Metis

Study

Deterrence

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Summary

The study explains the differences between conventional and nuclear deterrence and outlines two ideal-typical models of nuclear deterrence, including criticism of these models. It outlines the significance of strategic and non-strategic nuclear weapons, discusses various schools of thought on deterrence, and explains the particular challenges of extended nuclear deterrence. Finally, it looks ahead and projects three trends into the future – vertical proliferation, horizontal proliferation and entanglement.

Costs vs. Benefits

A "porcupine strategy" is intended to make Ukraine so strong defensively that Russia will abandon any attempts at conquest. The European NATO states also want to become more capable of conventional deterrence. Europe is even considering its own nuclear deterrence capabilities in parallel with nuclear sharing within NATO.

In the East-West conflict, deterrence was always considered in conjunction with arms control. Over the last thirty years, however, deterrence has hardly been mentioned in German security policy discourse. Now it is back in vogue.

Deterrence means instilling in the adversary the idea that an attack is pointless due to exorbitant costs. It is the manipulation of their cost-benefit calculation.

Effective deterrence requires two things: hardware, i.e. the military capability to retaliate against an attack with at least equal means; and software, i.e. the communicatively established credibility of the threat of retaliation.

Conventional vs. Nuclear

There is a fundamental difference between conventional and nuclear deterrence. With the dawn of the nuclear age, it immediately became clear that nuclear deterrence would be a pure form of deterrence, unlike anything seen in the conventional domain. The Second World War had taught us that even with the best air defence, some bombers would always get through to drop their payload on the target, such as a capital city. In the case of a few bombers with conventional payloads, this is a problem. In the case of just *one* bomber with a *single* nuclear weapon, however, it would mean the immediate end of the capital city and thus of the war. Nuclear weapons are therefore considered "absolute weapons" – their excessive destructive power ensures that different rules apply in the nuclear domain.

The countless elements of conventional warfare – personnel, training, equipment, morale, innovation capability, knowledge of the terrain, weather, luck and much more – can enable a defender in a conventional war to absorb an attack or even launch a surprise counterattack against a seemingly superior attacker. Conventional deterrence therefore often fails due to misperceptions and miscalculations.

In conventional warfare, the many factors influencing war not only make weighing up costs and benefits a highly uncertain business. They also sometimes encourage risk-taking. Nuclear weapons, on the other hand, reduce deterrence to its essence because (to date) no significant defence is possible[1] and all the typical elements of warfighting play no role in a nuclear confrontation. In short, one can hope to win conventional wars, but one can only hope to prevent nuclear wars.

1 This refers to defence against strategic weapons, specifically intercontinental ballistic missiles. Their warheads must be intercepted outside the atmosphere. They are small, fast and cold, which makes them difficult to detect and hit. An exo-atmospheric defence system that goes beyond shooting down a few warheads is not cost-effective in the foreseeable future. It is always easier and cheaper for the attacker to overwhelm any defence system with additional warheads and decoys as part of their first strike.

Unlike in the conventional domain, in the nuclear domain, the residual doubt that the exorbitant costs could materialise is sufficient. If two nuclear powers cannot rule out the possibility that a nuclear attack could result in devastating nuclear retaliation (through what is known as assured second-strike capability), then the first strike will never take place and a stable deterrence equilibrium[2] will be established – in theory.

Resilience vs. Retaliation

It is true that the cost-benefit calculation of the adversary can be manipulated not only on the cost side, but also on the benefit side. Instead of threatening retaliation in the context of deterrence by punishment, deterrence by denial can serve to deny the attacker the hoped-for benefits of the attack. If defensive and protective measures, hardening, absorption and reconstitution capabilities mean that the expected damage is low, then the attacker must realise that their attack is not worthwhile.[3]

However, as seen above, developing such resilience is only possible against conventional or hybrid attacks.[4] At most, an extremely limited use of nuclear weapons would be affected by this consideration. The following therefore continues to apply in principle: in the nuclear domain, deterrence stands and falls with the threat of retaliation, i.e. the cost side of the equation.

Emotion vs. Rationality

Etymologically, the word "terror" (derived from the Jacobin *terreur* – reign of terror – during the French Revolution) is the root of the word "deterrence". And the *Oxford English Dictionary* defines deterrence accordingly as "to discourage or turn aside or restrain by fear". In German, too, the word "Schreck" (fear) is contained in "Abschreckung" (deterrence). In short, the element of instilling fear is inextricably linked to the basic idea of deterrence.[5]

While at the beginning of the nuclear age, fear of retaliation was given the same importance in theoretical writings as the assumption that political decision-makers soberly weigh costs against benefits, a strong assumption of rationality increasingly overshadowed the understanding of deterrence as essentially an emotional business in academic and political discourse. The theory of deterrence, which continues to dominate thinking in this field, at least in the political West, is based on the assumption of rational actors and the simplified modelling of their interactions in order to develop functional, practical software – i.e. a credible deterrent threat.

Risks vs. Violence

Deterrence theory recognises two ideal-typical ways of ensuring the credibility of the threat of retaliation: the escalation of risks and the escalation of violence. The goal in both cases is escalation dominance. The aim is to credibly signal to the opponent that one is prepared to always take that decisive step further – whereupon they must back down.

According to the risk escalation model, crises – not necessarily, but certainly also in the form of limited, conventional (i.e. non-nuclear) wars – become competitions to see who can escalate the crisis to the point where the risk of a nuclear exchange is highest without actually triggering it (brinksmanship).

The game theory idea behind the risk escalation model is that of the chicken game, a test of courage between two drivers racing towards each other at high speed. The chicken game illustrates the interests at stake in a conflict situation between two actors in which neither wants to back down, but at the same time neither wants to cause a fatal collision. It is immediately obvious that the winner is the one who clearly throws the steering wheel out of the moving car. Even if he wanted to, he could no longer change course. In doing so, he increases the risk of a collision and at the same time forces his opponent to back down. He has the risk escalation dominance.

Applied to nuclear deterrence between states, the application of this principle means that practices that seem absurd and dangerous can appear promising in a confrontation. According to this logic, in order to make the opponent back down, they must be made to believe that, in the event of a crisis or war, the risk of a false alarm or an accidentally triggered first strike on the part of their opponent is dangerously high, or that the head of state could actually decide to launch a nuclear first strike in a suicidal manner ("the threat that leaves something to chance").

After a few repetitions, however, the mad man with his finger on the red button loses credibility – especially in confrontations where no existential state interests are at stake. In other words, the constant threat of nuclear apocalypse eventually loses its effect. This is one of the reasons why the model of escalating violence was developed.

This alternative model takes into account the virtually invulnerable arsenals on both sides by assuming that mutual assured destruction (MAD) is a given, but no longer part of the threat. If the adversary's cost-benefit calculation is still to be manipulated under this assumption, something else must be used as a threat.

2 However, the so-called "stability-instability paradox" states that a stable deterrence balance at the strategic – i.e. nuclear – level does not necessarily mean the absence of any confrontation or even peace. On the contrary, smaller conflicts or conflicts fought indirectly with conventional means may even become more likely if both parties to the conflict are certain that they will not go to extremes to enforce limited interests.

3 See "Deterrence in the 21st century", Metis Study No. 16 (May 2020).

4 See "Resilience", Metis Study No. 21 (November 2020).

5 The nuclear age is an age of existential fear. This alone makes nuclear weapons seem ethically questionable. Added to this is their indiscriminate effect, which makes them, as weapons of mass destruction, incompatible with the principles of international humanitarian law. However, due to space constraints, ethical and international law aspects are not addressed in this study.

The second model relies on waging limited wars and escalating violence. To this end, a spectrum of controllably escalating options for violence is assumed. The opponent is to be burdened step by step with ever-increasing damage and losses, which make it appear too costly for them to achieve their original war aims. The focus is on demonstrating determination in the face of the destruction that one has to bear oneself. This model therefore achieves its deterrent effect not through the risk of total annihilation, but through the costs it holds out to the opponent ("the threat of what is yet to come").

This model of escalating violence, which at first glance appears more plausible, also has its pitfalls. Firstly, it relies on the adversary, with their back against the wall, ultimately not resorting to nuclear weapons. Secondly, the model is based on the assumption of a shared understanding of the escalation ladder – as if both sides always knew exactly where the other side currently stands. Thirdly, violence must be inflicted on the adversary. However, unlike risks, the resulting destruction cannot be rhetorically "de-escalated". The sum of violence on both sides therefore remains, even if one of the two eventually gives in. Escalating violence thus conveys a deterrent threat, but may undermine the willingness to resolve the conflict and make peace.

Theory vs. Practice

A key strand of criticism of deterrence theory relates to the assumption of rationality. Historical case studies suggest that this does not correspond to the behaviour of decision-makers in practice. In crises, they almost never deliberately and calculatedly chose courses of action in line with the models that would have exerted excessive pressure on their counterparts. In reality, caution, prudence and fear are far more common than a willingness to deliberately escalate risk or violence. The Cuban Missile Crisis, which has been extensively researched, is considered a particularly compelling historical example of this in the specialist literature.

A number of other theoretical assumptions can also be questioned in light of practical experience. For example, it is not only the nuances of political business that slip through the coarse mesh of the chicken game. Crucial aspects such as the influence of third parties, rewards for overcoming crises, and the possibility of compromise are also left out.

Furthermore, in practice, it cannot be assumed that signals are actually received and interpreted correctly, as in the model. The risk of misperceptions and miscalculations between nuclear powers weighs heavily in deterrence practice. The psychology of decision-makers, their values and cultural backgrounds, as well as the internal constitution of states and decision-making processes in government apparatus, do not feature in the theory of nuclear deterrence. Its harshest critics therefore consider deterrence theory to be as theoretically elegant as it is practically irrelevant.

The criticism is rounded off by one final, fundamental doubt. Since no nuclear weapons have been used since Hiroshima and Nagasaki, strictly speaking, no causal link to deterrence can be established. The non-use of nuclear weapons since 1945 is precisely that: a non-event. And where no clearly observable effects are visible, causes can at best be determined approximately, but not at all in the strict sense of a causal chain. So has nuclear war been averted so far *because of*, or perhaps rather *in spite of,* nuclear deterrence?

Even the earliest writings on nuclear deterrence recognised it as a paradoxical undertaking: by doing everything possible to be able to blow up the world at any time, the aim is to prevent precisely that from happening. Deterrence theory has never resolved this paradox. The practice of deterrence also struggles with this, for example when it comes to positive and negative control over nuclear arsenals. Their use must be possible within minutes as soon as it is desired (otherwise the threat of retaliation is not credible). At the same time, however, under no circumstances must it be possible for them to be used accidentally or by third parties when not desired. A conflict of objectives.

Strategic vs. Tactical

From today's perspective, it is politically inconceivable that nuclear weapons could be used without strategic significance. Breaking the 80-year-old taboo [6] against the use of nuclear weapons in warfare would open a new chapter in human history. Politically, the consequences would therefore be epoch-making in any case. It would not matter in what context and with what specific consequences this nuclear explosion took place.

From a military perspective, the potential use of nuclear weapons must be assessed in a more nuanced manner. Depending on their intended effect, a distinction is made between strategic and non-strategic [7] – or tactical – weapons. The former are ideally intended to prevent war (or, as a lesson learned from the Second World War, to bring war to an abrupt end) and are therefore only relevant at the highest level of conflict and as a last resort. The latter, on the other hand, are intended to have concrete effects on the battlefield below this level in order to influence the ongoing war. It is primarily this intended effect and only secondarily the often lower explosive power or the shorter-range delivery system that characterises nuclear weapons as non-strategic. Incidentally, their explosive power is often still many times greater than the explosions that destroyed Hiroshima and Nagasaki. [8]

6 This nuclear taboo – the collective revulsion at the thought of the consequences of using nuclear weapons, which is well documented in research but varies in intensity around the world – is another explanation for the absence of nuclear war since 1945, existing conceptually alongside and in complex interaction with nuclear deterrence.

7 All nuclear weapons that are not covered by any arms control treaty for strategic weapons are classified as *non-strategic* ex negativo.

8 For a visualisation, see https://nuclearsecrecy.com/nukemap/

Both strategic and non-strategic weapons are primarily political weapons because their potential threat is intended to manipulate the behaviour of the adversary. However, non-strategic weapons are sometimes considered more "usable" because their effect is limited to the battlefield and is therefore more restricted. A larger exchange of strategic weapons, on the other hand, would quickly threaten the existence of both parties and, potentially, the human species.[9]

Maximum vs. Minimum

Establishing a secure second-strike capability was a major challenge at the beginning of the nuclear age. Initially, only bombers were available as delivery systems. These could have been destroyed on the ground by a surprise attack. In the 1960s, with the development of intercontinental and, above all, submarine-based missiles, it became easier to establish a secure second-strike capability. Submarines hidden in the world's oceans and thus virtually inaccessible to adversaries could now underpin any threat of retaliation.

How much hardware is needed for effective deterrence? One school of thought argues that parity is necessary. According to this view, neither of the two actors in a deterrence relationship should fall behind in terms of the quality and, above all, the quantity of their arsenals. This school of thought was partly responsible for the enormous growth of arsenals during the Cold War (Fig. 1) and the emergence of the nuclear triad – i.e. the maintenance of land-based[10], air-based[11] and sea-based[12] strategic weapons systems. In addition, there were many thousands of non-strategic weapons – from nuclear mines and torpedoes to nuclear artillery shells and backpack bombs. Under the New START arms control treaty, strategic weapons are limited to 1,550 operational warheads until February 2026 for the two countries with by far the largest arsenals – the US and Russia. Non-strategic weapons are currently not subject to arms control. In the West, with the exception of nuclear sharing within NATO, these weapons hardly play a role anymore. Russia, on the other hand, is estimated to have retained around 1,500 of these weapons and continues to envisage their use in limited nuclear warfare below the strategic level in its doctrine.

The other school of thought argues that "minimal deterrence" – i.e. establishing a secure second-strike capability combined with a credible threat of retaliation – is already sufficient to fulfil the strategic purpose of preventing war. The adversary may have a more modern and larger arsenal, but as long as one's own arsenal is sufficient to threaten unacceptable damage, there is sufficient deterrence.

France's arsenal is a near-ideal case of minimal deterrence in practice. The approximately 300 nuclear warheads on submarines and aircraft (hardware) are coupled with a threat of retaliation (software) that benefits from strategic ambiguity. Unlike the US or Russia, for example, France does not specify in a doctrine document the circumstances under which it would resort to nuclear weapons, but only refers vaguely to the threat to its own vital interests. This maximises the residual doubt on the part of potential attackers.

Central vs. Extended

The example of France can also be used to discuss the difference between deterring existential threats to one's own state ("central" or "homeland deterrence") and extending this deterrent threat to third parties ("extended deterrence").

France's sovereign and, in terms of minimal deterrence, sufficient arsenal serves its purpose with regard to France's vital interests. However, if France wanted to practise credible *extended* deterrence (for European partners), the hardware would have to be supplemented and the software rewritten.

France currently only has strategic weapons at its disposal. It would therefore first have to develop and deploy non-strategic weapons in order to be able to make any threat of retaliation at the battlefield level. This would then raise the old issue of the increased credibility problem of extended deterrence in the form of the following question: Would Paris risk its own existence not only for itself and its vital interests, but also for Berlin, Warsaw or Riga?

Historically, the US has attempted to address this problem by establishing extremely powerful armed forces capable of damage limitation. In the event of an escalating military conflict with Russia, the US wants to be able to destroy as many Russian nuclear weapons as possible on the ground using conventional and nuclear weapons, thereby limiting the damage on the US side.[13]

9 Simulations generated using modern climate models suggest that the risk of a "nuclear winter", first considered in the 1980s, is real. Nuclear weapon explosions cause fires and send ash and dust swirling into the upper atmosphere. A massive strategic exchange of blows with 4,000 warheads, each with an explosive force of approximately 100 kilotons, would cause the Earth's average temperature to drop so far that the global food supply would collapse.

10 Typically, strategic weapons are deployed on land in the form of intercontinental ballistic missiles either in bunkered silos or on mobile transporters on wheels or tracks, known as TELs (Transporter Erector Launcher). Less common is the use of TELs on railway tracks. North Korea is also experimenting with underwater launches from a lake.

11 Typically, strategic weapons are deployed in the air on aircraft that carry cruise missiles and, in some cases, free-fall bombs. Aeroballistic missiles are rare in this context.

12 Typically, strategic weapons are deployed at sea in the form of intercontinental missiles on submarines.

13 There are doubts as to whether this goal can be achieved. Due to space constraints, however, this is not the subject of discussion here.

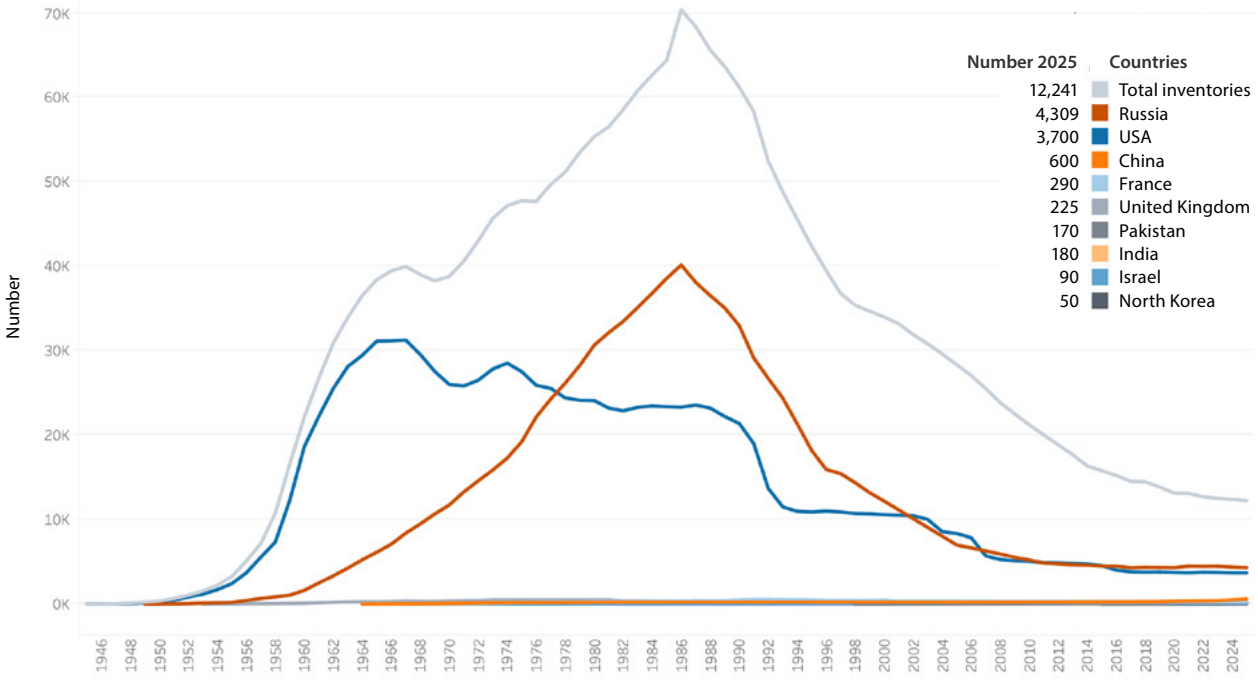

Fig. 1 **Development of global nuclear arsenals from 1945 to the present** | Federation of American Scientists (2025); Hans M. Kristensen, Matt Korda, Robert S. Norris, Eliana Johns, and Mackenzie Knight – Visualisation: Tableau Public. Retrieved on 15 December 2025 from https://public.tableau.com/app/profile/kate.kohn/viz/EstimatedGlobalNuclearWarheadInventories1945-2021/Dashboard1

Only then did the inclusion of NATO allies in extended deterrence and nuclear sharing (Fig. 2) become more credible. During the Cold War, this was intended to fuel residual doubts on the Soviet side that Washington might actually risk New York for Berlin. And to this day, it is intended to reassure the allies that the US is indeed willing to take nuclear risks for their security.[14] In light of Russia's aggression, doubts about US security guarantees during Trump's second term, and the redistribution of burdens between the US and Europe, however, the credibility problem of extended deterrence in NATO has become more acute than ever.

Nuclear deterrence is a fragile, resource-intensive act of communication. Extended deterrence is even more fragile and costly. Contrary to popular belief, extended deterrence is not a "protective umbrella" that can simply be opened and closed. Firstly, there is no protection (through missile defence). There is only a deterrent threat that includes third parties. The umbrella metaphor is therefore completely inappropriate: there is no protective surface from which rain beads off. There is only the threat of blowing up the cloud if it starts to rain. Secondly, the practice of nuclear deterrence is not only a communication process, but also a reciprocal socialisation process. The "nuclear grammar" in the form of both linguistic formulas and signals through demonstrative movements in one's own arsenal must be practised together. History shows that even in the relationship between the US and the Soviet Union or today's Russia, i.e. the two nuclear powers that have been "accustomed to each other" in speech and action for the longest time, communication has repeatedly failed, with one side playing nuclear chess and the other playing checkers.

The institution of NATO nuclear sharing, which has been in place for decades, is anything but easy and quick to replace. At the same time, given the historically poor state of the transatlantic relationship, the question arises as to possible parallel or fallback arrangements in Europe, based, for example, on France's repeated offers of strategic dialogue since 2020 or the possibility of Franco-British nuclear cooperation enshrined in the 2025 *Northwood Declaration*.

14 Because this historically reduced the incentive for European allies included in nuclear sharing to seek their own nuclear weapons, nuclear sharing has always been an instrument of nuclear non-proliferation for the US. The allies, in turn, took the risk of becoming the target of a first strike themselves. Nuclear sharing is therefore not only a military arrangement, but primarily a political interdependence for the purpose of balancing risks and interests.

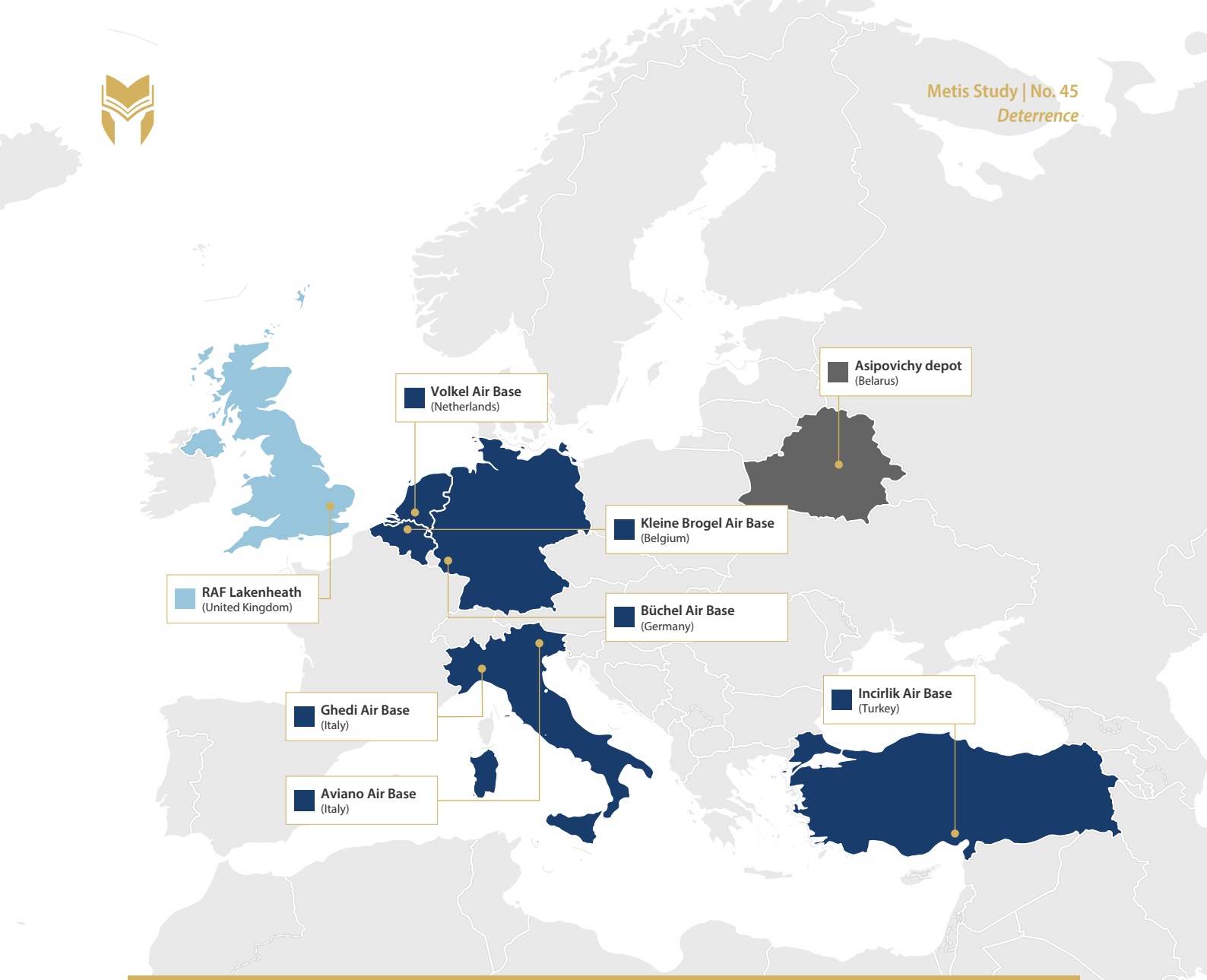

Fig. 2 **Nuclear sharing in Europe** | Source: Hans M. Kristensen, Matt Korda, Eliana Johns, Mackenzie Knight-Boyle 2025: Nuclear Notebook: The Changing Nuclear Landscape in Europe, in: Bulletin of the Atomic Scientists 81: 6, 485–505.

The five countries on whose territory the estimated 100 non-strategic US B-61 free-fall bombs are stationed for NATO's nuclear sharing are shown in dark blue. Details are subject to secrecy. The United Kingdom (in light blue) announced in the summer of 2025 that it wanted to enter into the same arrangement with the US with 12 of its own F-35s, thereby adding a (non-strategic) air component to its sea-based (strategic) arsenal for the first time since 1998. France does not currently have any non-strategic weapons and, unlike the United Kingdom, is not integrated into nuclear sharing or, with its strategic arsenal, into the Nuclear Planning Group, NATO's nuclear policy body. Russia and Belarus claim that Russian nuclear weapons have been stationed in Belarus (in dark grey) since 2023. However, this would not significantly alter the strategic balance, as Russia had already pre-positioned nuclear-capable systems in Kaliningrad that can reach Western Europe in a matter of minutes.

Foresight

Trend 1 — Vertical proliferation

All nine nuclear-weapon states are modernising and diversifying their arsenals. Not only are delivery systems increasing in quantity and quality, but the number of warheads is also rising. The Chinese arsenal is growing particularly rapidly and, if the pace remains the same, is likely to have grown to between 1,000 and 1,500 warheads by the beginning of the next decade. In China, minimum deterrence has been replaced by the pursuit of parity (Fig. 3). Even nuclear-weapon states that maintain smaller arsenals are not immune to this trend. In 2021, for example, the United Kingdom increased the potential upper limit of its arsenal from 225 to 260 warheads.

The expansion of China's nuclear arsenal, particularly through new silo fields, is putting pressure on the current US arsenal. Since more than one US warhead is planned for each additional Chinese silo, the Chinese build-up is "soaking up" a significant portion of the US arsenal, which is currently limited to 1,550 operational warheads under New START. If the US damage limitation strategy outlined above – both to protect its own territory and its allies – is to continue to function, then an expansion of the US arsenal appears inevitable. For this reason alone, growing arsenals are to be expected after the end of New START.

Russia, for its part, is likely to continue to rely on nuclear threats, especially in the area of non-strategic nuclear weapons, to compensate for its own conventional weaknesses on the part of its land forces. Moscow no longer uses nuclear deterrence solely to maintain the status quo, but actively employs nuclear threats to cover its revisionist conventional war of aggression in Ukraine. If Russia succeeds in this, this behaviour could set a precedent worldwide and encourage others to adopt this more offensive style of nuclear blackmail.

It is therefore to be expected that the active arsenals of the US and Russia will grow beyond the New START ceiling, which will no longer apply after February 2026 – initially through uploading, i.e. arming existing delivery systems with additional operational warheads, and later also through the production of new warheads.

The new arms race between the US and Russia has been evident for some time in the Russian systems that Moscow has been developing in response to the US withdrawal from the Anti-Ballistic Missile Treaty (ABM Treaty) in 2002 in order to counteract any future US missile defence system: These include the Avangard hypersonic glide vehicle, which can evade interception attempts thanks to its extreme speed and manoeuvrability; the Burevestnik nuclear-powered cruise missile with virtually unlimited range; and the Poseidon nuclear torpedo, which is designed to threaten coastal cities. Donald Trump's announced plans for a "Golden Dome" – a comprehensive missile defence system for the US that is neither technically nor financially feasible, but fuels Russian paranoia – further accelerates this dynamic.

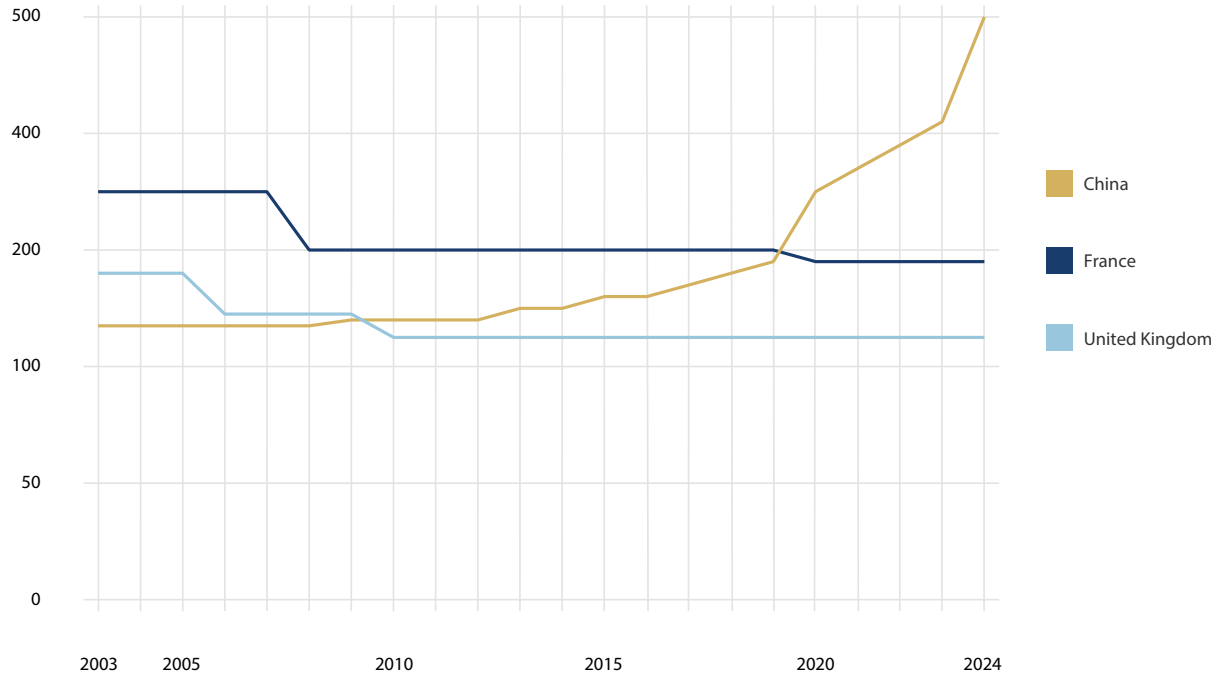

Fig. 3 **The rapid growth of China's arsenal** | Source: Federation of American Scientists (2024), https://ourworldindata.org/nuclear-weapons

Trend 2 — Horizontal proliferation

Iran is generally considered the next potential nuclear weapons state. The bombing of Iran's nuclear programme has set it back, but at the same time has given the Iranian regime an incentive to no longer use nuclear latency as a bargaining chip, but to start the "sprint to the bomb". Open sources report that, following the attacks in the summer of 2025, Iran retained 400 kg of 60 % enriched uranium, which would be sufficient for approximately 10 warheads if Iran still (or again) had enrichment facilities.

However, the circle of nuclear weapon states could also grow from other quarters. Doubts about the US's nuclear security guarantees affect not only allies in Europe, but also countries such as Japan and South Korea. In South Korea, large sections of the political elite and a majority of the population are now in favour of developing their own nuclear weapons, or at least retaining the nuclear option, in order to deter their nuclear-armed neighbour North Korea.

If plans to integrate France's arsenal more closely into the European security architecture fail due to domestic political resistance in France in the wake of a change of government, the question of nuclear armament in Germany, which is already smouldering, is likely to be raised with increasing urgency. A political majority in favour of this is not to be expected in the foreseeable future. But even in the hypothetical case of such a majority, the project would be costly and dangerous. In order to launch its own nuclear weapons programme, Germany would first have to withdraw from the Nuclear Non-Proliferation Treaty (NPT) and remove itself from the supervision of the International Atomic Energy Agency. So far, only North Korea has made use of this option. Germany's revision of its obligations under international law would send shock waves through the global non-proliferation regime – other states such as South Korea and Japan, as already mentioned, but also Turkey and Saudi Arabia, could quickly follow suit. Germany's declaration of renunciation of nuclear weapons under the Two Plus Four Agreement would also have to be broken. Germany would also have to develop sovereign capabilities for enriching fissile material. A simple nuclear weapon could then be built quickly. But miniaturised warheads and adequate delivery systems would first have to be developed and tested. Germany would also have to conduct a nuclear test in order to be considered an "unofficial" (i. e. outside the NPT) nuclear weapons state globally. The Bundeswehr would have to learn how to handle nuclear weapons in terms of doctrine and organisation. During all this, Germany would exist in a window of vulnerability in which numerous states would attempt to sabotage the programme. In short, the political and international legal costs as well as the security risks of a German nuclear weapons programme would be immense.

Trend 3 — Entanglement

High-tech in the conventional armaments sector is leading to increasing convergence between the nuclear and non-nuclear domains. While nuclear weapons could long be threatened only by other nuclear weapons, conventional precision weapons such as missiles, hypersonic cruise missiles and other unmanned systems and system networks are now also being considered for strategically relevant strikes.[15] Due to this entanglement, which is increasingly reflected in military doctrine, there is now growing discussion as to whether conventional weapons could also deter the limited use of nuclear weapons in the future. Technology therefore blurs, to a limited extent, the extremely sharp distinction between conventional and nuclear deterrence described at the outset.

15 See "Conventional arms control and emerging technologies", Metis Study No. 20 (September 2020).

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Metis Institute
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University of the Bundeswehr Munich

Web: metis.unibw.de

Bluesky: @metis.unibw.de

Author

PD Dr. Frank Sauer

metis@unibw.de

Creative Director

Christoph Ph. Nick, M. A.

Zum Staunen* | zum-staunen.de

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Zum Staunen* | SciComm Creative Studio

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