for retaliation in kind, but also to respond to acts of conventional aggression or to biological or chemical weapons attacks against their allies. As Russia does not have a no-first-use policy either, the same can be seen to apply to its extended nuclear deterrence arrangement with Belarus.

Although previously such umbrella states tended to keep a low profile when it came to their own involvement in nuclear deterrence, in recent years they have been unprecedentedly vocal about the perceived security value of nuclear weapons. For instance, Poland and South Korea have both called for the expansion of extended nuclear deterrence arrangements by expressing readiness to host non-strategic nuclear weapons.² The Finnish defence minister, Antti Häkkinen, also said in 2023 that nuclear deterrence was ‘one of the reasons why Finland joined NATO’.³ These examples coincide with

¹ Mount, A., ‘The US and South Korea: The trouble with nuclear assurance’, *Survival*, vol. 65, no. 2 (2023), pp. 123–40.

² Chiappa, C., ‘Poland: We are ready to host nuclear weapons’, *Politico*, 22 Apr. 2024; and Choe, S.-H., ‘In a first, South Korea declares nuclear weapons a policy option’, *New York Times*, 12 Jan. 2023.

³ Keski-Heikkilä, A., ‘Häkkinen: Näiden maiden rauhanajan ilmavalvontaan Suomi voisi osallistua’ [Häkkinen: Finland could participate in the peacetime air surveillance of these countries], *Helsingin*

SUMMARY

● This paper examines the role of nuclear weapons in military alliances, focusing on the perspectives of the so-called umbrella states—that is, allied states that do not have their own nuclear weapons but are part of the ‘extended nuclear deterrence arrangements’ of a nuclear-armed patron. After analysing allied security thinking and highlighting the underlying assumptions about nuclear deterrence, the paper subjects some of those assumptions to critical scrutiny.

Taking into account regional military balances and escalation risks related to nuclear deterrence, it challenges the perceived security benefits of forward-deployed non-strategic weapons, continued support for allied nuclear doctrines based on readiness for the first use of nuclear weapons, and the assumed inevitability of nuclear second strike that underlies the practices of nuclear assurance.

The goal is to open discussion on the development of a more measured approach to deterrence that would allow for minimizing the role of nuclear weapons in military alliances.



a more general discussion among umbrella states on ways to strengthen extended nuclear deterrence to address regional threats. Underlying these trends is the current threat environment, characterized by overt threats of nuclear weapon use and greater investments by several nuclear-armed states in nuclear weapons, as well as their apparent lack of interest in arms control.

However, apart from their conviction that only nuclear weapons can deter nuclear threats, many allies do not seem to have a clear idea of what value these weapons add to the overall defence and deterrence postures of their respective alliances, nor of the risks involved in increased reliance on nuclear weapons. Such undiscerning endorsement of nuclear deterrence in the world's most powerful military alliances is at odds with long-standing international efforts to reduce the role of nuclear weapons so as to pave the way for arms control and disarmament. This sets a dangerous precedent for proliferation by raising the fundamental question as to why non-allied countries that are much weaker in terms of their conventional power should continue to refrain from obtaining nuclear weapons of their own. At the same time, umbrella states' views on nuclear deterrence and their involvement in related practices influence the policies of nuclear-armed states, with the USA seeking to assure allies of its commitment to extended nuclear deterrence and adversaries factoring this into their respective threat perceptions and defence planning.

This paper analyses umbrella states' security policies and threat perceptions to identify some of the key assumptions underlying their current thinking on extended nuclear deterrence. It then subjects those assumptions to critical scrutiny with the intention of opening discussion on the development of a more measured approach to deterrence that would better account for the broader context of allied military capabilities vis-à-vis the relative power of adversaries, as well as the related escalation risks. The paper also outlines pathways for minimizing the role of nuclear weapons in military alliances without jeopardizing deterrence. The focus is on US-led alliances, meaning that the recent arrangement between Belarus and Russia is not discussed. This arrangement seems mainly to serve Russia's political objectives rather than Belarus' perceived deterrence needs; as well as adding to Russia's nuclear signalling in the context of its war in Ukraine, its nuclear weapon deployments in Belarus also deliberately mirror NATO policy, which it has long criticized.⁴

Section II discusses umbrella states' threat perceptions and the role of nuclear weapons in their security policies, with a focus on the past two years. While allies are rather circumspect about how exactly nuclear weapons serve to deter regional adversaries, the discussion points to particular contingencies that seem to highlight the need for nuclear deterrence. Section III then scrutinizes the underlying assumptions, questioning in particular the perceived need for further investments in non-strategic weapons, the maintenance of the policy of nuclear first use, and the deeply held conviction that use of nuclear weapons can only be deterred with nuclear weapons. Finally, section VI outlines policy recommendations

Sanomat, 22 Aug. 2023.

⁴ Melin, K., 'Tools of coercion and control: Russian nuclear weapons in Belarus', RUFBS Briefing no. 56, Swedish Defence Research Agency (FOI), Oct. 2023.



drawing from the preceding discussion, suggesting ways to reduce reliance on nuclear weapons in military alliances.

II. The role of nuclear weapons in allied security policy

Military alliances are built on shared interests. For the USA—the provider of most extended nuclear deterrence arrangements—alliances have facilitated the forward positioning of forces and capabilities, allowing it to project power and influence as well as to counter adversaries overseas while keeping wars away from American homeland.⁵ In return, US military presence and security commitments have increased its allies' sense of security against perceived regional threats. In the case of NATO allies and three countries in the Asia-Pacific region—Australia, Japan and South Korea—these commitments also include extended nuclear deterrence arrangements. As noted above, the USA does not have a no-first-use policy. In this context, extended nuclear deterrence means the USA is ready to use nuclear weapons to respond to any acts of aggression against its allies, including non-nuclear attacks. Having considered a 'sole-purpose' policy—which would have been similar to no first use in that it would have reserved nuclear weapons solely for the deterrence of nuclear attacks—the USA under the administration of President Joe Biden ultimately rejected it, apparently because of the perceived need to assure allies and partners that are 'particularly vulnerable to attacks with non-nuclear means that could produce devastating effects'.⁶

This section takes a closer look at the role of nuclear weapons in US allies' threat perceptions and security policies, drawing on strategic documents that allied states published in 2022–24. It also makes inferences about regional contingencies for which extended nuclear deterrence seems particularly relevant, and discusses allied support and calls by US allies for expanded nuclear deterrence practices in the past two years.

NATO: Deterring nuclear blackmail by Russia

The USA's extended nuclear deterrence arrangements in Europe were initially intended to prevent aggression by the Soviet Union. These arrangements included the practice of nuclear sharing whereby the USA deployed thousands of non-strategic nuclear weapons in the territories of its European allies during the cold war.⁷ The fall of the Soviet Union and the relatively good relations between NATO and Russia until the 2000s largely removed this rationale for extended nuclear deterrence. While most of these weapons had been removed by the early 1990s, B61 gravity bombs remained in Europe.⁸ At the same time, NATO's nuclear doctrine—which mirrors US nuclear policy in that it retains the option of using nuclear weapons first—remained largely unchanged. Although the military value of this doctrine and continued nuclear sharing were frequently called into question in the 1990s

⁵ McInnis, K. J., 'The competitive advantages and risks of alliances', The Heritage Foundation, 30 Oct. 2019.

⁶ US Department of Defence (DOD), *2022 National Defense Strategy of the United States of America* (DOD: Washington, DC, Oct. 2022), p. 9.

⁷ Erästö, T., 'The role of umbrella states in the global nuclear order', SIPRI Insights on Peace and Security no. 2023/06, June 2023, pp. 3–4.

⁸ Kristensen, H. M. et al., 'Nuclear weapons sharing', *Bulletin of Atomic Scientists*, 8 Nov. 2023.



and 2000s, Russia's annexation of Crimea in 2014 and especially its full-scale invasion of Ukraine in 2022 increased the prominence of nuclear weapons in NATO's deterrence policy.⁹ In this context, European allies—together with Australia and Japan—also reportedly sought in 2021 to convince the USA not to move towards a sole-purpose policy.¹⁰

Threat perceptions

In dramatic contrast to 2010, when Russia was still portrayed as a partner whose security was 'intertwined' with that of NATO, the 2022 NATO strategic concept states that Russia is 'the most significant and direct threat to Allies' security and to peace and stability in the Euro-Atlantic area'.¹¹ European member states' strategic documents from the past two years also unambiguously present Russia as the alliance's foremost adversary. As for how the allies interpret Russia's intentions, the documents refer to Russia's quest to maintain spheres of influence, to 'expand its territory', and to undermine 'European cohesion' and 'the sense of political unity in the West'.¹²

The documents also raise the prospect of direct Russian military aggression against NATO. Apparently reflecting the possibility that the war in Ukraine could escalate into a war between NATO and Russia, the Netherlands' 2023 security strategy notes that a 'direct conflict with Russia has become more conceivable'.¹³ Denmark's 2022 security and defence paper states that 'the most significant threat to the Alliance' is the possibility that Russia could 'quickly occupy parts of or even all of three Baltic countries in order to test NATO's solidarity and willingness to wage large-scale war'.¹⁴ This prospect arguably also explains why Estonia's 2023 national security concept identifies Russia as an 'existential' threat to Estonia.¹⁵

Although some of the strategic documents acknowledge the weakening of Russia's conventional capabilities as a result of the war in Ukraine, this is not seen as lessening the threat Russia is perceived to pose. On the contrary, as argued in the Danish security and defence paper, 'the weakening of Russia's conventional capabilities due to losses and attrition in Ukraine may reduce the Russian threshold for the use of nuclear weapons', referring to a commonly held assumption that Russia 'could seek to dominate the conflict by deploying nuclear weapons early'.¹⁶ Similarly, Czechia's security strategy argues that, 'Exhausted by the conventional conflict, Russia will become

⁹ Erästö, 'The role of umbrella states in the global nuclear order' (note 7), pp. 3–4.

¹⁰ Sevastopulo, D. and Foy, H., 'Allies lobby Biden to prevent shift to "no first use" of nuclear arms', *Financial Times*, 30 Oct. 2021.

¹¹ North Atlantic Treaty Organization (NATO), *Active Engagement, Modern Defense: Strategic Concept for the Defence and Security of the Members of the North Atlantic Treaty Organization* (NATO: Brussels, Nov. 2010), p. 30, para. 34; and NATO, 'NATO 2022 strategic concept', 29 June 2022, p. 4, para. 8.

¹² See, respectively, Czech Government, *Security Strategy of the Czech Republic 2023* (Czech Ministry of Foreign Affairs, 2023); Latvian Ministry of Foreign Affairs, 'The state defence concept', 2023, p. 4 para. 11; and Dutch Government, *The Security Strategy for the Kingdom of the Netherlands*, 3 Apr. 2023, p. 14.

¹³ Dutch Government (note 12), p. 22.

¹⁴ Danish Security Policy and Analysis Group, *Danish Security and Defence towards 2035* (Danish Ministry of Foreign Affairs: Copenhagen, Sep. 2022), p. 10.

¹⁵ Estonian Government, 'National security concept of Estonia', 22 Feb. 2023, p. 6.

¹⁶ Danish Security Policy and Analysis Group (note 14), p. 10.



increasingly reliant on nuclear capabilities to defend its position as a great power'.¹⁷

Thus, the strategic documents seem to point to a *fait accompli* scenario where Russia would use its local military advantage in the early stages of a conflict, before the mobilization of allied forces. This scenario was highlighted in a 2017 RAND study which argued, based on war-gaming projections, that NATO's 'tripwire' strategy and its force structure at the time was insufficient to repel a Russian invasion of the Baltic states bordering Russia.¹⁸ More specifically, although NATO did possess sufficient military capabilities to counter Russia, these would not reach the Baltic in time to prevent partial occupation of Baltic territory, which could lead Russia to 'doubt NATO's will to follow through with a delayed counteroffensive'.¹⁹ The testimony posed the question of whether NATO's resolve might be weakened by a high number of casualties or by the threat of Russian retaliation—either by means of cruise missile strikes against targets in Western Europe and the USA, or through limited nuclear weapon use.²⁰

The role of nuclear weapons

While stressing the security benefits of extended nuclear deterrence and the need to further strengthen defence and deterrence, the strategic documents of European NATO member states discussed above are rather circumspect when it comes to the exact role of nuclear weapons in their overall strategy for countering the Russian threat. For example, the Danish document stresses the 'need for a stronger focus on NATO as a nuclear alliance' and argues that 'a credible deterrence of Russia for the foreseeable future will . . . require maintaining the US nuclear guarantee'.²¹

NATO's 2022 strategic concept is only slightly more specific, stating: 'The strategic nuclear forces of the Alliance, particularly those of the United States, are the supreme guarantee of the security of the Alliance. . . . NATO's nuclear deterrence posture also relies on the United States' nuclear weapons forward-deployed in Europe and the contributions of Allies concerned.'²² However, the *fait accompli* scenario and the related threat of limited nuclear strikes by Russia, as described above, indicate that the USA's own limited nuclear strike options play a key role in NATO's deterrence policy—based on the logic that these would constitute a measured response to nuclear weapon first use by Russia. This rationale is more clearly stated in the 2022 US Nuclear Posture Review, which describes the need for 'flexible, tailorable' nuclear capabilities in terms of ensuring 'that Russia's leadership does not miscalculate regarding the consequences of nuclear weapon use on any scale, thereby reducing their confidence in both initiating conventional war against NATO and considering the employment of non-strategic nuclear weapons in

¹⁷ Czech Government (note 12), p. 14, para. 27.

¹⁸ Shlapak, D. A., 'Deterring Russian aggression in the Baltic States: what it takes to win', Addendum to testimony before the House Armed Services Committee, Subcommittee on Tactical Air and Land Forces, 1 Mar. 2017, p. 3.

¹⁹ Shlapak (note 18), p. 3.

²⁰ Shlapak (note 18), p. 3.

²¹ Danish Security Policy and Analysis Group (note 14), pp. 39, 46.

²² NATO, 'NATO 2022 strategic concept' (note 11), p. 8, para. 29. See also NATO, *Active Engagement, Modern Defense* (note 11), p. 14, para. 18.



such a conflict'.²³ While NATO's strategic concept does not explicitly refer to flexible nuclear options, these can be seen as implicit in the stated intent to 'significantly strengthen our deterrence and defence posture to deny any potential adversary any possible opportunities for aggression', to which end NATO will ensure that its 'deterrence and defence posture remains credible, flexible, tailored and sustainable'.²⁴

More specifically, flexibility in the US Nuclear Posture Review refers to limited options provided on the one hand by the US arsenal of non-strategic nuclear weapons—that is, the B61 bombs deliverable from both US and allied dual-capable aircraft, notably F-35s—and, on the other hand, certain strategic nuclear weapons that can be used tactically—namely the submarine-launched W76-2 low-yield warhead and the air-launched Long-Range Standoff (LRSO) nuclear weapon.²⁵ NATO allies' perceived need and support for limited nuclear options based on non-strategic weapons is demonstrated in their support for the alliance's nuclear-sharing practices, discussed below.

Support for the nuclear mission

Like US allies elsewhere, several European NATO member states participate in strategic signalling by the USA through joint flights with its nuclear-capable strategic B-2 and B-52 bombers, or by allowing overflights or landings in their national territory by such aircraft.²⁶ However, their primary form of support for nuclear deterrence practices is through NATO's nuclear-sharing arrangements.

The most visible form of such support is political; for example in 2012–14, at least 13 NATO member states defended the alliance's nuclear-sharing policy at multilateral nuclear arms control and disarmament forums. At the 10th review conference of the parties to the Treaty on the Non-proliferation of Nuclear Weapons (NPT) in 2022 and in the 2023 preparatory committee meeting for the 11th NPT review conference, such statements were triggered by the criticism by several NPT members of NATO's nuclear-sharing arrangements.²⁷ All of the five states that host US non-strategic nuclear weapons were active in the debate; Belgium, Germany, Italy, the Netherlands and Türkiye each stressed that nuclear sharing is consistent with the NPT.²⁸ Several other NATO members also joined in the debate. For example, Hungary argued that NATO nuclear sharing contributes to non-proliferation by 'remov[ing] incentives for nations to develop their own nuclear deterrence capabilities', and Poland described the practice as being 'a legitimate key element of [the] defence and deterrence policy of NATO' and 'essential for

²³ US DOD (note 6), p. 11.

²⁴ NATO, 'NATO 2022 strategic concept' (note 11), p. 6, para. 21.

²⁵ US DOD (note 6), p. 11.

²⁶ See e.g. US Air Forces Europe, Air Forces Africa, 'US B-52 assurance overflights demonstrate US commitment to southeastern European allies, partners', Press release, 23 Aug. 2022; Lee, M., 'US flaunts deterrence capabilities in exercise near Korean Peninsula', *Korea JoongAng Daily*, 25 Dec. 2022; and Harpley, U. L., 'B-52 Stratofortress to land in South Korea for first time in decades', *Air & Space Forces Magazine*, 16 Oct. 2023.

²⁷ Treaty on the Non-Proliferation of Nuclear Weapons (Non-Proliferation Treaty, NPT), opened for signature 1 July 1968, entered into force 5 Mar. 1970, INFCIRC/140, 22 Apr. 1970; and Acheson, R., 'Editorial: Overcoming the legacy of annihilation', *NPT News in Review*, vol. 18, no. 2, 3 Aug. 2023, p. 2.

²⁸ Acheson (note 27); and 10th Review Conference of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons (10th NPT Review Conference), Statements by Germany, 4 Aug. 2022; Belgium, 8 Aug. 2022; Italy, 8 Aug. 2022, p. 3; and Türkiye, 9 Aug. 2022.



our security, especially these days given the implications and context of Russian war of aggression against Ukraine'.²⁹ Albania, Romania and the three Baltic states also defended NATO nuclear policy at the NPT meetings.³⁰ In addition, Belgium and Norway, which observed the meetings of states parties to the Treaty on the Prohibition of Nuclear Weapons, used that forum to voice their 'full support' for NATO's nuclear deterrence posture, while, in the same context, Norway specified that this support included 'the established nuclear sharing arrangements'.³¹

As for operational support for nuclear sharing, the main example is nuclear weapons hosting by the five above-mentioned countries—Belgium, Germany, Italy, the Netherlands and Türkiye—which together are estimated to have a total of 100 B61 US gravity bombs on their territory. In addition to being available for use by US aircraft, these non-strategic nuclear weapons may be launched from the dual-capable aircraft operated by the hosting states.³² With the exception of Türkiye, these states are currently replacing their ageing dual-capable aircraft with the F-35A Lightning II fighter jet, which will enable use of the precision-strike feature of the modernized version of the B61 bomb, the B61-12.³³

Some allies that do not host non-strategic nuclear weapons nevertheless take part in the yearly military exercise that simulates the use of these weapons by providing conventional aircraft to escort dual-capable aircraft, to conduct surveillance and to help with refuelling.³⁴ They may also make their airspace available for use during the exercise.³⁵ In 2022, 14 allies were reported as having participated in the annual nuclear exercise, which was held in Belgium.³⁶ While NATO does not reveal the participating countries, in previous years they have reportedly included at least Czechia and Poland alongside nuclear-armed and host states.³⁷ Denmark confirmed its participation in the 2022 exercise, and Greece also seems to have taken part.³⁸ In 2023, 13 countries took part in the exercise, which was held in Italy

²⁹ 10th NPT Review Conference, Statement by Hungary, 8 Aug. 2022, p. 2; and First Preparatory Committee of the Parties to the Treaty on the Non-proliferation of Nuclear Weapons (NPT PrepCom 2023), Statement by Poland, 1 Aug. 2023, p. 3.

³⁰ 10th NPT Review Conference, Statement by Albania, 9 Aug. 2022; NPT PrepCom 2023, Statement by Romania, 1 Aug. 2023, pp. 1–2; and NPT PrepCom 2023, Joint Statement by Estonia, Latvia and Lithuania, 31 July 2023.

³¹ Second Meeting of the States Parties to the Treaty on the Prohibition of Nuclear Weapons, Statements by Belgium, 29 Nov. 2023; and Norway, 29 Nov. 2023.

³² Kristensen et al. (note 8).

³³ Kristensen, H., 'General confirms enhanced targeting capabilities of B61-12 nuclear bomb', Federation of American Scientists, 23 Jan. 2014; and Center for Arms Control and Non-Proliferation, 'US nuclear weapons in Europe', Fact sheet, 18 Aug. 2021; and Newdick, T., 'Dutch F-35s gain nuclear strike mission "initial certification"', *War Zone*, 10 Nov. 2023.

³⁴ Alberque, W., 'Nuclear deterrence 101: What Finland needs to know on the occasion of joining NATO', *Maanpuolustus*, 22 Sep. 2022.

³⁵ Juntunen, T. et al., *Naton ydinasepelote ja Suomi [NATO's nuclear deterrent and Finland]*, Finnish Government Report and Research Publication Series 2024:2 (Finnish Government: Helsinki, 2024), p. 105.

³⁶ Associated Press and Reuters, 'NATO: Circumstances for using nuclear weapons "remote"', Deutsche Welle, 13 Oct. 2022.

³⁷ Kristensen, H., 'NATO nuclear exercise underway with Czech and Polish participation', Federation of American Scientists, 17 Oct. 2017.

³⁸ Kristensen, H. (@nukestrat), 'Non-nuclear Denmark is participating in NATO's nuke exercise Steadfast Noon, according to Danish official responding to question from @jenspetersson. Non-nuclear Norway says it has never participated', X, 20 Oct. 2022; and Kristensen, H., 'NATO Steadfast Noon exercise and nuclear modernization in Europe', Federation of American Scientists, 17 Oct. 2022.



and involved training in Croatian airspace.³⁹ Czech aircraft were observed as having participated alongside host states and nuclear-armed states.⁴⁰

Falling between political and operational support are consultations within NATO's Nuclear Planning Group (NPG), in which all alliance members except France currently participate.⁴¹ According to NATO, the NPG 'provides a forum in which NATO member countries can participate in the development of the Alliance's nuclear policy and in decisions on NATO's nuclear posture'.⁴² Discussions in the NPG cover issues such as 'the overall effectiveness of NATO's nuclear deterrent, the safety, security and survivability of nuclear weapons, and communications and information systems'.⁴³

Strengthening deterrence based on non-strategic nuclear weapons

Poland has expressed an interest in hosting nuclear weapons. In October 2022, following reports of Russian nuclear sharing with Belarus, Polish President Andrzej Duda said that 'a potential opportunity' for Poland to participate in nuclear sharing had been discussed with the USA.⁴⁴ Duda took up the issue again in April 2024, claiming that Poland had requested to host US nuclear weapons.⁴⁵ Although the US ambassador to Poland had also pointed to the possibility of nuclear sharing with the country in May 2020, the US government has not at any point indicated that it would be planning new deployments of non-strategic nuclear weapons in allied territories in peacetime.⁴⁶

Instead, there seems to be a discussion within NATO on a so-called dispersal strategy, whereby US non-strategic nuclear forces would be spread across a greater number of allied locations during crises so as to complicate counterforce targeting for the adversary.⁴⁷ While such a strategy is probably part of standard nuclear planning to some extent, the current discussion seems to include new elements involving contributions by a greater number of allies. For example, dispersal might mean the construction of new nuclear weapon storage sites or the refurbishment of old ones—as is reportedly being done at the Royal Air Force (RAF) Lakenheath airbase in the United Kingdom.⁴⁸ Further, there are indications of construction projects at European host states' nuclear weapon bases that are 'designed to facilitate the rapid movement of weapons on- and off-base to increase operational flexibility'.⁴⁹

³⁹ NATO, 'NATO holds long-planned annual nuclear exercise', News, 13 Oct. 2023.

⁴⁰ Kristensen, H. (@nukestrat), 'Apparently several Czech Gripen jets participate in ongoing NATO nuclear exercise Steadfast Noon. The jets are not nuclear-capable but participate as part of the SNOWCAT program that provides conventional capabilities in support of nuclear operations', X, 24 Oct. 2023.

⁴¹ NATO, 'Nuclear Planning Group (NPG)', 9 May 2022.

⁴² NATO (note 41).

⁴³ NATO (note 41).

⁴⁴ Borger, J., 'Poland suggests hosting US nuclear weapons amid growing fears of Putin's threats', *The Guardian*, 5 Oct. 2022.

⁴⁵ Chiappa (note 2).

⁴⁶ Brzozowski, A., 'Debate to relocate US nuclear weapons to Poland irks Russia', *EurActiv*, 20 May 2020.

⁴⁷ International Institute for Strategic Studies (IISS), 'Poland's bid to participate in NATO nuclear sharing', *Strategic Comments*, vol. 29 no. 7 (2023).

⁴⁸ Korda, M. and Kristensen, H., 'Increasing evidence that the US Air Force's nuclear mission may be returning to UK soil', *Federation of American Scientists*, 28 Aug. 2023.

⁴⁹ Kristensen et al. (note 8), pp. 397–98.



Moreover, as suggested by the International Institute for Strategic Studies (IISS) in September 2023, the strategy could mean the establishment of ‘Dispersed Operating Bases’ in countries like Poland to provide ‘additional options for dispersing dual-capable aircraft in wartime and in near-war situations’.⁵⁰ The IISS also suggests that, even if Poland did not host B61 bombs, the Polish F-35 combat aircraft could be certified as dual-capable aircraft to deliver such weapons and that similar measures could be taken in other member states.⁵¹

The dispersal discussion is already being reflected in national debates. In July 2023, the head of Poland’s National Security Bureau, Jacek Siewiera, expressed interest in having the country’s F-35s certified to carry nuclear weapons.⁵² Similarly, some officials in Finland have proposed repealing existing legislation that prohibits the import of nuclear explosives, so as to allow the transit of non-strategic nuclear weapons through Finnish territory during crises, and some Finnish experts have argued for the certification of the country’s F-35s to carry nuclear weapons.⁵³

Australia and Japan: Countering spillover of regional conflicts

Arguably, neither Australia nor Japan faced imminent threats to their national security at the time their respective alliances with the USA took shape. The rationales behind the Japan–USA alliance that followed World War II have been described in terms of allowing Japan to focus on post-war economic recovery and growth without regard to security concerns, of the USA ‘nipping a resurgent Japanese militarism in the bud’ and of giving the USA ‘a base from which to confront China, Russia, and its satellites’.⁵⁴ As for Australia, it initially entered into the 1951 defence treaty with New Zealand and the USA—known as the ANZUS Treaty—at a time it was worried about a potential resurgence of Japanese militarism and the spread of communism.⁵⁵ However, neither of these fears materialized into substantial military threats to Australia. In recent decades, however, the US extended nuclear deterrence arrangements with Australia and Japan have become more significant given their threat perceptions associated with the rise of China, along with the nuclear and missile activities of the Democratic People’s Republic of Korea (DPRK, North Korea) that affect Japan in particular.

Threat perceptions

While both Australia and Japan view China as their main security concern, this perceived threat does not appear as direct as in the case of European allies regarding Russia. Rather than being based on speculation about China’s aggressive intentions against themselves, these two countries’ concerns seem

⁵⁰ IISS (note 47).

⁵¹ IISS (note 47).

⁵² IISS (note 47).

⁵³ Nikula, S., ‘Orpo ydinaseiden kauttakulusta: Linjaus olisi hyvä tehdä loppusyksyyn mennessä’ [Prime Minister Orpo on transit of nuclear weapons: It would be good to decide on a policy by late autumn], *Helsingin Sanomat*, 6 Mar. 2024; and Lavikainen, J., ‘Kyky ydinaseiden taistelukäyttöön ehkäisee ydinaseiden käyttöä’ [Capability to use nuclear weapons in combat prevents nuclear weapon use], *Helsingin Sanomat*, 25 Jan. 2024.

⁵⁴ Mizokami, K., ‘Japan and the US: It’s time to rethink your relationship’, *The Atlantic*, 27 Sep. 2012.

⁵⁵ US Department of State, ‘The Australia, New Zealand and United States Security Treaty (ANZUS Treaty), 1951’, *Milestones 1945–1952*, Office of the Historian, [n.d.].



to be related to an increase in China's power relative to the USA and its allies, as well as its greater assertiveness in the Asia-Pacific region.

As suggested in Australia's 2023 Defence Strategic Review, the recommendations of which the Australian government accepted, a shift in the regional balance created by China's military build-up and economic development means that the USA 'is no longer the unipolar leader of the Indo-Pacific'.⁵⁶ Apparently pointing to the rivalry between China and the USA, the review argues that 'the prospect of major conflict in the region . . . directly threatens our national interest'.⁵⁷ It also states that 'China's assertion of sovereignty over the South China Sea threatens the global rules-based order in the Indo-Pacific in a way that adversely impacts Australia's national interests'.⁵⁸

Referring to the trends identified in the 2023 review, Australia's 2024 National Defence Strategy notes a further deterioration in the regional security environment caused by increasing China–USA competition and the related 'conventional and non-conventional military build-up', which is 'increasing the risk of military escalation or miscalculation that could lead to a major conflict in the region'.⁵⁹ The defence strategy also suggests that China's growing power may translate into efforts 'to change the current regional balance in its favour'.⁶⁰ Elsewhere it argues that 'An unfavourable balance would increase the risk of regional countries, including Australia, being coerced and losing their ability to pursue their sovereign interests peacefully'.⁶¹

Similarly, Japan's 2022 National Security Strategy argues that 'China's current external stance, military activities, and other activities have become a matter of serious concern . . . and present . . . the greatest strategic challenge in ensuring the peace and security of Japan'.⁶² Like the Australian documents, the Japanese security strategy document seems to link the threat to a broad structural shift by referring to 'historical changes in power balances' alongside other concerns that could be seen as implicitly referring to China, such as 'military buildups', 'mounting pressures by unilaterally changing the status quo by force', and 'grey zone situations over territories'.⁶³ The Japanese security strategy also notes China's increasing defence spending as well as its rapid enhancement of 'military power, including its nuclear and missile capabilities'.⁶⁴

Both the Australian and Japanese documents point to the possibility of aggression against their respective territories and interests. The Australian review from 2023 portrays this threat as non-nuclear in nature, stating that while 'invasion of the Australian continent is a remote possibility, any adversary could seek to coerce Australia through cyber attacks, incursions in

⁵⁶ Independent Defence Strategic Review, *National Defence: Defence Strategic Review 2023* (Australian Government: Canberra, 2023), p. 17.

⁵⁷ Independent Defence Strategic Review (note 56), p. 17.

⁵⁸ Independent Defence Strategic Review (note 56), p. 23, para. 1.5.

⁵⁹ Australian Department of Defence, *National Defence Strategy*, 2024, p. 11.

⁶⁰ Australian Department of Defence (note 59), p. 12, para. 1.10.

⁶¹ Australian Department of Defence (note 59), p. 12, para. 1.7.

⁶² Japanese Government, Cabinet Secretariat, *National Security Strategy of Japan*, Provisional translation, Dec. 2022, p. 9.

⁶³ Japanese Government (note 62), p. 2.

⁶⁴ Japanese Government (note 62), p. 8.



our north west shelf or parts of our exclusive economic zone, or disruptions to our sea lines of communication'.⁶⁵ In this connection, both the review and the 2024 national defence strategy also note the dangers of 'long-range precision strike weapons', notably missiles, which they see as having reduced the benefits previously offered by Australia's geography.⁶⁶ Taken together with the concerns about major power conflict, the risk of direct aggression against Australia could be associated with a scenario in which a regional war involving China and the USA spills over in a way that impacts US allies, potentially through sabotage operations or even direct missile attacks against the Australian mainland.⁶⁷

The risk of being drawn into a regional conflict is arguably even greater in the case of Japan, which hosts US bases that would be critical for any regional conflict involving the USA, especially related to Taiwan. Implicitly referring to this problem, the Japanese security strategy notes that 'China has not denied the possibility of using military force' in Taiwan and that it 'has been intensifying its military activities in the sea and airspace surrounding Taiwan, including the launch of ballistic missiles into the waters around Japan'.⁶⁸ The strategy also links China's efforts 'to unilaterally change the status quo by force' to its territorial dispute with Japan, noting that these efforts include China's 'intrusions into the territorial waters and airspace around the Senkaku Islands', which are administered by Japan but claimed by China. In general, China's military activities are seen as affecting 'Japan's national security in the Sea of Japan, the Pacific Ocean, and other areas'.⁶⁹

Japan also views North Korea's nuclear and missile programmes as a threat. North Korea frequently fires its missiles over Japan or near its territory, and considers Japan as an adversary, forming an 'Asian-version NATO' together with the USA and South Korea.⁷⁰ According to Japan's 2022 security strategy, 'North Korea's military activities pose an even more grave and imminent threat to Japan's national security than ever before'.⁷¹ As with the perceived threat from China, these concerns mostly seem to be linked with potential spillover effects of a conflict not directly involving Japan—with the distinction that the related threats in the case of North Korea are more likely to be of a nuclear nature given its heavy reliance on nuclear weapons as a source of military power (see the discussion below on South Korea).

The role of nuclear weapons

Like other umbrella states, Australia and Japan stress the importance of extended nuclear deterrence without specifying exactly how this helps to counter regional threats. Unlike European allies, however, both countries present extended nuclear deterrence as being essential to deterring *nuclear*

⁶⁵ Independent Defence Strategic Review (note 56), p. 37, para. 4.9.

⁶⁶ Independent Defence Strategic Review (note 56), p. 25, para. 1.15; and Australian Department of Defence (note 59), p. 15, para. 1.26.

⁶⁷ Independent Defence Strategic Review (note 56), p. 23, para. 1.4 and p. 32, para. 3.8; and Australian Department of Defence (note 59), p. 45, para. 7.1.

⁶⁸ Japanese Government (note 62), p. 8.

⁶⁹ Japanese Government (note 62), pp. 2, 8.

⁷⁰ Mahadzir, D., 'North Korea fires "super-large" rockets in to the Sea of Japan', US Naval Institute (USNI) News, 19 Mar. 2024; and 'Respected Comrade Kim Jong Un makes speech at 9th session of 14th SPA [Supreme People's Assembly]', Korean Central News Agency, 8 Sep. 2023.

⁷¹ Japanese Government (note 62), p. 9.

threats; while the Australian documents from both 2023 and 2024 state that Australia's 'best protection against the [increasing] risk of nuclear escalation is the United States' extended nuclear deterrence, and the pursuit of new avenues of arms control', Japan's national defence strategy, also from 2022, holds that extended deterrence—which has nuclear deterrence 'at its core'—is essential 'in dealing with the threat of nuclear weapons'.⁷²

Thus, the Australian and Japanese strategic positions apparently limit the role of nuclear weapons to deterring nuclear attacks rather than conventional or other weapons of mass destruction threats—which seems to be consistent with a sole-purpose policy. This is in spite of the reported resistance by both countries to the adoption of such a policy by the USA in 2021.⁷³ The Australian and Japanese documents also do not refer to 'flexible' nuclear options, nor do these countries host non-strategic nuclear weapons—even though there has been some discussion of this possibility in Japan in recent years.⁷⁴ Instead, the Japanese security strategy simply points to efforts to 'deepen bilateral discussions on extended deterrence' to ensure that it 'remains credible and resilient'.⁷⁵

Moreover, both countries' strategy documents stress the need for national acquisition of conventional deep-strike capabilities as a way to strengthen deterrence. The Australian report from 2023 associates these capabilities with 'asymmetric advantages' and recommends a 'strategy of denial' designed 'to deny an adversary freedom of action to militarily coerce Australia and to operate against Australia without being held at risk'.⁷⁶ The 2024 document adopts this strategy, likewise pointing to the need to 'hold at risk forces that could attempt to project power against Australian territory and our northern approaches'.⁷⁷ The Japanese defence strategy, in turn, refers to the increasing difficulty of 'fully address[ing] missile threats with the existing missile defense network alone', which is why Japan needs a capability 'to mount effective counterstrikes against the opponent to prevent further attacks while defending against incoming missiles by means of the missile defense network'.⁷⁸ Moreover, it specifies that such counterstrikes would be directed 'against the opponent's territory'.⁷⁹

These efforts by Australia and Japan to strengthen their own conventional deterrence capabilities could be viewed as a symptom of the lack of credibility, or undesirability, of a US nuclear response to potential spillover effects of regional conflicts in the form of direct attacks against these two allies—particularly if such attacks are non-nuclear in nature. Indeed, China has plenty of conventional options by which to hold regional adversaries under threat, and its long-standing declaratory policy of nuclear restraint—which includes not only no first use but also unconditional assurances not to use nuclear weapons against non-nuclear weapon states—suggest that any

⁷² Independent Defence Strategic Review (note 56), p. 38, para. 4.10; Australian Department of Defence (note 59), p. 14, para. 1.25; and Japanese Ministry of Defense, 'National Defense Strategy', Provisional translation, 16 Dec. 2022, p. 10.

⁷³ Sevastopulo and Foy (note 10).

⁷⁴ Hamada, K., 'Should Japan have a nuclear-sharing agreement?', Project Syndicate, 15 Mar. 2023.

⁷⁵ Japanese Ministry of Defense (note 72), p. 19.

⁷⁶ Independent Defence Strategic Review (note 56), p. 71, para. 9.3 and p. 49, para 7.4.

⁷⁷ Australian Department of Defence (note 59), p. 24, para. 3.11 and p. 37, para. 6.4.

⁷⁸ Japanese Ministry of Defense (note 72), pp. 13–14.

⁷⁹ Japanese Ministry of Defense (note 72), p. 14.



military threats it might pose to Australia or Japan would be non-nuclear in nature.⁸⁰

Support for the nuclear mission

Like other US allies, Australia and Japan have provided support to the US strategic nuclear mission. A novel feature here is Australia's plan to host US B-52 bombers, for which purpose it is currently expanding an air base in the Northern Territory.⁸¹ As for Japan, during 2022–24 it was reported to have allowed B-52 bombers to use its airspace and land on its territory, as well as to have conducted joint flights with this aircraft type.⁸² In 2022 Japanese officials visited a US nuclear-powered ballistic missile submarine (SSBN) in connection with the USA–Japan Extended Deterrence Dialogue in June 2022, and in April 2023 Japanese officials, together with their South Korean counterparts, visited a US SSBN in Guam.⁸³ Over the past decade, the USA has also conducted bilateral nuclear consultations with Australia and Japan, the latter taking place in the framework of the Extended Deterrence Dialogue.⁸⁴

South Korea: Deterring nuclear weapon use by North Korea

The initial rationale for the US extended nuclear deterrence arrangements with South Korea was to deter aggression from its northern neighbour, which had started the 1950–53 Korean War by invading the south. At the time, North Korea was not nuclear-armed, and a rough military parity is seen to have prevailed between the two Koreas from the 1950s until the late 1980s.⁸⁵ After the loss of Soviet support to North Korea and continuing economic problems in the country, the qualitative gap between its ageing systems and South Korea's state-of-the-art military capabilities has grown steadily since the late 1980s, putting North Korea at a disadvantage. However, North Korea's subsequent nuclear proliferation—which provided it with an asymmetric advantage against the South Korea–USA alliance—again reinforced the security value of extended nuclear deterrence from South Korea's perspective, especially after North Korea's first nuclear test in 2006.⁸⁶

⁸⁰ Chinese State Council, 'China's national defense in the new era', White paper, 2019.

⁸¹ Hurst, D., 'US deployment of nuclear-capable B-52 bombers to Australia's north likely to fuel China tensions', *The Guardian*, 31 Oct. 2022.

⁸² Dangwal, A., 'US B-52s "respond" to Russian Tu-95 bombers; hold joint drills with Japan after RuAF muscle-flexing', *Eurasian Times*, 18 Oct. 2023; Harpley (note 26); US Indo-Pacific Command, 'US, Japan, Republic of Korea conduct third trilateral aerial exercise', News, 2 Apr. 2024; and Agee, K., 'B-52 bomber makes rare landing at Tokyo air base, second such visit since July', *Stars and Stripes*, 3 Apr. 2024.

⁸³ US Department of State, 'Japan–US Extended Deterrence Dialogue', Media note, 23 June 2022; and Maitre, E. and Anindea, A., 'Calling to foreign ports: A re-emerging practice for US nuclear-armed submarines?', Foundation for Strategic Research (FRS), Research & Documents no. 15/2023, Nov. 2023.

⁸⁴ Japanese Ministry of Foreign Affairs, 'Japan–US Extended Deterrence Dialogue', Press release, 14 Nov. 2022; and Nichols, T., Stuart, D. and McCausland, J. D. (eds), *Tactical Nuclear Weapons and NATO* (Strategic Studies Institute: Carlisle Barracks, PA, Apr. 2012).

⁸⁵ You, C. and Hahn, K., 'The perpetuated hostility in the inter-Korean rivalry: A theory of multilevel veto players and the persistence of South–North Korean rivalry, 1954–2007', *Korea Observer*, vol. 49, no. 2 (2018).

⁸⁶ Roehrig, T., 'The US nuclear umbrella over South Korea: Nuclear weapons and extended deterrence', *Political Science Quarterly*, vol. 132, no. 4 (2017).



Threat perceptions

As stated in the 2023 national security strategy of President Yoon Suk-yeol's administration, North Korea's continuously advancing capabilities in nuclear and other weapons of mass destruction 'pose a critical threat' to South Korea's national security.⁸⁷ The strategy document refers to North Korea's September 2022 nuclear law—which contains provisions suggesting the possibility of pre-emptive nuclear strikes and the operational deployment of tactical nuclear weapons—and argues that North Korea has 'threatened . . . even the possibility of preemptive nuclear strikes'.⁸⁸ The document also claims that North Korea has 'revealed its offensive nuclear strategy while diversifying, miniaturizing, and lightening its nuclear weapons'.⁸⁹ These statements indicate South Korea believes North Korea has lowered its threshold of using nuclear weapons. South Korea's strategy document questions any defensive rationales behind North Korea's nuclear and missile development, arguing that North Korea 'continues to develop various strategic and tactical weapons, including new missiles, under the pretext of strengthening its self-defense capabilities'.⁹⁰ It also points to past examples of North Korea's aggressive behaviour by recalling its repeated violations of the Inter-Korean Military Agreement and its disregard for 'all efforts for peace on the Korean Peninsula while eagerly seeking opportunities to provoke and disrupt our society'.⁹¹

The role of nuclear weapons

In marked contrast to other US allies, South Korea's objectives in countering the threat from North Korea go beyond defence and deterrence to pre-emption. South Korea's national security strategy describes this pre-emptive strategy, which it calls 'Kill Chain', as being 'designed to preemptively destroy North Korea's nuclear and other missiles before they can be launched in the event of clear indications of their use'.⁹² In this context the strategy mentions South Korea's own conventional deep-strike capabilities, rather than US nuclear weapons, stating that 'surveillance and reconnaissance assets and precision strike capabilities will be acquired' to implement the Kill Chain plan.⁹³ In addition to deterrence by denial through pre-emptive counterforce strikes, the document also refers to deterrence by punishment, or the Korean Massive Punishment and Retaliation (KMPR) strategy—which basically means a conventional 'decapitation' strike aimed at eliminating the North Korean leadership.⁹⁴

Even though the national security strategy only mentions South Korea's conventional precision-strike capabilities in connection with the Kill Chain

⁸⁷ South Korean Office of National Security, *The Yoon Suk Yeol Administration's National Security Strategy: Global Pivotal State for Freedom, Peace, and Prosperity*, June 2023, p. 92.

⁸⁸ South Korean Office of National Security (note 87), p. 10; and Korean Central News Agency (KCNA), 'Law on DPRK's policy on nuclear forces promulgated', KCNA Watch, 9 Sep. 2022.

⁸⁹ South Korean Office of National Security (note 87), pp. 30, 92.

⁹⁰ South Korean Office of National Security (note 87), p. 30.

⁹¹ South Korean Office of National Security (note 87), p. 92.

⁹² South Korean Office of National Security (note 87), p. 92.

⁹³ South Korean Office of National Security (note 87), p. 92.

⁹⁴ South Korean Office of National Security (note 87), p. 93; and Panda, A., 'South Korea's "decapitation" strategy against North Korea has more risks than benefits', Carnegie Endowment for International Peace, Commentary, 15 Aug. 2022.



and KMPR strategies, in practice any pre-emptive strike against North Korea would arguably depend on US counterforce capabilities, including nuclear weapons. This is because North Korea's nuclear-armed missiles and nuclear command-and-control infrastructure include targets that are hardened and buried deep underground—a fact that is also noted in the 2018 US Nuclear Posture Review.⁹⁵ In other words, these targets would be very difficult to destroy with only conventional means. Indeed, the 2018 US Nuclear Posture Review explicitly referred to pre-emption as a policy option with regard to North Korea by noting that the USA has 'the early warning systems and strike capabilities necessary to degrade North Korean missile capabilities prior to launch'.⁹⁶ While the 2022 Nuclear Posture Review did not repeat this formulation, it too stated 'Any nuclear attack by North Korea against the United States or its Allies and partners is unacceptable and will result in the end of that regime'.⁹⁷

Instead of outlining a US role in the pre-emptive plans, however, the South Korean security strategy merely highlights the need to 'enhance the effectiveness of extended deterrence' in line with the April 2023 Washington Declaration—in which South Korea and the USA agreed, among other things, to strengthen nuclear consultations, as well as South Korea's role in providing 'conventional support to US nuclear operations'.⁹⁸ In addition to US–South Korean cooperation in countering threats from North Korea, the strategy stresses the importance of 'establishing a robust trilateral security cooperation framework' involving Japan.⁹⁹

Support for the nuclear mission

Like other allies, South Korea frequently conducts joint flights with, and allows overflights and landing on its territory by, US B-52 bombers.¹⁰⁰ Moreover, in July 2023 a US SSBN conducted a port visit in the South Korean city of Busan, which Minister of National Defence Lee Jong-seop described as an 'action demonstrating that the US extended deterrence against the Republic of Korea will be firmly implemented'.¹⁰¹ As noted above, in April 2023 Japanese and South Korean officials also jointly visited a US SSBN in Guam.¹⁰² In addition, South Korean officials visited the SSBN base on the USA's West Coast in February 2024.¹⁰³

As with US arrangements with Australia and Japan, frameworks for nuclear consultations between South Korea and the USA have been in place for over a decade.¹⁰⁴ These include the US–ROK Deterrence Strategy Committee and the Extended Deterrence Strategy and Consultation Group.¹⁰⁵ In April 2023 the two countries announced the establishment of a new Nuclear

⁹⁵ See US DOD, *Nuclear Posture Review* (DOD: Washington, DC, Feb. 2018), p. 33.

⁹⁶ US DOD, *Nuclear Posture Review* (note 95), p. 33.

⁹⁷ US DOD (note 6); cf US DOD, *Nuclear Posture Review* (note 95), p. 33.

⁹⁸ White House, 'Washington Declaration', Briefing Room Statement, 26 Apr. 2023.

⁹⁹ South Korean Office of National Security (note 87), p. 91.

¹⁰⁰ Harpley (note 26); and Lee (note 26).

¹⁰¹ Mongilio, H., 'USS Kentucky make port call in South Korea, first SSBN visit in 40 years', USNI News, 18 July 2023.

¹⁰² Maitre and Anindea (note 83).

¹⁰³ Defense Visual Information Distribution Service, 'ROK CNO visits naval submarine base Kings Bay', 2 Feb. 2024.

¹⁰⁴ Nichols, Stuart and McCausland (eds) (note 84).

¹⁰⁵ South Korean Ministry of National Defense, *2020 Defense White Paper*, June 2020.



Consultative Group, in line with the Washington Declaration.¹⁰⁶ In addition to sharing information on ‘mutual nuclear assets and intelligence’, this new group would cover ‘ways to plan and execute joint operations that combine Korea’s state-of-the-art conventional forces with the US’s nuclear capabilities’.¹⁰⁷ Plans have also been made to extend bilateral consultations between the USA and allies in the Asia-Pacific to a trilateral or quadrilateral format.¹⁰⁸

Strengthening deterrence based on non-strategic nuclear weapons

There has been long-standing debate in South Korea about the possibility of starting a national nuclear weapons programme or hosting US non-strategic nuclear weapons in response to North Korea’s nuclear capability.¹⁰⁹ However, the first high-level statement in support of such policies was made in January 2023 by President Yoon, who said that his country might ‘introduce tactical nuclear weapons or build them on our own’ if the nuclear threat from North Korea grows.¹¹⁰ Following the international backlash to these comments, however, South Korean officials sought to soften the tone; later in January 2023, the president highlighted the need to respect the NPT, whereas South Korean Minister of Unification Kwon Young-se argued that the discussion on South Korean nuclear weapon development undermines the long-term objective of denuclearization of the Korean peninsula.¹¹¹ The president’s comments contributed to US efforts later in 2023 to reinforce extended nuclear deterrence, as evident in the Washington Declaration, the establishment of the new nuclear consultation mechanism and the increasingly visible strategic signalling discussed above. However, as President Biden made clear, the USA was ‘not going to be stationing nuclear weapons on the peninsula’.¹¹²

III. Allied assumptions about nuclear deterrence

Although umbrella states express firm belief in the security benefits of extended nuclear deterrence, they rarely articulate their beliefs about exactly how nuclear weapons deter regional adversaries. Yet their threat perceptions point to regional scenarios indicating particular deterrence needs. As discussed in section II, European threat perceptions focus on the possibility of limited nuclear weapon use by Russia; Australia and Japan seem primarily concerned about China’s assertiveness and the potential spillover of regional conflicts to their own territories; and South Korea regards North Korea’s nuclear programme as an existential threat requiring deterrence, broadly defined to include pre-emption. At the same time, some of these states seem

¹⁰⁶ White House, ‘Remarks by President Biden and President Yoon Suk Yeol of the Republic of Korea in joint press conference’, Briefing Room Speeches and Remarks, 26 Apr. 2023.

¹⁰⁷ White House (note 106).

¹⁰⁸ Sakaguchi, Y. and Kobara, J., ‘US eyes trilateral deterrence talks with Japan and South Korea’, *Nikkei Asia*, 10 Mar. 2023.

¹⁰⁹ Moon, C. and Shin, Y.-D., ‘“South Korea going nuclear?”: Debates, driving forces, and prospects’, *China International Strategy Review*, vol. 5 (2023).

¹¹⁰ Choe (note 2).

¹¹¹ Davenport, K., ‘South Korea walks back nuclear weapons comments’, *Arms Control Today*, Mar. 2023.

¹¹² Klein, B., Atwood, K. and Fossum, S., ‘Biden and South Korea’s Yoon announce agreement to deter North Korea, including deploying nuclear-armed submarine’, CNN, 26 Apr. 2023.



to perceive the existing nuclear deterrence postures of their alliances to be insufficient and in need of strengthening. This section scrutinizes some of the key assumptions underlying umbrella states' thinking on extended nuclear deterrence, and weighs its perceived security benefits against related risks.

Non-strategic nuclear weapons and the threat of limited nuclear strikes

There is a perceived need among allies to adjust the existing extended nuclear deterrence arrangements to more effectively counter the threat of limited nuclear strikes by regional adversaries in Europe and the Korean Peninsula (see section II). For example, Poland and South Korea have called for deployments of non-strategic nuclear weapons on their respective territories, based on the nuclear-sharing model whereby five NATO members permanently host such weapons. At the same time, NATO allies seem to be discussing ways to increase the survivability of these forward-deployed nuclear weapons in Europe through a strategy of dispersal. But would new investments in non-strategic nuclear weapons really increase the allies' security in these regions?

The idea of new peacetime non-strategic nuclear weapon deployments makes little sense from the perspective of deterrence. Like the existing nuclear weapon bases in Europe, any potential new bases hosting American B61 bombs in Poland or South Korea would be obvious targets for counterforce strikes that can be expected to factor into regional adversaries' nuclear planning.¹¹³ In other words, the B61 bombs that are forward-deployed in allied territory are not survivable, meaning that they lack credibility as a deterrent. Indeed, this is the rationale behind the current discussion on the wartime dispersal of non-strategic nuclear weapons in Europe: in the event of a nuclear war, the B61 bombs would be vulnerable to Russian counterforce attacks, given their fixed deployment in allied air bases.

The dispersal of these forces across a greater number of locations in NATO territory would appear to increase their credibility as a deterrent by creating uncertainty about their location and thus complicating Russian counterforce targeting. However, Russia can hedge against this uncertainty by simply expanding the list of European targets to include potential as well as known nuclear weapon facilities.¹¹⁴ Instead of having the intended effect of making Russia back down from any nuclear strikes on NATO territory, the dispersal strategy could therefore lead the Russian leadership to order nuclear strikes on an even greater number of targets, accelerating escalation and exposing a bigger portion of the European continent to the devastating effects of nuclear war. Russia certainly has the technical capability to destroy multiple European nuclear weapon bases and relevant infrastructure given its massive nuclear arsenal—even after successful nuclear strikes by NATO's F-35s on Russian territory.¹¹⁵

¹¹³ See IISS (note 47).

¹¹⁴ Erästö, T., 'More investment in nuclear deterrence will not make NATO safer', SIPRI Essay, 5 Dec. 2023.

¹¹⁵ Kristensen, H. M., Korda, M. and Reynolds, E., 'Russian nuclear weapons, 2023', *Bulletin of the Atomic Scientists*, vol. 79, no. 3 (2023).



Moreover, insofar as the dispersal strategy would include countries bordering Russia, non-strategic nuclear weapons would more likely be viewed as *strategic* threats by Russia.¹¹⁶ This can be seen to apply especially to potential deployments or transfers of such weapons in the territory of Finland, whose eastern border in the north is only a few kilometres from Russia's most important SSBN bases. Given the long range and stealth of the F-35 aircraft that would be used to deliver non-strategic nuclear weapons, their presence in Finland and other countries on Russia's border could lower the threshold for Russia to respond pre-emptively to any perceived NATO preparations to strike against its territory. Thus, dispersal and related peacetime preparations—especially those enabling non-strategic nuclear weapon transfers or deployments close to the Russian border—can contribute to crisis instability, meaning increased risk of nuclear escalation. That risk is further heightened by the potential for misperception created by payload ambiguity related to dual-capable delivery systems, as well as the lower threshold of the use of non-strategic nuclear weapons compared to strategic ones.¹¹⁷

Most importantly, forward-deployed non-strategic nuclear weapons add little to the US strategic arsenal, which also provides limited nuclear strike options that are more credible as a source of deterrence. These weapons include highly survivable systems, and their use does not require prior consultation and a consensus decision among 31 NATO allies—which is the case for the B61 bombs that would be delivered by aircraft operated by US allies.¹¹⁸ This underlines the primary function of forward-deployed non-strategic nuclear weapons, which has always been nuclear *assurance*, rather than deterrence of adversaries.¹¹⁹ Thus, while greater investments in these weapons may increase allies' sense of security, this could be likened to a placebo effect—with the distinction that the impact on allied security would be negative, increasing regional escalation risks.

Nuclear first use: A policy for the weak and the overconfident

The USA has refrained from adopting a no-first-use or sole-purpose policy, seemingly because of concerns that such a shift might negatively impact allied security, or allies' sense of security. But would the USA really be prepared to escalate regional conflicts to nuclear war on behalf of its allies, at immense risk to its own national security and in defiance of the global norm against nuclear weapon use? And would this ultimately even serve allied security interests? The following discussion considers the perceived need among allies for nuclear first use in the form of both retaliation against conventional aggression and pre-emption of an imminent threat of nuclear attack.

¹¹⁶ See Woolf, A. F., 'Nonstrategic nuclear weapons', Congressional Research Service Report, RL32572, 28 Jan. 2009, p. 5.

¹¹⁷ Dill, C. et al., *Ending Tactical Nuclear Weapons: A Brief History and a Path Forward* (Janne E. Nolan Center on Strategic Weapons: Washington, DC, Aug. 2023), pp. 19, 27.

¹¹⁸ Kristensen, H. M. et al., 'Nuclear weapons sharing, 2023', *Bulletin of the Atomic Scientists*, 8 Nov. 2023.

¹¹⁹ Perkovich, G., 'Like wedding rings or euros? Nuclear weapons in Europe', Carnegie Endowment for International Peace, Policy Outlook, 14 Dec. 2011.



Deterrence of conventional aggression

Current thinking on nuclear deterrence against conventional aggression focuses on the possibility of limited nuclear weapon use, rather than massive retaliation, in line with the logic of escalation control. For example, the USA could seek to counter an invasion of allied territory with a ‘demonstration’ nuclear strike to convince the aggressor to back down. However, experts agree that this strategy has a major weakness: in reality the adversary might not back down but instead choose to escalate further by responding with a nuclear strike of its own—a situation which could quickly lead to uncontrolled escalation.¹²⁰ Even if a global nuclear war could be avoided, the disastrous humanitarian and environmental effects of nuclear weapon use on allied territory would likely far exceed the horrors of conventional war.

The threshold for nuclear weapon use is therefore extremely high for any rational actor. It might only appear worth crossing in extreme situations by a weaker party which has no other options at its disposal to avoid defeat—and no moral qualms about the consequences of such a decision. Indeed, overt threats of nuclear first use—such as those made recently by Russia and North Korea—are an indication of the weakness of their conventional military forces relative to those of their adversaries, which both of these two countries seek to compensate with nuclear deterrence.¹²¹

In contrast, the USA and its allies in Europe and the Korean Peninsula arguably have no need for such a compensation strategy given their overwhelming conventional military power. Although measuring military power is notoriously difficult, a comparison between European NATO allies and Russia based on key indicators—defence spending as well as the number of major conventional weapon systems and personnel—shows that regional balance overwhelmingly favours NATO, even when the USA is excluded from the comparison (see figure 1). Although a numerical comparison paints a more mixed picture in the Korean Peninsula, the significant qualitative gap between the military capabilities of North Korea and South Korea clearly favours the latter.¹²² As noted in the recent IISS Military Balance report, ‘North Korea’s continued investment in asymmetric capabilities, particularly the development of nuclear weapons and ballistic-missile delivery systems, reflects an awareness of the qualitative inferiority of its conventional forces’.¹²³

Of course, such general assessments of relative military power cannot predict the success of deterrence or conflict outcomes, as the will and ability to wage war depends not only on military capabilities but also on intangible factors such as strategy, tactics, morale and the psychological characteristics of leaders. As demonstrated by NATO threat perceptions about the Russian fait accompli scenario, a weaker party could in theory attack a superior adversary by using its local advantage to achieve limited goals. However, even if one assumes that Russia would deem the benefits of taking over NATO territory as being worth the costs and risks of triggering Article 5 of the North

¹²⁰ See e.g. Burr, W., ‘Looking back: The limits of limited nuclear war’, *Arms Control Today*, vol. 36 (Jan./Feb. 2006) (online version corrected 29 Aug. 2008).

¹²¹ See e.g. Ven Bruusgaard, K., ‘Russian nuclear strategy and conventional inferiority’, *Journal of Strategic Studies*, vol. 44, no. 1 (2021).

¹²² See e.g. IISS, ‘Asia’, *The Military Balance 2024* (Routledge: London, Feb. 2024), pp. 281–89.

¹²³ IISS (note 122), p. 281.

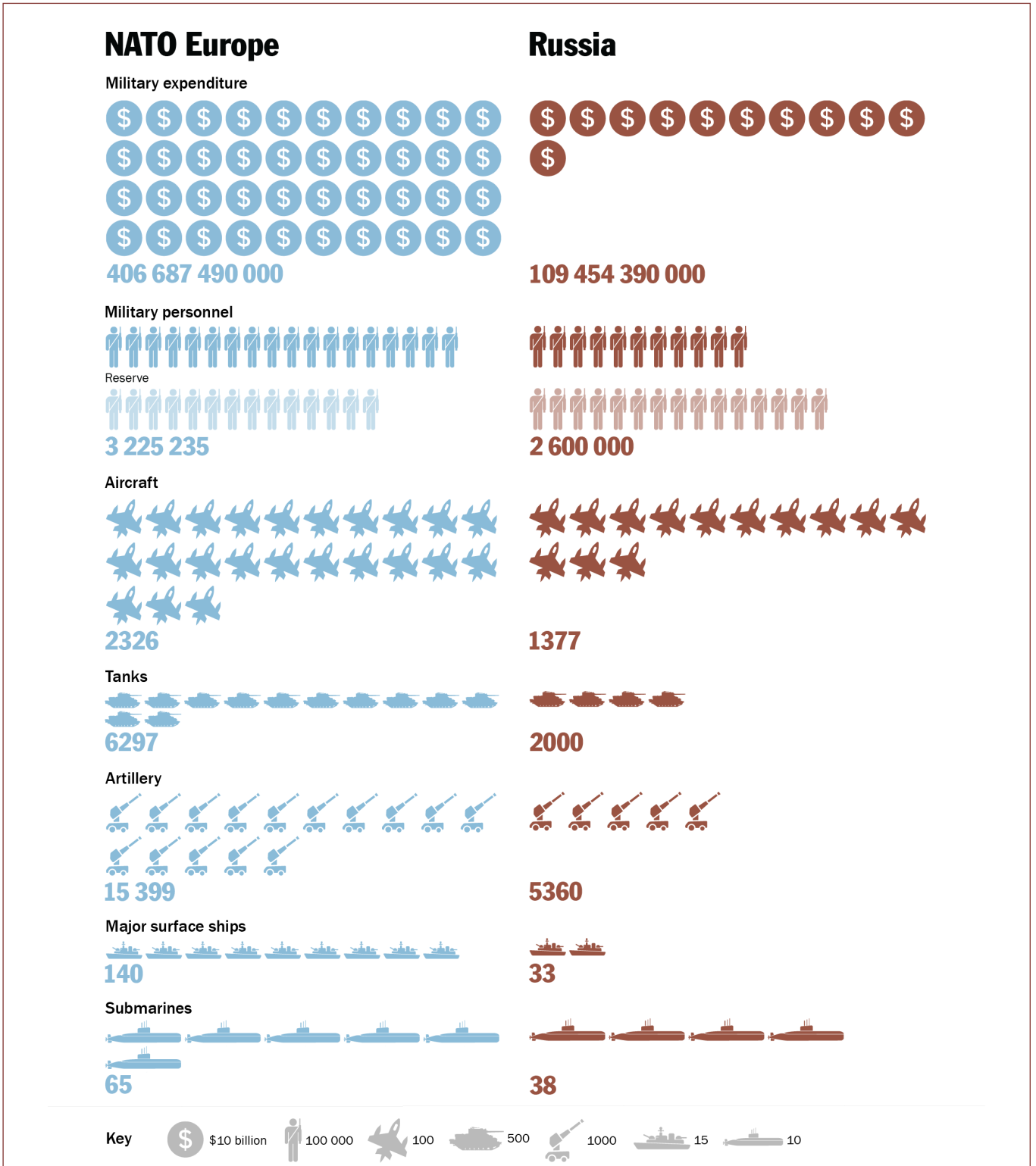


Figure 1. Conventional military capabilities: A comparison between European NATO members and Russia
 NATO = North Atlantic Treaty Organization.

Notes: The comparison focuses on major conventional weapons, with ‘aircraft’ including all combat-capable aircraft and ‘tanks’ referring only to main battle tanks. Strategic forces, i.e. aircraft and submarines used for nuclear weapon delivery, are not included in the comparison. Canada and the United States are excluded given the focus on European NATO members.

Sources: International Institute for Strategic Studies, *The Military Balance 2024* (Routledge: London, Feb. 2024); and SIPRI Military Expenditure Database, accessed Apr. 2024.



Atlantic Treaty, its practical ability to do so is questionable; together with NATO's recent shift from the tripwire strategy towards 'forward defence', the alliance's Nordic enlargement has significantly strengthened defence in the Baltic region.¹²⁴ Similarly, the overall strength of the South Korean–US alliance cannot guarantee that North Korea will be deterred from nuclear weapon use, nor does it remove the ability of North Korea's conventional artillery to wreak havoc in Seoul.¹²⁵ Yet it is hard to see what North Korea would have to gain from attacking South Korea, especially given its own vulnerability to retaliation.

Indeed, the formidable military capabilities of US alliances provide plenty of conventional military options to counter aggression, and it is this kind of strength that arguably constitutes the most credible deterrent. This can also be said to apply to the bilateral US alliances with Australia and Japan, whose security strategies in fact highlight the importance of conventional deterrence; as noted above, these two countries are focused on further strengthening conventional capabilities, while apparently reserving nuclear weapons for the deterrence of nuclear rather than conventional attack.

Disarming nuclear strikes

In addition to being a response to conventional military aggression or a way to control escalation, nuclear first use could also mean massive counterforce strikes intended to destroy the adversary's nuclear arsenal; this could be done either pre-emptively to counter an imminent threat of a first strike, or preventively to eliminate potential future threats posed by the adversary's respective nuclear deterrent. Given that all nuclear-armed states have historically gone to great lengths to ensure the survivability of their second-strike nuclear forces against such disarming strikes, pre-emptive or preventive nuclear counterforce strikes are generally not considered a viable strategy. However, some in the USA have regarded North Korea as an exception, viewing its nascent nuclear arsenal as a relatively easy and acceptable target for pre-emptive strikes.¹²⁶

This confidence in the USA's ability to win a nuclear war against North Korea can also be seen as partly explaining South Korea's pre-emptive strategy, which aims to deter nuclear first use by North Korea, or, if this fails, to prevent or limit the damage done by the latter's nuclear-armed missiles. Although this strategy presumably relies on South Korea's own conventional military capabilities, massive counterforce strikes against North Korea's nuclear forces would likely also require US capabilities, including nuclear weapons. However, even these might not be able to eliminate all of North Korea's nuclear weapons, some of which could still hit South Korea, US bases in the region and possibly even the US mainland. Indeed, the recent diversification of North Korea's nuclear arsenal—including through the development of intercontinental and sea-launched ballistic missiles, hypersonic missiles

¹²⁴ Alberque, W. and Ålander, M., 'NATO's Nordic enlargement: Contingency planning and learning lessons', *War on the Rocks*, 8 Dec. 2022.

¹²⁵ Lendon, B., 'North Korea showcases artillery that poses a deadly threat to the South', *CNN*, 7 Mar. 2024.

¹²⁶ Sanger, D. E., 'Talk of "preventive war" rises in White House over North Korea', *New York Times*, 20 Aug. 2017; and Erästö, T., *New Technologies and Nuclear Disarmament: Outlining a Way Forward* (SIPRI: Stockholm, May 2021), pp. 16, 19.



and tactical nuclear warheads—has significantly complicated counterforce planning for its adversaries and thus further increased the risks involved in any pre-emptive strikes by South Korea and the USA against North Korea.¹²⁷

As noted by several experts, the problem with pre-emptive strategy is that, instead of averting nuclear war, it may in fact make such a war more likely. First, the readiness for pre-emption—which is communicated clearly in South Korea’s and, more implicitly, in the USA’s strategic documents—has heightened North Korea’s threat perceptions in a way that could in the worst case lead to the ‘use it or lose it’ scenario.¹²⁸ As noted by one observer, ‘North Korean leaders might misperceive that a regime-ending strike is imminent’, which could in turn ‘drive Pyongyang’s decision to use nuclear weapons preemptively’.¹²⁹ A second and related problem is that the pre-emptive strategy of South Korea and the USA seems to have already contributed to arms race dynamics by fuelling North Korea’s efforts to diversify its nuclear arsenal so as to enhance its survivability against potential counterforce strikes. The prospect of becoming a target of a disarming strike can also be seen to have partly driven North Korea’s shift towards a more aggressive nuclear posture.¹³⁰

Thus, it can be argued that the pre-emptive strategy against North Korea, which ultimately rests on readiness for nuclear first use by the USA, is counterproductive to both South Korean and US security interests.

The assumed inevitability of nuclear second strike

Umbrella states have come to stress the importance of nuclear deterrence in recent years mainly in response to their regional adversaries’ overt nuclear threats. Underlying this response is one of the basic assumptions of nuclear deterrence, namely that nuclear first use can only be deterred by threatening retaliation in kind. In line with this logic, any doubts about nuclear-armed states’ resolve to carry out such retaliatory nuclear strikes are viewed as potentially undermining deterrence, as these could embolden adversaries and lower their threshold for aggression. But does a credible military response to nuclear aggression necessarily need to be nuclear?

In fact, reports on how the USA plans to respond to a potential limited nuclear weapon use by Russia in the context of the Ukraine war suggest that the response would likely be conventional.¹³¹ This reflects the reality that the ability to impose significant damage to adversaries no longer depends on nuclear weapons; advanced conventional weapons can also reach high-value targets deep inside an adversary’s territory and destroy them with high precision.¹³² Previous American war-gaming on potential second-strike scenarios against limited nuclear weapon use by Russia has reportedly also

¹²⁷ Panda (note 94).

¹²⁸ Kelly, R. E., ‘Why North Korea may use nuclear weapons first, and why current US policy toward Pyongyang is unsustainable’, *Bulletin of the Atomic Scientists*, 21 Nov. 2023.

¹²⁹ Cho, S., ‘South Korea’s offensive military strategy and its dilemma’, Center for Strategic & International Studies, 29 Feb. 2024.

¹³⁰ Panda (note 94).

¹³¹ Sanger, D. E., ‘Biden says Russian use of a nuclear weapon would be a “serious mistake”’, *New York Times*, 25 Oct. 2022.

¹³² Hoffmann, F., ‘Strategic non-nuclear weapons and strategic stability: Promoting trust through technical understanding’, FRS, Nov. 2021, pp. 3–4.



highlighted the benefits of conventional over nuclear response. Reflecting the obvious moral dilemmas and escalation risks of any nuclear weapon use, reasons for choosing conventional weapons in the war game included the likelihood of the USA winning a conventional war and the desire to avoid the normalization of nuclear weapon use and to keep the ‘leverage’ of uniting world opinion against Russia. The consensus was that the USA should respond to a nuclear attack ‘just with stepped-up conventional military operations’.¹³³

Emerging research is also picking up on these trends. As noted by one observer, current US declaratory policy already implicitly allows for the conventional deterrence of nuclear weapon use, as it only commits the USA to an ‘overwhelming’ response, which need not be nuclear.¹³⁴ The same expert stresses the need for steps to increase the credibility of conventional deterrence of nuclear weapon use, which would mean describing and expressing confidence in the ability of non-nuclear forces to achieve such deterrence. This would also help to ensure that national resources are allocated accordingly, and allow the USA to factor this policy into joint preparation for nuclear crises with allies.¹³⁵

It could be further argued that, contrary to established deterrence theory, demonstrations of resolve based on a conventional military response to nuclear weapon use might ultimately diminish the psychological deterrent effect that adversaries seek to create by issuing threats of nuclear first use. This is because the alternatives for the defender would no longer be limited to either backing down or engaging in a potentially suicidal nuclear war—a choice that inevitably creates doubts about the credibility of nuclear retaliation. In contrast, demonstrations of resolve focused on overwhelming conventional response would be highly credible, as these would significantly lower the risks for the defender—including allies who would likely be most affected by nuclear war. From this perspective, nuclear assurance—which is still largely based on the assumed inevitability of US nuclear second strike—can in fact be seen to play into the hands of the party threatening first use.

While the nuclear counterforce potential of advanced conventional weapons can be seen to further add to their deterrent value, it also presents a challenge to strategic stability.¹³⁶ Indeed, awareness of this potential already seems to be contributing to nuclear modernization by nuclear-armed states, which seek to ensure the survivability of their nuclear arsenals against long-range precision-strike weapons.¹³⁷ In addition to arms race stability, the possibility of nuclear counterforce strikes through conventional means could also affect crisis stability insofar as a nuclear-armed adversary would deem the other side’s conventional capabilities to be sufficient to eliminate or neutralize their nuclear forces—as discussed above in connection with the risks of the current South Korean pre-emptive strategy towards North Korea. That nuclear-armed states’ strategic threat perceptions about conventional

¹³³ Kaplan, F., ‘Why the US might not use a nuke, even if Russia does’, *Slate*, 7 Oct. 2022.

¹³⁴ Mount, A., ‘Conventional deterrence of nuclear use’ (unpublished article, 2024).

¹³⁵ Mount (note 134).

¹³⁶ Mount (note 134); Lieber, K. A. and Press, D. G., ‘The new era of counterforce: technological change and the future of nuclear deterrence’, *International Security*, vol. 41, no. 4 (Spring 2017); and Hoffmann (note 132).

¹³⁷ Erästö (note 126).

counterforce strikes are linked to the possibility of simultaneous nuclear weapon use against hardened targets further highlights the need for nuclear restraint in the form of a sole-purpose or no-first-use policy.

IV. Conclusions

The US-led alliances to which most umbrella states belong have formidable conventional military capabilities, which, together with the political unity that allows their mobilization, constitute the most important deterrent against aggression. The deterrence value of these capabilities nevertheless tends to be downplayed and overshadowed by the persistent tendency to view nuclear weapons as the ultimate deterrent. Greater appreciation of already existing military power based on conventional capabilities, together with awareness of the limitations of nuclear deterrence, can open the door for reducing the role of nuclear weapons in military alliances.

Umbrella states could contribute to reducing the role of nuclear weapons by promoting, or at least not opposing, a shift towards greater restraint in allied declaratory policy based on the principles of no first use or sole purpose. Even if these states believe in the need for nuclear weapons to back up the alliances' capabilities as a last resort, there is arguably no compelling reason for them to demand readiness by the USA to use nuclear weapons first. A more restrained US declaratory policy based on sole purpose or no first use would benefit the allies by strengthening the global norm against nuclear weapon use, while also giving more credibility to their moral condemnation of overt nuclear threats made by countries like North Korea and Russia. Although such a policy would undermine South Korea's pre-emptive strategy towards North Korea in that it would signal lack of readiness by the USA to use nuclear weapons in support of the strategy, this could be regarded as a positive development; as argued above, the effort to deter North Korea by threatening a disarming strike is counterproductive for both South Korean and US security as it lowers the threshold of nuclear weapon use and fuels arms race dynamics in the Korean Peninsula.

In principle, NATO member states could also reduce the role of nuclear weapons by withdrawing their support for the alliance's nuclear sharing arrangements. While this would be politically difficult given the symbolic importance of nuclear sharing for nuclear assurance, the deterrence value of the forward-deployed non-strategic weapons in Europe is doubtful. Insofar as allies perceive the need to respond in kind to limited nuclear strikes, tactical second-strike options are already included in the US strategic arsenal. As well as being redundant, forward-deployed non-strategic nuclear weapons on allied territory are vulnerable to counterforce strikes. As for the plans to increase the survivability of these weapons through wartime dispersal, these involve considerable escalation risks; in addition to lessening the likelihood that a nuclear war could remain limited, dispersal could make the outbreak of nuclear war more likely were adversaries to perceive that non-strategic nuclear weapons in border regions might threaten their strategic assets. Rather than seeking to strengthen deterrence based on non-strategic nuclear weapons, allies should recognize that these weapons are not an answer to their security concerns.



Instead of holding on to outdated notions of deterrence that rely excessively on nuclear weapons, both the USA and umbrella states should draw more attention to and further develop the idea of conventional deterrence of nuclear weapon use. In this, they would do well to take note of Western nuclear-armed states' responses to Russian nuclear threats in the context of the Ukraine war, as well as the conceptualization of this policy by emerging academic research. While a more explicit doctrine of conventional deterrence of nuclear weapon use by the USA might initially cause uncertainty among allies accustomed to nuclear assurance, it could ultimately have the opposite effect, as allied doctrines and deterrence practices would be adjusted to reflect this policy.

Finally, allies should be cognizant of the inherent limitations of any kind of deterrence, whether nuclear or conventional. Deterrence is likely to play into the calculations of moderately rational leaders, but it does nothing to change the fact that nuclear-armed states have the means to abolish their adversaries and to create global-scale destruction. Instead of a futile quest for absolute security, allies should recognize the strength of existing conventional capabilities of their alliance, which can temper worst-case assumptions about the intentions of regional adversaries. The downside to the prevailing power imbalance that favours allies in Europe and the Korean Peninsula is that the conventionally weaker adversaries will likely continue to rely heavily on nuclear weapons for asymmetric advantage. However, US allies should resist the urge to mirror their adversaries' nuclear policies as reciprocity in this case will not bring stability. They should also actively explore opportunities to reduce regional tensions and address mutual threat perceptions by engaging their adversaries in confidence- and security-building measures. Ultimately, the only sure way to minimize the risk of nuclear war is for nuclear-armed states to pursue arms control and nuclear disarmament, which allies can promote most effectively by reducing their own reliance on nuclear deterrence.



Abbreviations

IISS	International Institute for Strategic Studies
NATO	North Atlantic Treaty Organization
NPG	Nuclear Planning Group
NPT	1968 Treaty on the Non-Proliferation of Nuclear Weapons
SSBN	Nuclear-powered ballistic missile submarine



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REDUCING THE ROLE OF NUCLEAR WEAPONS IN MILITARY ALLIANCES

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