8. World nuclear forces

HANS M. KRISTENSEN AND MATT KORDA*

I. Introduction

The nine nuclear-armed states—the United States, the Russian Federation, the United Kingdom, France, China, India, Pakistan, the Democratic People's Republic of Korea (DPRK, or North Korea) and Israel—continued to modernize their nuclear arsenals in 2025 and most deployed new nuclear-armed or nuclear-capable weapon systems during the year.

Of the total global inventory of an estimated 12 187 nuclear warheads in January 2026, about 9745 were in military stockpiles for potential use, which is roughly 130 more than SIPRI's estimate for January 2025 (see table 8A.1). An estimated 4012 of the stockpiled warheads were deployed with missiles and aircraft as of January 2026, while the rest were in central storage. This is an increase of around 100 deployed warheads compared with the estimate for January 2025, mainly based on a reassessment of Russian nuclear warhead deployments and SIPRI's assessment of new Chinese and Indian nuclear warhead deployments during 2025. SIPRI estimates that somewhere between 2100 and 2200 of the deployed warheads were kept in a state of high operational alert on ballistic missiles. Nearly all of these alert warheads belonged to Russia and the USA, with smaller numbers maintained by France and the UK. It is also possible that China and India may occasionally have started to deploy warheads on high operational alert.

Overall, the number of nuclear warheads in the world continues to decline, but this is only due to Russia and the USA dismantling retired warheads. In addition to their military stockpiles, Russia and the USA each hold more than 1000 warheads previously retired from military service, which they are gradually dismantling. Notably, the number of warheads dismantled each year appears to be decreasing and it seems likely that the rate at which retired warheads are dismantled may soon be outpaced by the rate at which new warheads enter global stockpiles each year.

Section II of this chapter outlines the major trend: the ongoing modernization of all the nuclear-armed states' arsenals. Section III explores two other key developments: the changing nuclear doctrines of several nuclear-armed states because of armed conflict, regional tensions or their modernization programmes (with a focus on China, Russia and the USA); and the growing saliency of nuclear-sharing arrangements. Section IV concludes that these trends raise concerns about the future potential use of nuclear weapons. An

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appendix to the chapter provides simplified tables of the deployed nuclear forces, delivery systems and warhead stockpiles of each of the nine nuclear-armed states (appendix 8A).[1]

The availability of reliable information on the status of the nuclear arsenals and capabilities of the nuclear-armed states varies considerably, as some states are much more transparent on nuclear matters than others. A worrisome recent trend is that nuclear-armed states are generally becoming less transparent about their nuclear arsenals. Estimates in this chapter are primarily based on reports and observations of states' force structures as well as the amount of fissile material—plutonium and highly enriched uranium—that states are believed to have produced (see appendix 8B). In previous years, official data on US and Russian strategic deployments could be obtained through treaty-based declarations. However, the expiration without replacement of the 2010 Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START) in February 2026 has eliminated that source of data from the public debate. The figures presented here are estimates based on public information and assessments by the authors, and contain some uncertainties.

II. Nuclear weapon modernization trends

All nine nuclear-armed states continued to strengthen their nuclear arsenals in 2025. Most deployed new nuclear-armed or nuclear-capable weapon systems and several increased their nuclear warhead stockpiles during the year. Although most nuclear-armed states typically refer to their ongoing development and production efforts as nuclear 'modernization', their actions go well beyond simple maintenance and sustainment operations. This section first provides a brief general overview of developments in nuclear weapon modernization among the nuclear-armed states. It then explores noteworthy vertical proliferation trends in 2025 relating to specific nuclear capabilities: dual-capable systems (i.e. systems designed to deliver both conventional and nuclear warheads); multiple independently targetable re-entry vehicles (MIRVs); advanced types of hypersonic missile; sea-based systems; and aircraft and air-delivered weapons (with ground-launched systems covered in the sections on MIRVs and hypersonic missiles).

One area of growing uncertainty is the extent to which artificial intelligence and machine learning (AI/ML) are being integrated into nuclear command, control and communication (NC3) systems. Despite the high level of

[1] These tables summarize the more detailed findings published by the authors in the *Bulletin of the Atomic Scientists*, 'Nuclear notebook' series and the 'Status of world nuclear forces' overview on the Federation of American Scientists' website. See also Kristensen, H. M. and Korda, M., 'Estimating world nuclear forces: An overview and assessment of sources', SIPRI Commentary, 14 June 2021.

secrecy surrounding NC3 systems in all nuclear-armed states, it is clear that AI/ML now contributes to the development and operation of many such systems.[2] At present, it is assumed that the main role for AI/ML is in support functions, such as predictive maintenance, training simulators and routine monitoring of nuclear forces, rather than in high-risk areas, such as launch authority, targeting and crisis decision support.[3] AI/ML-related topics are therefore not covered in detail in this chapter.

Global trends in nuclear modernization

The United States and Russia

SIPRI estimates that, as of January 2026, the USA and Russia together possessed around 83 per cent of the nuclear warheads potentially available for use in global military stockpiles and almost 86 per cent of all nuclear warheads. These are slight decreases from recent annual estimates, a trend that is likely to continue as other states' nuclear arsenals grow. Nevertheless, both the USA and Russia have extensive programmes under way to modernize and replace nearly every aspect of their respective nuclear arsenals, including the warheads, delivery systems and associated production facilities.[4] The size of the USA's military stockpile (i.e. its usable warheads) remained relatively stable in 2025. The increase in SIPRI's estimate of Russia's stockpile was due to a reassessment based on new information as well as SIPRI's assessments of deployments of additional launchers and upgrades to existing launchers during the year. Some of the year-on-year fluctuations in estimated Russian stockpile and launcher numbers were the result of losses, the conversion of certain systems from nuclear to conventional capability and the removal of systems from service for maintenance (see tables 8A.1, 8A.2 and 8A.3).

The USA's modernization programme—which covers both its strategic and non-strategic (tactical) nuclear forces as well as its NC3 systems and weapon maintenance and production complex—is undergoing an extensive update, necessitating a sizeable increase in the programme's budget.[5] In terms of strategic forces, the programme includes the LGM-35A

[2] McDonnell, T. et al., *Artificial Intelligence in Nuclear Operations: Challenges, Opportunities, and Impacts*, IRM-2023-U-035284-Final (CNA Corporation: Arlington, VA, Apr. 2023).

[3] See e.g. Saalman, L., *AI in Chinese, Indian and US Nuclear Postures, Norms and Systems* (SIPRI: Stockholm, Feb. 2026). On the adoption of a resolution within the United Nations General Assembly that for the first time specifically addressed the potential risks of integrating AI into NC3 systems see chapter 10, section V, in this volume. On the broader impact of AI/ML on international security see chapter 14 in this volume.

[4] Kristensen, H. M. et al., 'United States nuclear weapons, 2025', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 81, no. 1 (Jan. 2025); and Kristensen, H. M. et al., 'Russian nuclear weapons, 2025', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 81, no. 3 (May 2025).

[5] US Department of Energy, 'FY 2026 Congressional Justification: National Nuclear Security Administration', vol. 1, DOE/CF-0212, May 2025.

Sentinel intercontinental ballistic missile (ICBM) to replace the LGM-30G Minuteman III ICBM; the Columbia-class nuclear-powered ballistic missile submarine (SSBN) to replace the Ohio-class SSBN; and the B-21 Raider heavy bomber aircraft to replace the B-2A. The USA is also modernizing each of these delivery system's associated nuclear warheads. In 2025 the USA completed the first production unit for the new strategic B61-13 gravity bomb, which is designed for use against 'certain harder and large-area military targets'.[6]

The USA is also modernizing its non-strategic nuclear forces. This includes the new B61-12 bomb (which completed production and forward deployment in 2024), production of the nuclear-capable F-35A combat aircraft, upgrades to bases in Europe, and development and production of the new nuclear sea-launched cruise missile.[7]

Russia is moving closer to completing the replacement of Soviet-era strategic nuclear forces with modern systems, including the fixed and mobile versions of the Yars ICBM (which is designated as the SS-27 Mod 2 by the USA), the Avangard hypersonic glide weapon system (SS-19 Mod 4), the Sarmat heavy ICBM (SS-29) and the Borei-class SSBN. In addition, Russia is developing follow-on ICBM systems, including the Kedr, Osina and Yars-M, although it remains unclear which of these will ultimately be deployed and which are intended as technology demonstrators. Russia is also modernizing its airborne and sea-based strategic nuclear weapon systems and non-strategic nuclear forces, as well as developing the infrastructure for deploying nuclear weapons in Belarus (see below). In March 2026 the Commander of US Strategic Command, Richard A. Correll, stated that Russia's stockpile included 'approximately 4600 nuclear warheads', including 2600 warheads for strategic forces.[8] These numbers are in general accordance with what SIPRI has estimated for years—although SIPRI assesses that, as of January 2026, the total number of Russian warheads in the military stockpile was probably somewhat lower than 4600, perhaps closer to 4400. Also in March 2026, the US State Department confirmed SIPRI's assessment from 2025 that while Russia is modernizing its non-strategic nuclear weapons, 'there are as yet no indications of a large-scale increase in the overall numbers of warheads assigned these roles'.[9]

[6] US Department of Defense (DOD), 'Fact sheet on B61 variant development', Fact sheet, 27 Oct. 2023; and US Department of Energy, National Nuclear Security Administration (NNSA), 'NNSA completes assembly of the first B61-13 nuclear gravity bomb ahead of schedule', 19 May 2025.

[7] US Department of Energy, National Nuclear Security Administration (NNSA), 'NNSA completes B61-12 life extension program', 7 Jan. 2025.

[8] Correll, R. A., Commander, US Strategic Command, Statement before the US House of Representatives, Armed Services Committee on Strategic Forces, 17 Mar. 2026.

[9] US Department of State, 'Report to the Senate on the status of tactical nonstrategic nuclear weapons negotiations', Mar. 2026, p. 2; and Kristensen, H. M. and Korda, M., 'World nuclear forces', *SIPRI Yearbook 2025*, p. 179.

The US and Russian modernization programmes have both been beset with multi-year delays, programmatic inefficiencies, budgetary overruns and poor quality control. The initial operational capability for the USA's next-generation Sentinel ICBM, for example, has been delayed by at least four years and will cost approximately 81 per cent above original projections due to poor contractor performance and deficiencies in predicting the realistic costs and requirements of the programme.[10] Notably, other apparently viable and potentially far less costly alternatives were dismissed before the Sentinel programme was approved.[11] As a result of the delays, the current Minuteman III ICBM will remain in service until at least 2050 rather than the mid 2030s as initially planned. In addition, the US Navy recently estimated that the deployment of its new Columbia-class SSBN will be delayed by approximately 17 months, necessitating a life-extension programme for up to five existing Ohio-class submarines.[12]

Meanwhile, Russia's flagship next-generation Sarmat ICBM is more than eight years behind schedule, with far more of its test launches ending in failure than success—including a test in 2025 that also significantly damaged the launch infrastructure.[13] Russia's nuclear modernization appears to have been hit by a combination of Western economic sanctions, poor industry performance and competing prioritization with conventional weapons production for Russia's ongoing war in Ukraine.[14]

Despite these setbacks, Russia continues to make progress on testing some new types of strategic delivery system. In October 2025 Russia tested its new Burevestnik (SSC-X-9 Skyfall) nuclear-powered cruise missile to a claimed distance of 14 000 kilometres and flight time of approximately 15 hours.[15] This test followed several catastrophic failures of the same system and it is probably several years away from operational deployment. Russia is also fielding a new dual- and MIRV-capable, hypersonic intermediate-range ballistic missile known as the Oreshnik, which it has used (in the conventional version) against Ukraine and has deployed to Belarus (see below).

[10] US Government Accountability Office (GAO), *Air Force Actions Needed to Expeditiously Address Critical Risks to Sentinel Transition*, Report no. GAO-25-108466 (GAO: Washington, DC, Sep. 2025); and US DOD, 'DOD press briefing announcing Sentinel ICBM Nunn-McCurdy decision', 8 July 2024.

[11] Korda, M. and Knight-Boyle, M., *The Two-hundred Billion Dollar Boondoggle* (Federation of American Scientists: Washington, DC, June 2025).

[12] O'Rourke, R., *Navy Columbia (SSBN-826) Class Ballistic Missile Submarine Program: Background and Issues for Congress*, Congressional Research Service (CRS) Report for Congress R41129 (US Congress, CRS: Washington, DC, 4 Dec. 2025); and Katz, J., 'Navy planning to execute 3-year Ohio-class sub life extensions', Breaking Defense, 7 Nov. 2023.

[13] Marcuz, E. (@Etienne_Marcuz), X, 28 Nov. 2025, <https://x.com/Etienne_Marcuz/status/1994472633451082096?s=20>.

[14] Starchak, M., 'Why Russia's nuclear forces are no longer being updated', Carnegie Politika, Carnegie Endowment for International Peace, 23 Jan. 2025.

[15] President of Russia, 'Visit to the Joint Force command post', 26 Oct. 2025; and Hopkins, V., 'Putin says Russia now has nuclear-powered missile', *New York Times*, 26 Oct. 2025.

China

China is in the middle of a significant modernization and expansion of its nuclear arsenal.[16] SIPRI estimates that China's nuclear arsenal increased from around 600 warheads in January 2025 to approximately 620 in January 2026 (see tables 8A.1 and 8A.6), and it is expected to keep growing over the coming decade.

The vast majority of China's warheads are thought to be stored separate from their launchers. However, in recent editions of its assessment of Chinese military capabilities, the US Department of Defense (DOD) has indicated that China may now be deploying warheads on missiles of a few mobile battalions during peacetime exercises, which would mark a change from China's long-standing policy of keeping warheads and missiles de-mated.[17] Moreover, the US DOD assessed in 2025 that China had loaded more than 100 missiles into three new missile silo fields.[18] It is possible, although unconfirmed, that some missiles in these fields may be equipped with nuclear warheads during training exercises similar to the mobile battalions. In addition, US government officials have privately stated that a Chinese SSBN on near-continuous deterrence patrol may carry nuclear warheads.[19] Partly based on these assessments, SIPRI estimates that China may have deployed a small number of nuclear warheads with operational forces as of January 2026 (perhaps up to 34), but that the vast majority of Chinese warheads remain in central and regional storage sites under normal circumstances. When paired with an early-warning system (currently under development), the purpose of this deployment would appear to be to strengthen China's second-strike nuclear capability.

SIPRI estimates that China had more ICBM launchers (i.e. land-based launchers) than either Russia or the USA as of January 2026 and could potentially have at least as many ICBMs as either country by the turn of the decade. However, despite this extensive build-up of launchers and ICBMs, China's stockpile of nuclear warheads is expected to remain much smaller than the stockpiles of Russia or the USA.

In its September 2025 Victory Day parade, China showcased several nuclear-capable systems that had not been previously displayed, including the DF-31B silo loader for its DF-31 class of ICBMs (which is designated as the CSS-10 class by the USA) and a new DF-61 ICBM launcher, which appears to bear strong similarities to the DF-41 (CSS-20). As well as building new missile

[16] Kristensen, H. M. et al., 'Chinese nuclear weapons, 2025', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 81, no. 2 (Mar. 2025).

[17] US DOD, *Military and Security Developments Involving the People's Republic of China 2024*, Annual Report to Congress (Office of the Secretary of Defense: Washington, DC, 18 Dec. 2024), pp. 106, 110.

[18] US DOD, *Military and Security Developments Involving the People's Republic of China 2025*, Annual Report to Congress (Office of the Secretary of Defense: Washington, DC, 23 Dec. 2025), p. 24.

[19] US officials, Private communication with the authors, 2025.

silos, China has refitted its Type 094 SSBNs with JL-3 (CSS-N-20) longer-range missiles, which were also displayed at the 2025 parade. In addition, it is developing a new class of SSBN and a new type of strategic bomber aircraft, which will presumably be able to carry the new JL-1 air-launched ballistic missile that was publicly displayed for the first time at the 2025 parade.[20]

The United Kingdom and France

While the UK is not thought to have increased its nuclear weapon arsenal in 2025 (see tables 8A.1 and 8A.4), its warhead stockpile will probably grow in the future based on the British government's announcement in 2021 that it was raising the stockpile's upper limit from 225 to 260 warheads.[21] The government also announced in 2021, and reaffirmed in both the 2023 Integrated Review Refresh and the 2025 Strategic Defence Review, that it would no longer publicly disclose its quantities of nuclear weapons, deployed warheads or deployed missiles—thus making any independent confirmation of an increase in the stockpile difficult.[22]

In 2025 the UK announced its intention to buy 12 nuclear-capable F-35A combat aircraft from the USA in order to join the nuclear-sharing arrangement under the North Atlantic Treaty Organization (NATO).[23] These aircraft—which will be stationed at the Royal Air Force (RAF) base near Marham, Norfolk—will from the early 2030s re-establish a dual-capable aircraft nuclear mission for the RAF for the first time since 1998 (see section III).

Under the UK's so-called triple-lock on nuclear deterrence, the government is committed to (*a*) replacing the Vanguard-class SSBN with four new Dreadnought-class SSBNs; (*b*) maintaining its policy of continuous at-sea deterrence, under which at least one SSBN remains on patrol at all times; and (*c*) delivering all future upgrades needed to maintain the UK's nuclear forces.[24] As part of these activities, the UK is participating in the US Trident II D5 missile programme to extend the service life of that missile and replacing the Mk4A nuclear warhead with the A21/Mk7 (also known as

[20] CGTN Europe, 'Full video: China's 2025 V-Day Military Parade', YouTube, 4 Sep. 2025; and Kristensen, H. et al., 'Nuclear weapons at China's 2025 Victory Day parade', FAS Strategic Security Blog, Federation of American Scientists, 4 Sep. 2025.

[21] British Government, *Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy*, CP 403 (Her Majesty's Stationery Office: London, Mar. 2021), pp. 76–77.

[22] British Government (note 21), pp. 76–77; British Government, *Integrated Review Refresh 2023: Responding to a More Contested and Volatile World,* CP 811 (His Majesty's Stationery Office: London, Mar. 2023); British Government, *Strategic Defence Review 2025—Making Britain Safer: Secure at Home, Strong Abroad* (His Majesty's Stationery Office: London, July 2025); and Kristensen, H. M. et al., 'United Kingdom nuclear weapons, 2024', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 80, no. 6 (Nov. 2024).

[23] British Government, 'UK to purchase F-35As and join NATO nuclear mission as government steps up national security and delivers defence dividend', Press release, 24 June 2025.

[24] British Ministry of Defence and Defence Nuclear Organisation, 'The UK's nuclear deterrent: The National Endeavour explained', 24 Apr. 2026.

Astraea). The UK's warhead programme is being carried out in parallel with the USA's W93/Mk7 warhead programme (see below). Significant concerns were raised in 2025 regarding the reliability of the UK–USA nuclear partnership, primarily due to the unpredictability of US President Donald J. Trump's second administration, which began in January 2025.[25]

France's nuclear weapon stockpile is believed to have remained stable throughout 2025, at approximately 290 warheads (see tables 8A.1 and 8A.5). In addition to the stockpiled warheads, SIPRI estimates that, as of January 2026, France probably had up to 80 retired TN 75 warheads awaiting dismantlement in its inventory.[26]

France continued to upgrade its SSBN force during 2025. It introduced the enhanced M51.3 SLBM, which has an updated warhead, and pressed ahead with its plans for a third-generation SSBN. France has upgraded its ASMPA (*air–sol moyenne portée–améliorée*) air-launched cruise missile (ALCM) to the longer-range ASMPA-R (*air–sol moyenne portée–améliorée rénové*) and is developing a new follow-on (the ASN4G) with significantly longer range and a new warhead (the TNA-2). The French government also plans to reactivate the nuclear mission at an airbase in eastern France with the introduction of two additional squadrons of nuclear-capable Rafale combat aircraft by 2035 (see below).[27] These plans will result in an increase in the size of the French nuclear weapon stockpile.

India and Pakistan

India and Pakistan continued to develop new types of nuclear weapon delivery systems in 2025, and both are pursuing the capability to deploy multiple warheads on ballistic missiles. India was estimated to have a growing stockpile of about 190 nuclear weapons as of January 2026—a small increase from the previous year (see tables 8A.1 and 8A.7). These weapons were assigned to a maturing nuclear triad of aircraft, land-based missiles and SSBNs.[28] More warheads are thought to be in production for additional missiles. It has long been assumed that India stores its nuclear warheads separate from its deployed launchers during peacetime. However, the country's recent moves towards placing missiles in canisters and conducting sea-based deterrence patrols suggest that India could be shifting in the direction of mating some of its warheads with their launchers in peacetime. Based on this assessment,

[25] Alexis-Martin, B., 'UK nuclear deterrent: The mutual defense agreement is at risk in a Trumpian age', The Conversation, 27 Mar. 2025; and Messmer, M. and O'Sullivan, O., 'The UK's nuclear deterrent relies on US support: But there are no other easy alternatives', Chatham House, 24 Mar. 2025.

[26] Kristensen, H. M. et al., 'French nuclear weapons, 2025', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 81, no. 4 (July 2025).

[27] French Ministry of the Armed Forces, 'Retour de la dissuasion nucléaire à Luxeuil-Saint-Sauveur' [Return of nuclear deterrence to Luxeuil-Saint-Sauveur], 19 Mar. 2025.

[28] Kristensen, H. M. et al., 'Indian nuclear weapons, 2024', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 80, no. 5 (Sep. 2024).

SIPRI estimates that, as of January 2026, India may have started to deploy a small number of nuclear warheads on a single SSBN conducting occasional deterrence patrols.

Pakistan's nuclear warhead stockpile is thought to have remained stable at around 170 warheads as of January 2026 (see tables 8A.1 and 8A.8), although it continued to develop its nascent nuclear triad during 2025. While Pakistan's land and air capabilities are well established, its sea-based capabilities are still in the development and testing phase. Pakistan's development of several new delivery systems and accumulation of fissile material suggest that its nuclear weapon arsenal and fissile material stockpile are likely to continue to expand over the next decade, although forecasts vary considerably due to limited official publicly available data.[29]

Over the past decade, India's nuclear planning has placed a greater emphasis on investing more resources in longer-range weapon systems that appear to be focused on China, but its planning still remains heavily influenced by its long-standing rivalry with Pakistan. In May 2025 India and Pakistan engaged in their most significant armed conflict in decades, which involved conventional Indian strikes on Pakistani air and missile bases that are assessed to have nuclear missions. Both sides took deliberate steps to keep the conflict at the conventional level and reduce the risk of nuclear crisis. However, the clash marked a shift in the region's dynamics, making the risk of rapid, unexpected escalation to a nuclear level a lingering and serious concern.[30]

North Korea

North Korea continues to develop its nuclear capabilities to fulfil its stated goal of 'exponentially' expanding its nuclear arsenal.[31] North Korea's development of both high- and low-yield warheads and associated delivery systems seems to have the objective of holding both regional and intercontinental targets at risk and widening its options for potential use of nuclear weapons. SIPRI estimates that, as of January 2026, North Korea had probably assembled around 60 warheads and possessed enough fissile material to potentially produce at least 90 warheads (see tables 8A.1 and 8A.9).[32]

Throughout 2025 North Korea continued to advance its fissile material production activities—which probably included uranium enrichment and reprocessing operations—and construction at various facilities connected

[29] Kristensen, H. M. et al., 'Pakistan nuclear weapons, 2025', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 81, no. 5 (Sep. 2025).

[30] Kristensen et al. (note 29); and Facini, A., 'Navigating crises with a lower bar to nuclear war', Lawfare, 28 Oct. 2025. On the armed conflict in May 2025 see chapter 3, section III, in this volume.

[31] McCurry, J., 'Kim Jong-un vows to "exponentially" increase nuclear warhead production', *The Guardian*, 1 Jan. 2023.

[32] For background information see Kristensen, H. M. et al., 'North Korean nuclear weapons, 2024', Nuclear notebook, *Bulletin of the Atomic Scientists*, vol. 80, no. 4 (July 2024).

with its nuclear programme.[33] In addition, North Korea continued to unveil and test new missile systems with incremental improvements over their predecessors, such as the new 'next-generation' Hwasong-20 ICBM, as well as medium-range, highly manoeuvrable systems designed to evade missile defences. Based on the ongoing expansion in North Korea's missile systems and likely acceleration in fissile material production, the country's nuclear weapon stockpile is expected to grow in the coming years.

Israel

Israel continues to maintain its long-standing policy of nuclear ambiguity, leaving significant uncertainty about the number and characteristics of its nuclear weapons.[34] SIPRI estimates that Israel's stockpile probably remained stable at around 90 warheads as of January 2026 (see tables 8A.1 and 8A.10).

Israel is believed to be modernizing its nuclear arsenal, including its Jericho family of ballistic missiles. In 2025 it intensified construction at a new site at the Negev Nuclear Research Center near Dimona, the purpose of which has not been publicly disclosed.[35] Given the age of the legacy reactor at Dimona (it first went critical in the early 1960s), it is possible that Israel is building a new heavy water reactor for plutonium production or some other facility related to its nuclear mission.

Vertical proliferation of key capabilities

Nuclear modernization is typically prompted by several interlocking factors. These include the need for regular refurbishment of nuclear weapons and facilities due to age and degradation; the desire to upgrade weapons with new capabilities; the influence of media hype and corporate lobbyists on nuclear policy decisions; the lack of arms control treaties keeping arsenals in check; and—perhaps most importantly—the prioritization on the part of all nuclear-armed states of maintaining a secure second-strike capability to offset the improvements in their adversaries' offensive and defensive capabilities. This section provides an overview of how these trends are currently playing out across the nuclear-armed states with regard to the development of certain types of nuclear weapon capability.

[33] International Atomic Energy Agency, Board of Governors, 'Application of Safeguards in the Democratic People's Republic of Korea', Report by the Director General, GOV/2025/51-GC(69)/13, 18 Aug. 2025.

[34] On Israel's 'strategic ambiguity' policy see also Cohen, A., 'Israel', eds H. Born, B. Gill and H. Hänggi, SIPRI, *Governing the Bomb: Civilian Control and Democratic Accountability of Nuclear Weapons* (Oxford University Press: Oxford, 2010).

[35] Gambrell, J., 'Construction intensifies at site linked to Israel's suspected nuclear program, satellite photos show', AP, 3 Sep. 2025.

Dual-capable systems and nuclear–conventional entanglement

Dual-capable systems are platforms—including combat aircraft and missiles—designed to deliver both conventional and nuclear warheads.[36] These systems may appeal to nuclear-armed states because it may be more cost-effective to produce dual-capable systems rather than to produce separate delivery systems for nuclear and conventional warheads. They also introduce potential targeting and threat assessment challenges for adversaries. However, these challenges raise significant risks related to escalation management: how can a state target another state's dual-capable systems during a conventional conflict without risking triggering a nuclear escalation, given that those systems may have a nuclear role? Conversely, if a state is being attacked by a dual-capable system, how can that state assess whether the incoming attack is nuclear or conventional? These challenges (often referred to as 'entanglement' of nuclear and conventional systems) increase the risk that conventional conflicts could unexpectedly and inadvertently move into the nuclear realm.[37] A related entanglement challenge can arise when conventional and nuclear forces are co-located on the same base or deployed to the same area of operation. Such cases could pose (perhaps unintended) geographic entanglement challenges for an attacking state.[38]

Five nuclear-armed states—China, India, North Korea, Pakistan and Russia—field operational dual-capable missile systems and all five are believed to be modernizing these capabilities. For example, documents leaked in December 2025 indicated that Russia was producing an extended-range variant of the dual-capable Iskander ballistic missile that would put most of Central Europe within range.[39] During 2025, Russia also continued development of its new dual-capable Oreshnik IRBM—which can carry MIRVs (see below)—and began construction of a forward-operating base for it in Belarus. China is assessed to have increased the number of dual-capable DF-26 IRBM launchers in its arsenal during 2025 and appears to be fielding a new conventional anti-ship version of the missile. India and Pakistan are both thought to be developing new types of dual-capable missiles to add to those already in their arsenals. North Korea, for its part, continued to develop and field dual-capable short- and medium-range missile launchers during the year.

[36] For a more comprehensive overview of developments in dual-capable systems see *SIPRI Yearbook 2025*, pp. 183–85.

[37] See e.g. Zala, B., 'Nuclear-conventional entanglement in Northeast Asia: The case for crisis management interoperability', *Journal for Peace and Nuclear Disarmament*, vol. 7, no. 1 (2024), pp. 115–30; and McQuarrie, N., 'Why China has not acted on Western warnings to "disentangle" conventional and nuclear missile capabilities', *Bulletin of the Atomic Scientists*, 22 Aug. 2025.

[38] Logan, D., 'Are they reading Schelling in Beijing? The dimensions, drivers, and risks of nuclear-conventional entanglement in China', *Journal of Strategic Studies*, vol. 46, no. 1 (Feb. 2023).

[39] Moiseienko, A. and Place, J., 'Russia is mass-producing 1000-km Iskander missiles that can reach most of Europe, leaks reveal', United24 Media, 18 Dec. 2025.

Seven of the nine nuclear-armed states operate dual-capable aircraft. Russia and the USA are enhancing the capability of their heavy bombers and fighter aircraft to deliver both nuclear and conventional weapons (see below). Notably, the US bomber modernization programme will increase the number of bases for dual-capable bombers from three to five. China is adding a long-range nuclear capability to its conventional bombers. France, India, Israel and Pakistan all operate fighter aircraft that can deliver both conventional and nuclear weapons.

Multiple independently targetable re-entry vehicles

China, France, Russia, the UK and the USA have long-standing, operational MIRV capabilities, while three of the four other nuclear-armed states (India, Pakistan and North Korea) are known to be working to bridge the gap. MIRV technology serves as a powerful 'force multiplier' but is widely regarded as one of the most destabilizing developments in nuclear strategy.[40] MIRVs are designed to overwhelm ballistic missile defences and enable quick destruction of multiple high-value military targets, thereby depleting an adversary's capability to retaliate. Since one incoming missile with MIRV can destroy multiple warheads on missiles in up to 10 silos, decision makers may come under pressure to launch their own nuclear weapons pre-emptively during a crisis to avoid losing many of their most capable weapons to a first strike. Russia and the USA have for decades insisted they need to keep missiles on high alert to prevent such a scenario, and China is now developing a similar missile posture to reduce vulnerability to large-scale pre-emptive attack.

In November 2024 Russia unveiled a new type of MIRV system—the Oreshnik IRBM—in combat use against Ukrainian targets.[41] The Oreshnik is capable of carrying at least six multiple re-entry vehicles. It is distinct from other known MIRV systems in that it is dual capable. In the conventional configuration each re-entry vehicle can carry multiple submunitions. In December 2025 Belarusian President Alexander Lukashenko claimed that Russia had deployed the Oreshnik to Belarusian territory, which Russia later seemed to confirm.[42] During the year, independent analysts identified a possible deployment site under construction in eastern Belarus.[43]

[40] Krepon, M., Wheeler, T. and Mason, S. (eds), *The Lure and Pitfalls of MIRVs: From the First to the Second Nuclear Age* (Stimson Center: Washington, DC, May 2016).

[41] Teterevleva, A. and Rodionov, M., 'Putin says Russia will keep testing new missile in combat', Reuters, 23 Nov. 2024; and Kullab, S. and Morton, E., 'Ukraine shows AP the wreckage of a new experimental Russian missile', AP, 24 Nov. 2024.

[42] 'Lukashenko addresses rumors about Oreshnik location in Belarus', Belarus.by, 19 Dec. 2025; Duitsman, M., Eveleth D. and Lewis J., 'Possible Oreshnik deployment in Belarus', Arms Control Wonk, 26 Dec. 2025; and Harding, L., 'Russia claims to have moved nuclear-capable missile system into Belarus', *The Guardian*, 30 Dec. 2025.

[43] Duitsman, Eveleth and Lewis (note 42).

Although China has had the technological capability to develop and deploy MIRVs on missiles since the early 1980s, it did not do so until 2014 when it added MIRVs to the DF-5B.[44] It then added MIRVs to the DF-41 in 2020. Notably, despite having the capability, China has seemingly not deployed as many MIRVs on its missiles as it perhaps could have done.[45] For example, it is not thought to have deployed MIRVs on the missiles in its three new missile silo fields.

India has recently fielded an intermediate-range missile with MIRV capability—the Agni-V IRBM. A test launch of the missile in March 2024 reportedly involved MIRV technology and tracking of 'multiple re-entry vehicles'.[46]

Pakistan is developing a medium-range missile, the Ababeel, that can reportedly deliver MIRVs; however, it has performed successfully in only a small number of tests, with more than six years between successive tests.[47] There were unconfirmed reports that the missile failed in a test launch in August 2025.[48] It is unlikely that the missile had been operationally deployed as of January 2026.

In June 2024 North Korea claimed to have successfully tested a part of a developing MIRV system, but officials from the Republic of Korea (South Korea) subsequently claimed that the test was a failure.[49] North Korea has since unveiled two new heavy ICBMs, the Hwasong-19 and Hwasong-20, that may be associated with the country's MIRV programme. The Hwasong-19's sole test in October 2024 appeared to involve a post-boost vehicle that could theoretically carry multiple warheads.[50] Photos of the Hwasong-20, which had not yet been tested as of January 2026, indicate that it could achieve greater thrust than the Hwasong-19, suggesting that North Korea is making

[44] Zhang, H., *The Untold Story of China's Nuclear Weapon Development and Testing: A Technical History* (MIT Press: Cambridge, MA, 2025); and Kristensen, H. M., 'Pentagon report: China deploys MIRV missile', FAS Strategic Security Blog, Federation of American Scientists, 11 May 2015.

[45] US DOD, *Military and Security Developments Involving the People's Republic of China 2022* (Office of the Secretary of Defense: Washington, DC, 29 Nov. 2022), p. 65; and Zhang (note 44).

[46] Indian Ministry of Defence, Press Information Bureau, 'DRDO successfully conducts Mission Divyastra: Indigenously developed Agni-5 missile makes maiden flight with MIRV', 20 Aug. 2025.

[47] Pakistani Inter Services Public Relations (ISPR), Press release no. PR34/2017-ISPR, 24 Jan. 2017; and Radio Pakistan, 'Pakistan conducts successful flight test of Ababeel weapon system', 18 Oct. 2023.

[48] Paank, 'Pakistan Navy missile strikes in Ormara and Awaran: Civilian safety at risk', Human Rights Monitoring Report, 21 Aug. 2025; and Jamwal, J. (@JaidevJamwal), X, 1 Dec. 2025, <https://x.com/JaidevJamwal/status/1995495706048843798>.

[49] Korean Central News Agency, 'DPRK Missile Administration conducts test of new important technology', accessed via KCNA Watch, 27 June 2024; and Choe, S. H., 'North Korea says it tested multiple-warhead missile technology', *New York Times*, 26 June 2024.

[50] Korean Central News Agency, 'Crucial test showing DPRK's definite response will and overwhelming edge of its strategic attack force test-fire of DPRK's latest ICBM Hwasongpho-19 successfully conducted under guidance of respected comrade Kim Jong Un', KCNA Watch, 1 Nov. 2024; and Zwirko, C., 'North Korea says it tested new "Hwasong-19" ICBM, largest solid-fuel missile yet', NK News, 1 Nov. 2024.

strides in its development of a heavy multi-warhead ICBM.[51] SIPRI assesses that, as of January 2026, North Korea had not yet deployed a MIRV capability with any of its missiles; such a capability would almost certainly require additional tests before being fielded.

Advanced hypersonic missiles

Advanced types of hypersonic missile fall into two main categories: unpowered hypersonic glide vehicles (HGVs), which are launched from rockets at the edge of space and glide to targets; and hypersonic cruise missiles (HCMs), which are powered by high-speed, air-breathing engines after initial launch from a rocket. Both can deliver payloads that travel at speeds of at least Mach 5. While re-entry vehicles delivered by long-range ballistic missiles already reach hypersonic speed during re-entry, HGVs and HCMs are designed to be much more manoeuvrable at high speeds and able to change course in mid-flight.[52]

Although several nuclear- and non-nuclear-armed states are developing HGV or HCM capabilities, only China, France, India, North Korea and Russia are known to be developing and deploying nuclear-capable versions.

Russia has claimed to have completed the rearmament of two ICBM regiments with nuclear-armed Avangard HGV systems in 2023 and is reportedly in the early stages of developing a range of new HGVs that could be fitted on to modified ICBMs.[53] Russia has also fielded the nuclear-capable 3M22 Zircon (SS-N-33) naval HCM, which is reported to have been used in a conventional land-attack role against targets in Ukraine.[54]

China has the world's most expansive HGV missile arsenal, although most of the missiles have conventional-only missions. The US DOD assesses that China has a small number of development programmes for nuclear-capable HGVs, including for an HGV system that was tested in 2021, possibly as a technology demonstrator for a developmental fractional orbital bombardment system. This system can launch a warhead into low Earth orbit before

[51] Van Diepen, V. H., 'It is autumn in North Korea, and the missiles are changing. Are they past peak?', 38 North, 4 Nov. 2025.

[52] On hypersonic missile developments in 2025 see also chapter 9, section III, in this volume.

[53] Karakaev, S. V., interviewed in Krasnaya Zvezda, 'Стратегическая мощь России крепнет' [Russia's strategic power is growing], Dzen News, 16 Dec. 2023; MilitaryRussia.Ru (@militaryrussia.ru), Telegram, 15 May 2023, <https://t.me/militaryrussiaru/5673> and <https://t.me/militaryrussiaru/5674>; Ryabkov, K., '«Ярс-М» и «Осина-РВ». Направления развития стратегического ракетного комплекса' ['Yars-M' and 'Osina-RV'. Directions of strategic missile complex], TopWar, 18 May 2023; M51.4ever (@M51_4ever), X, 20 Nov. 2023, <https://twitter.com/M51_4ever/status/1725181990062719000>; and Richard, C. A., Commander, US Strategic Command, Statement before the US House of Representatives, Armed Services Committee on Strategic Forces, 1 Mar. 2022.

[54] Weichert, B. J., 'Russia has turned its Zircon hypersonic missiles against Ukraine', *National Interest*, 19 Nov. 2025.

de-orbiting it to strike a target, typically from unexpected trajectories to evade early-warning defences.[55]

India is developing HCMs that are possibly dual capable in nature, while France's next-generation ASN4G ALCM has been described in official documents as a 'hypersonic, manoeuvrable missile'.[56] North Korea is developing HGV systems—including the Hwasong-12Na—as part of its five-year plan for its nuclear weapons programme.[57]

Sea-based systems

France, Russia, the UK and the USA were early adopters of submarine-based nuclear weapons, arguing that they offer stability because of their relative invulnerability to surprise attack. This is meant to provide a secure second-strike capability, ensuring that nuclear deterrence is credible. However, highly capable, modern sea-launched missiles can be destabilizing if they are deployed close to other states, as this gives them the potential to strike targets (including with MIRVs) much faster than land-based ICBMs. In recent years, submarine-based nuclear-weapon delivery systems have been proliferating, especially in the four nuclear-armed states in the Indo-Pacific.[58]

The United States. The USA is modernizing its SSBNs and submarine-launched ballistic missiles (SLBMs) as well as some of the associated nuclear warheads. A new class of at least 12 SSBNs (the Columbia class) is under construction to replace the existing Ohio class, with the lead boat—USS *District of Columbia*—reaching its 60 per cent completion threshold in October 2025. However, its delivery has fallen 17 months behind schedule, delaying the expected first deterrence patrol of the Columbia-class SSBN until at least 2031.[59] The keel of the second boat—USS *Wisconsin*—was laid in September 2025.[60] The delays affecting the Columbia class may mean that the US Navy will need to extend the life of several of its current Ohio-class SSBNs.[61]

[55] US DOD, *Military and Security Developments Involving the People's Republic of China 2024* (note 17), pp. 109–110.

[56] Sayler, K. M., *Hypersonic Weapons: Background and Issues for Congress*, Congressional Research Service (CRS) Report for Congress R45811 (US Congress, CRS: Washington, DC, 10 Apr. 2025), p. 22; and Cormier-Bouligeon, F., 'Avis fait au nom de la Commission de la Défense Nationale et des Forces Armées sur le projet de loi de finances pour 2026, Tome VII, Défense: Équipement des forces—Dissuasion' [Opinion on behalf of the Committee on National Defence and the Armed Forces on the Draft Finance Bill for 2026, vol. VII, Defence: Equipment of the forces—Deterrence], no. 1906, French National Assembly, 29 Oct. 2025.

[57] Lewis, J. (@ArmsControlWonk), X, 29 July 2023, <https://x.com/ArmsControlWonk/status/1685412130223276032>.

[58] For a more comprehensive overview of developments in sea-based systems see *SIPRI Yearbook 2025*, pp. 187–94.

[59] LaGrone, S., 'First Columbia-class sub 60% complete, next year "pivotal," says General Dynamics CEO', USNI News, 24 Oct. 2025; and O'Rourke (note 12).

[60] US Navy, 'Keel authenticated for future USS Wisconsin (SSBN 827)', 28 Aug. 2025.

[61] O'Rourke (note 12); and LaGrone, S., 'Navy could extend life of five Ohio-class ballistic missile boats to hedge against Columbia program delays', USNI News, 1 Nov. 2022.

Since 2017, the US Navy has been replacing its Trident II D5 SLBMs with an enhanced version, known as the D5LE (LE for 'life extension'). The upgrade was probably completed in October 2025 when the USS *Pennsylvania* (SSBN 735) finished its extended refit period and returned to active service.[62] Since the USA and the UK draw from a common missile pool, the D5LE is planned to be deployed on the UK's Trident submarines as well as the first eight of the USA's Columbia-class SSBNs. An upgraded SLBM, the D5LE2, which will include several substantially redesigned components, is scheduled to enter into service on the ninth Columbia-class SSBN in 2039. It will then be retrofitted on to the eight other Columbia-class SSBNs over the following decade. The D5LE2 will be armed with a new nuclear warhead, the W93, and a new re-entry body, the Mk 7. This will be the first new warhead design fielded by the USA since the end of the cold war. The W93/Mk7 completed a second phase of development in March 2025, which further refined the design options for the warhead.[63] The completion of the first production unit of the W93 is tentatively scheduled for the mid 2030s.

The USA is also developing a nuclear sea-launched cruise missile (SLCM-N), despite this being in direct violation of a US pledge from 1992 not to develop such a weapon.[64] The new SLCM-N could potentially also result in the first significant increase in the size of the US nuclear weapon stockpile since 1996, but this will ultimately depend on which warhead is selected to arm the missile. While this decision was expected to be taken in 2025, the result had not been officially disclosed as of January 2026.[65]

Russia. The modernization of Russia's sea-based missile systems includes replacing the Russian Navy's remaining Delfin-class SSBNs with Borei-A (or Project 955A) SSBNs, an upgraded variant of the original Borei design. In July 2025 the *Knyaz Pozharsky*—Russia's eighth Borei-class SSBN and fifth of the improved Borei-A type—was delivered to the Russian Navy for entry into service and was assigned to the Northern Fleet at Gadzhiyevo, Murmansk oblast.[66] In 2025 two submarines—the *Imperator Aleksandr III* (a Borei-A class SSBN) and the *Krasnoyarsk* (a Yasen-M class nuclear-powered guided-missile submarine, SSGN)—transferred from the Northern

[62] US Navy, Naval Sea Systems Command, 'Pennsylvania availability begins: The ballistic missile submarine's arrival marks Dry Dock 4's return to service following recent seismic mitigation work', 24 May 2023; and US Navy, Commander US Pacific Fleet, 'USS Pennsylvania returns to Naval Base Kitsap-Bangor', 27 Oct. 2025.

[63] Spivey, W., 'Full ahead for the W93', Los Alamos National Laboratory, 5 June 2025.

[64] Bush, G. W., US President, 'Address before a joint session of the Congress on the state of the union', 28 Jan. 1992.

[65] US official, Private communication with the authors, July 2024.

[66] President of Russia, 'Церемония подъёма флага на атомном крейсере «Князь Пожарский»' [Flag lift ceremony on the nuclear cruiser '*Knyaz Pozharsky*'], 24 July 2025; and Sevmash, 'Ракетный подводный крейсер «Князь Пожарский» прибыл в пункт постоянного базирования на Северном флоте' [Missile submarine '*Knyaz Pozharsky*' arrived at a permanent base in the Northern Fleet], 2 Aug. 2025.

Fleet to the Pacific Fleet following deployments of three months.[67] It seems that Russia aims to have a total of 12 Borei-class SSBNs, 9 of which will be of the Borei-A type. Russia is currently developing a fifth-generation strategic submarine—potentially known as Arktur or Arcturus—to succeed its Borei-class SSBNs in the late 2030s and beyond.[68]

In November 2025, following a decade of construction work, Russia launched its new 'special purpose' submarine—*Khabarovsk*—which is designed to carry new nuclear-armed Poseidon torpedoes.[69] The submarine had not yet entered service by the end of 2025, but may do so in late 2026. Russia claimed to have tested the Poseidon torpedo in October 2025.[70]

China. In 2025 China continued to pursue its strategic goal from the early 1980s of developing and deploying sea-based nuclear weapons. The People's Liberation Army Navy (PLAN) currently fields six Type 094 (Jin class) SSBNs, two of which are Type 094As—upgraded variants of the original design. The US DOD's 2024 report on Chinese military capabilities assessed that China is building additional Type 094A SSBNs, although it remains unclear how many SSBNs the PLAN ultimately intends to operate.[71] China publicly revealed its Type 094-class SSBN for the first time in 2025, displaying it on multiple occasions, both in state media documentaries and in public events.[72] China also displayed its new JL-3 SLBMs for the first time during its September 2025 Victory Day parade.[73] Development of China's next-generation Type 096-class SSBN appears to be subject to delays.

The United Kingdom. The UK is replacing its four Vanguard-class SSBNs with four new Dreadnought-class SSBNs. As of 2025, construction on all four boats had officially begun. But, due to significant production delays, the new submarine will not enter into service until the early 2030s—when construction first began in 2016, the first boat was originally expected

[67] Sevmash, 'Корабли, построенные на предприятии ОСК Севмаш, успешно выполняют боевые задачи' [Ships built at the USC Sevmash shipyard successfully carry out combat missions], 8 Sep. 2025.

[68] 'Патрушев сообщил об активных работах по созданию стратегической подлодки пятого поколения' [Patrushev announced active work on the creation of a strategic submarine of the fifth generation], Interfax, 22 Dec. 2025; and Safranov, S., 'В конструкторском бюро назвали сроки появления в ВМФ новых атомных подлодок' [The design bureau announced the timing of the appearance of new nuclear submarines in the navy], RIA Novosti, 21 June 2023.

[69] Sevmash, 'На предприятии ОСК Севмаш состоялась церемония вывода из эллинга атомной подводной лодки «Хабаровск»' [The ceremony for the launch of the *Khabarovsk* nuclear submarine from its slipway took place at the USC Sevmash shipyard], 1 Nov. 2025.

[70] Reuters, 'Russia tests nuclear-capable Poseidon super torpedo, Putin says', YouTube, 29 Oct. 2025.

[71] US DOD, *Military and Security Developments Involving the People's Republic of China 2024* (note 17), p. 53.

[72] CCTV, '"Overcoming adversity: Determined to build a first-class military" Episode 1: Military orders are like mountains', 1 Aug. 2025; and Zhen, L., 'China's military reveals details of Type 094 nuclear submarine for first time', *South China Morning Post*, 2 May 2025.

[73] CGTN Europe (note 20).

to enter into service in 2028.[74] Given the delays to the Dreadnought class, the service lives of the existing Vanguard-class SSBNs have been commensurately extended to an overall lifespan of about 37–38 years. However, the work to upgrade each Vanguard-class SSBN in turn has also been subject to significant delays and budget overruns.[75] As a result, the UK's operational Vanguard-class SSBNs have had to extend their deterrence patrols. The length of time at sea for British nuclear submarines has reportedly increased from about 60–70 days in the 1970s to 150–200 days in recent years—potentially contributing to several operating errors, accidents and personnel issues within the UK's nuclear forces.[76]

The UK is also upgrading the missiles and warheads carried on its SSBNs. It intends to replace the current Holbrook warhead with a new warhead (the Astraea) that will use the A21/Mk7 aeroshell being developed in parallel with the Mk7 aeroshell for the USA's new W93 warhead.[77] The UK's new warhead is unlikely to enter into service until sometime in the late 2030s or early 2040s.[78]

Given that the UK draws its SLBMs from a common pool shared with the USA, the UK is benefiting from the US Navy's programme to extend the service life of the Trident II D5 missile. The UK has not completed a successful Trident test launch in more than a decade, with its most recent attempted test in 2024 failing due to a problem with the test equipment strapped to the missile's first-stage booster.[79]

France. France's next generation of SSBNs (the SNLE 3G) are currently in development and were scheduled to transition to their next stage before the end of 2025, but no official announcement was made to that effect during the year. The first of the new boats is expected to enter into service in the mid 2030s.[80] The French SLBM, the M51, can carry up to six MIRVs and is continuously being upgraded in an iterative manner, with each new iteration

[74] British Royal Navy, 'Keel ceremony marks milestone in submarine Dreadnought's construction', 20 Mar. 2025; and British Royal Navy, 'In awe of Agamemnon: The King sees Royal Navy's newest submarine commissioned', 22 Sep. 2025.

[75] Nuclear Information Service, 'HMS Vanguard leaves Devonport after 7 years of maintenance', 7 July 2023; British Ministry of Defence, 'British jobs secured through upgrade to nuclear deterrent', 4 Dec. 2015; and 'HMS Vanguard finally sails from Devonport after more than 7 years', Navy Lookout, 10 May 2023.

[76] Forsyth, R., 'Extra-long trident patrols: Heightened risks for crew wellbeing and nuclear safety?', British American Security Information Council (BASIC), 6 Dec. 2022; and Hogan, F., 'Royal Navy misses £500m of submarine maintenance', *The Times*, 15 Feb. 2026.

[77] Wallace, B., British Secretary of State for Defence, 'Nuclear deterrent', Written statement HCWS125, British House of Commons, 25 Feb. 2020; and Wolfe, J., Director of US Strategic Systems Programs, 'FY 2026 budget request for nuclear forces and atomic energy defense activities', Statement before the US Senate, Armed Services Committee, Subcommittee on Strategic Forces, 20 May 2025.

[78] Mills, C., 'Replacing the UK's Nuclear Deterrent: The Warhead Programme', House of Commons Library Briefing Paper no. 9777, 1 Aug. 2024.

[79] Brown, L., 'UK urged to prepare for Donald Trump halting Trident partnership', *The Times*, 5 Mar. 2025.

[80] Cormier-Bouligeon (note 56).

thought to have increased range and penetration capabilities to offset improvements in adversarial missile defence capabilities. The first version, the M51.1, carried older TN 75 sea-based warheads, while the newer M51.2 carries the *tête nucléaire océanique* (TNO, sea-based nuclear warhead). As of January 2026, SIPRI assesses that all operational French SSBNs have been equipped with the M51.2/TNO, although French budgetary documents indicate that the M51.1 remains in the French arsenal, most likely in reserve.[81] The third iteration of the missile—the M51.3, which is equipped with the updated TNO-2 warhead—entered into service in October 2025 and may already have been assigned to some operational SSBNs as of January 2026.[82] The M51.3 programme has resulted in upgrades to the infrastructure at the SSBN base at Île Longue on France's Atlantic coast.[83] The French government issued the contract for the development of the fourth iteration, the M51.4, in August 2025.[84]

India. India is building a fleet of SSBNs as it continues to develop the naval component of its nascent nuclear triad. India's navy currently operates three SSBNs: INS *Arihant*, INS *Arighaat* and INS *Aridhaman*, with the latter reportedly being commissioned in April 2026.[85] India's fourth SSBN—reportedly named INS *Arisudan*—is expected to enter into service in 2027.[86] Satellite imagery indicates that the *Aridhaman* and the *Arisudan* are approximately 16 to 18 metres longer than the first two SSBNs and are equipped with eight missile tubes—twice the number present on the *Arihant* and *Arighaat*. India is reportedly developing a follow-on class of SSBN, known as S5. When that programme is completed, India may operate between six and eight SSBNs concurrently.[87] Of the three operational SSBNs, the first (the *Arihant*) is thought to be equipped with the K-15 short-range SLBM (the K-15 has been test-launched only from the *Arihant*). The *Arighaat* has twice test-launched the K-4 intermediate-range SLBM, most recently in December 2025, but the missile will probably need to undergo further testing before it becomes fully operational.[88] The K-15 is expected to be retired from service once the K-4 becomes fully operational.

[81] Cormier-Bouligeon (note 56).

[82] French Ministry for the Armed Forces, 'Mise en service opérationel du missile M51.3' [Operational deployment of the M51.3 missile], Press release, 28 Oct. 2025.

[83] Cormier-Bouligeon (note 56).

[84] French Ministry for the Armed Forces, 'The French Defence Procurement Agency (DGA) orders the development of the M51.4 strategic ballistic missile to ArianeGroup', Press release, 12 Sep. 2025.

[85] 'Bigger, quieter and deadlier: Navy commissions INS Aridhaman—all about India's 3rd nuclear sub', *Times of India*, 3 Apr. 2026.

[86] Gupta, S., 'Arihant class nuclear-powered submarine S4* likely to be named INS Arisudan', *Hindustan Times*, 5 Jan. 2026.

[87] 'Bhabha Atomic Research Centre making reactor for Navy's next-generation nuclear submarines', *Times of India*, 21 Sep. 2025.

[88] Gupta, S., 'India nears sea-based nuclear triad as K-4 missile clears key test', *Hindustan Times*, 25 Dec. 2025.

Aircraft and air-delivered weapons

Of the nuclear-armed states, the USA, Russia and France have the most mature nuclear air-delivery capabilities, and all three had extensive modernization programmes under way throughout 2025.

The USA had 65 nuclear-capable bombers as of January 2026. The USA's 46 B-52H bombers carry nuclear cruise missiles while its 19 B-2As carry gravity bombs. The USA plans to produce at least 100—possibly as many as 120—new B-21 bombers that will gradually replace the B-2As and result in an increase in the number of US nuclear bomber bases. Construction at the first B-21 bomber base to integrate the new aircraft began in 2022 and continued through 2025. The USA is developing and deploying two new gravity bombs—the B61-12 and B61-13—to replace and consolidate nearly all its existing types of gravity bomb. The US National Nuclear Security Administration (NNSA) announced at the start of 2025 that the B61-12 is 'fully forward deployed'.[89] SIPRI estimates that, as of January 2026, a total of 100–120 B61-12s were deployed at bases in several NATO member states (Belgium, Germany, Italy, the Netherlands, Türkiye and, possibly, the UK). The new B61-12 bombs replaced the earlier versions of the B61 deployed at the bases. In May 2025 the NNSA completed the first production unit of the B61-13, a high-yield bomb designed for 'the defeat of certain harder and large-area military targets'.[90]

Prior to 2025, Russia had a fleet of around 67 legacy strategic bombers capable of delivering nuclear cruise missiles deployed at two strategic bomber bases—Engels (Saratov oblast) and Ukrainka (Amur oblast). However, several of the bombers were damaged during 2025 after attacks by Ukrainian uncrewed aerial vehicles (UAVs, or drones), leaving a fleet of approximately 15 Tu-160/M and 45 Tu-95MS aircraft.[91] Commercial satellite imagery has revealed that, throughout 2025, Russia dispersed significant numbers of these aircraft to its Belaya (Irkutsk oblast), Dyagilevo (Ryazan oblast) and Olenya (Murmansk oblast) airbases.[92] Russia continued to modernize its bomber fleet during 2025, although some of its newer bomber development programmes are suffering from substantial delays. Russia is also modernizing its non-strategic dual-capable aircraft, some of which were destroyed by Ukrainian drones in 2025.[93]

France operates approximately 50 Rafale aircraft that can deliver nuclear-armed ALCMs (the ASMPA type described above). The life-extended version

[89] Hruby, J., Administrator, US National Nuclear Security Administration, Remarks at the Hudson Institute, Washington, DC, 16 Jan. 2025.

[90] US Department of Energy (note 6).

[91] Newdick, T., 'Confirmed losses of Russian aircraft mount after Ukrainian drone assault', The War Zone, 4 June 2025.

[92] Authors' assessment based on analysis of satellite imagery.

[93] Reuters, 'Russia faces struggle to replace bombers lost in Ukrainian drone strikes', Moscow Times, 6 June 2025.

(the ASMPA-R) was tested from ground-based and carrier-based Rafales in 2024 and 2025 respectively, and is intended to act as a bridge capability until France's next-generation hypersonic ALCM (the ASN4G) enters into service in the mid 2030s.[94] In March 2025, during a visit to Luxeuil-Saint-Sauveur airbase in eastern France, President Emmanuel Macron announced plans to reactivate the base's nuclear mission with the introduction of two squadrons of Rafale aircraft by 2035.[95] Luxeuil will become the first base to receive the next-generation Rafale F5 and ASN4G missile. Once complete, this project will probably double the number of France's nuclear-capable Rafale aircraft.

III. Changing nuclear doctrines and developments in nuclear sharing

A state's nuclear doctrine encompasses the goals and missions that guide the deployment and use of nuclear weapons, and determines the state's nuclear force structure, declaratory policy and diplomacy. With the global strategic context undergoing major changes in recent years, the nuclear doctrines of the nuclear-armed states also appear to be changing to reflect this new environment. For many nuclear-armed states, these changes involve updates to policies relating to nuclear sharing and coordination or to 'nuclear signalling'—the primary way that states communicate intent, resolve and capability regarding their nuclear arsenals.

This section first examines the latest updates to Russia's nuclear doctrine and the claims that nuclear weapons have been deployed in Belarus, before briefly looking at the USA's doctrine and potential changes in nuclear-sharing arrangements among NATO member states. It next examines emerging nuclear coordination between France and the UK, partly in response to the actions and rhetoric of the second Trump administration, and then assesses the potential extension of Pakistan's nuclear deterrent to Saudi Arabia. Finally, the section explores how China's modernization of its nuclear forces suggests that its doctrine is also evolving.

Russian nuclear doctrine and nuclear sharing

Russia still seems to be operating within the confines of its most recently issued update to its nuclear doctrine from November 2024. While much of the doctrine remained the same as its 2020 iteration, the 2024 update appeared to expand the range of contingencies under which Russia could

[94] Vautrin,C.(@CaVautrin),X,13Nov.2025,<https://x.com/CaVautrin/status/1988966351277330743>; and Cormier-Bouligeon (note 56).

[95] Macron, E., President of France, Speech at Luxeuil-Saint-Sauveur airbase, Élysée, 18 Mar. 2025; and French Ministry of the Armed Forces (note 27).

use nuclear weapons.[96] The revised wording in the 2024 update is probably a result of the evolving nuclear dynamics around the Russia–Ukraine war. The mixed performance of Russia's conventional weapons against Ukraine could reaffirm, and potentially even deepen, Russia's reliance on nuclear weapons in its national security strategy.

Russian nuclear weapon sharing with Belarus

In December 2024 Belarusian President Alexander Lukashenko claimed that 'dozens' of Russian nuclear weapons were forward deployed to Belarus.[97] If true, this would be the first instance of Russia deploying nuclear weapons outside of its national territory since the end of the cold war. Satellite imagery, photographic analysis and leaked intelligence indicate that a military depot near Asipovichy in central Belarus is the most likely location for such a deployment. By the end of 2025 the depot had undergone significant upgrades, including the addition of major roadways, a rail transfer site, high-security garages, multiple layers of fencing, radiation monitors, communications towers, air defence pads and other things typically found at nuclear-related storage sites.[98] Nevertheless, there was no conclusive publicly available visual evidence as of January 2026 that Russian nuclear warheads and related personnel were deployed in Belarus.

In December 2025 the Russian Ministry of Defence released a video showing Russia's new dual- and MIRV-capable Oreshnik IRBM operating inside Belarus.[99] The presence of these systems in Belarus, along with previously deployed Iskander systems and nuclear-capable aircraft, indicates that Russia now appears to have multiple different means for delivering nuclear weapons from Belarusian territory.

US nuclear doctrine and NATO nuclear sharing

Despite numerous signals that the administration of President Joe Biden planned to modify the US nuclear posture to counterbalance Russian and Chinese developments—including the possibility of uploading 'some or all' of the USA's reserve warheads—this change did not occur during the term of the Biden administration, nor did it occur during the first year of the second

[96] Russian Ministry of Foreign Affairs, 'Fundamentals of state policy of the Russian Federation on nuclear deterrence', Approved by Russian Presidential Executive Order no. 991, 19 Nov. 2024.

[97] 'Belarus has dozens of Russian nuclear weapons and is ready for its newest missile, its leader says', AP, 10 Dec. 2024.

[98] Shauliuha, A. and Furlong, R., 'RFE/RL finds new evidence of Russia's suspected secret nuclear base in Belarus', Radio Free Europe/Radio Liberty, 26 Mar. 2025; and Kristensen, H. and Korda, M., 'Depot in Belarus shows new upgrades possibly for Russian nuclear warhead storage', FAS Strategic Security Blog, Federation of American Scientists, 14 Mar. 2024.

[99] Osborn, A., 'Russia shows off deployment of nuclear-capable Oreshnik missiles in Belarus', Reuters, 30 Dec. 2025.

Trump administration in 2025.[100] There was also no US nuclear posture review in 2025. However, in the light of the New START treaty's expiry in February 2026, it is possible that the second Trump administration may decide to increase the number of warheads deployed on strategic missiles and add new nuclear weapons to the arsenal.

Developments in NATO nuclear sharing

In June 2025 the British government announced its intention to purchase 12 new F-35A aircraft and rejoin NATO's nuclear-sharing mission as a 'host nation', reintroducing 'a nuclear role for the Royal Air Force for the first time since the UK retired its sovereign air-launched nuclear weapons following the end of the Cold War'.[101] The UK will become the sixth host nation within NATO's nuclear-sharing arrangements (the other five are Belgium, Germany, Italy, the Netherlands and Türkiye), while several other NATO member states participate in support roles. In recent years—including in 2025—there have been discussions in several NATO member states about joining, expanding or increasing coordination with regard to these arrangements. These discussions have been spurred both by deteriorating relations with Russia and by the anti-NATO rhetoric of the second Trump administration.[102]

In Poland, for example, officials have made statements in recent years—including in 2025—in favour of hosting US nuclear weapons on Polish territory.[103] Similarly, Finland and Sweden (which joined NATO in 2023 and 2024 respectively) have both signalled that they would potentially be open to stationing US nuclear weapons on their territory during wartime.[104] In January 2026 Sweden's Prime Minister, Ulf Kristersson, stated that Sweden had begun to engage with France and the UK on possible nuclear weapons cooperation, but did not provide any detail.[105] During the NATO nuclear

[100] Congressional Commission on the Strategic Posture of the United States, *America's Strategic Posture: Final Report of the Congressional Commission on the Strategic Posture of the United States* (Institute for Defense Analyses, IDA: Alexandria, VA, 2023), p. 48; and Vaddi, P., Special Assistant to the President and Senior Director for Arms Control, Disarmament, and Nonproliferation, National Security Council, 'Adapting the US approach to arms control and nonproliferation to a new era', Remarks to Arms Control Association, 7 June 2024.

[101] British Government (note 23).

[102] 'Trump casts doubt on willingness to defend Nato allies "if they don't pay"', *The Guardian*, 7 Mar. 2025.

[103] 'Joining nuclear sharing programme would boost Poland's security: President', Polska Agencja Prasowa, 26 Sep. 2025; Cienski, J. and Kość, W., 'Poland seeks access to nuclear arms and looks to build half-million-man army', Politico, 7 Mar. 2025; and 'Poland's leader says his country is ready to host NATO members' nuclear weapons to counter Russia', AP, 22 Apr. 2024.

[104] DR, NRK, SVT and YLE, 'Unik nordisk sändning om svaret på Putins krig' [Unique Nordic broadcast on the answer to Putin's war], SVT, 12 Sep. 2024; and Allik, H.-L., 'Sweden approves controversial US defense deal', DW, 19 June 2024.

[105] SVT, Agenda, 'Skilsmässan' [The divorce], 25 Jan. 2026.

exercise Steadfast Noon in October 2025, Finland and Sweden participated with conventional combat aircraft in support of the nuclear mission.[106]

While neither France nor the UK appears to be seeking to replace the USA's nuclear-sharing role in Europe, there were growing indications in 2025 that they are actively seeking to supplement it and create a stronger European nuclear backstop. In March 2025 after German Chancellor-in-waiting Friedrich Merz said he wanted to discuss a nuclear-sharing arrangement with France and the UK, President Macron stated that he would 'open the strategic debate on the protection of our allies on the European continent by our (nuclear) deterrent'.[107] Similarly, the UK's 2025 Strategic Defence Review stated that 'the UK must explore how to support the US and its NATO Allies in strengthening extended deterrence across the Euro-Atlantic'.[108]

Throughout 2025, the USA continued to upgrade the nuclear storage vaults and related infrastructure at the RAF Lakenheath airbase in the UK, in order to facilitate the potential contingency storage of nuclear weapons at the base.[109] These upgrades are taking place in the broader context of a plan to modernize up to 180 nuclear storage vaults across Europe, which probably include all active vaults as well as dozens of vaults in caretaker status at other bases.[110]

In January 2025 the US NNSA stated that the new B61-12 gravity bombs were 'fully forward deployed', indicating that the B61-3 and B61-4 bombs previously deployed at NATO bases outside the USA have been returned to the USA and replaced with the B61-12.[111] Unlike the older versions, the B61-12 is equipped with a guided tail-kit that enables the bomb to hit targets more accurately, meaning that it can use lower yields and thus generate less radioactive fallout.[112] The NNSA's Stockpile Stewardship and Management Plan for US fiscal year 2025 indicated that the B61-12 had been formally assigned to the B-2, F-15, F-16, F-35 and 'certified NATO aircraft'—especially the F-35A—suggesting that the B61-12 had received certifications of compatibility with

[106] Finnish Ministry of Defence, 'Finland to participate in NATO's annual nuclear deterrence exercise', 10 Oct. 2025; and Swedish Government, 'Sverige deltar i Steadfast Noon' [Sweden participates in Steadfast Noon], Press release, 10 Oct. 2025.

[107] Corbet, S., 'Macron says he'll confer with allies on protecting Europe with French nuclear deterrence', AP, 5 Mar. 2025.

[108] British Government, *Strategic Defence Review 2025* (note 22).

[109] Authors' assessment based on analysis of satellite imagery.

[110] 'Request for information: Vault modernization program', System for Award Management (SAM.gov), Notice ID FA9422_VMP, 29 Aug. 2023.

[111] Hruby (note 89).

[112] Kristensen, H. and McKinzie, M., 'Video shows earth-penetrating capability of B61-12 nuclear bomb', FAS Strategic Security Blog, Federation of American Scientists, 14 Jan. 2016.

all these aircraft.[113] The F-35A will eventually replace all Belgian, Dutch and US F-16s, and German and Italian Tornado aircraft in the nuclear strike role.

Emerging nuclear coordination between France and the United Kingdom

In 2025 the primary development in nuclear coordination between France and the UK was the signing of the Northwood Declaration on 10 July 2025.[114] This landmark accord marks a significant shift, as both states formally agreed that their independent nuclear forces 'can be coordinated' to address extreme threats to Europe. The declaration affirms that there is 'no extreme threat to Europe' that would not prompt a response from both states. It positions their combined deterrence as a strategic backstop for European security, especially amid uncertainties regarding US nuclear commitments to Europe under the second Trump administration. A new high-level body, the UK–France Nuclear Steering Group, was created to provide political direction and coordinate nuclear policy, capabilities and operations. This group is jointly led by the UK's Cabinet Office and the French Presidency. The group held its inaugural meeting in Paris on 10 December 2025.[115] During the meeting, officials from the UK were granted unprecedented access to observe Operation Poker, an annual exercise involving France's airborne nuclear component.[116]

The coordination now explicitly includes potential alignment of SSBN patrols, intelligence sharing and 'deterrence messaging' to present a united front against adversaries like Russia. The nuclear pact was part of a broader defence modernization framework that also includes joint work on deep-strike missiles, cyber defence and artificial intelligence.[117] This coordination is historic because it is the first time either state has publicly committed to coordinating its nuclear deterrent with a partner other than the USA (in the UK's case) or at all (in France's case).

[113] Marrow, M., 'Exclusive: F-35A officially certified to carry nuclear bomb', Breaking Defense, 8 Mar. 2024; and US Department of Energy (DOE), National Nuclear Security Administration (NNSA), *Fiscal Year 2025 Stockpile Stewardship and Management Plan—Biennial Plan Summary, Report to Congress* (DOE: Washington, DC, Sep. 2024), pp. 1-4, 2-10.

[114] British Government, 'Northwood Declaration (UK–France joint nuclear statement)', 10 July 2025.

[115] British Government, 'New UK–France Nuclear Steering Group meets to advance cooperation under Northwood Declaration', 18 Dec. 2025.

[116] British Government (note 115).

[117] Fraioli, P. (ed.), International Institute for Strategic Studies, 'The Northwood Declaration: UK–France nuclear cooperation and a new European strategic backstop', *IISS Strategic Comments*, vol. 31, comment 20 (Aug. 2025).

Potential extension of Pakistan's nuclear deterrent to Saudi Arabia

In September 2025 Pakistan and Saudi Arabia signed a Strategic Mutual Defence Agreement. While the joint statement issued after the signing did not specifically confirm the extension of Pakistan's nuclear deterrent to Saudi Arabia, subsequent comments made by Pakistan's defence minister, Khawaja Muhammad Asif, suggested that Pakistan's nuclear weapon capabilities 'will be made available' to Saudi Arabia.[118] However, Asif is also reported to have stated that nuclear weapons were 'not on the radar' of the pact—although a senior official from Saudi Arabia noted in the same news report that the agreement 'encompasses all military means'.[119]

Chinese nuclear doctrine and nuclear modernization

The Chinese government's declared aim is to maintain China's nuclear capabilities at the minimum level required to safeguard national security, with the goal of 'deterring other countries from using or threatening to use nuclear weapons against China'.[120] China has long maintained a policy of not using or threatening to use nuclear weapons against non-nuclear-armed states or nuclear weapon-free zones. However, the dramatic changes in China's nuclear posture in recent years, especially its deployment of quick-launch solid-fuelled missiles in silos, its advancements in missile defence and the possible development of a launch-on-warning (LOW) capability, have triggered widespread discussions about long-standing elements of Chinese nuclear doctrine, including its stated nuclear 'no-first-use' (NFU) policy.[121]

Since 2022, the US DOD has assessed that China is implementing an 'early warning counterstrike' strategy—akin to a LOW posture—using ground- and space-based sensors to enable rapid launch of missiles before an adversary can destroy them. According to the US DOD, China has deployed at least three early-warning satellites to facilitate this posture, with the DOD's 2025 report on Chinese military capabilities assessing that 'China's early warning infrared satellites can reportedly detect an incoming ICBM within 90 seconds of launch with an early warning alert sent to a command center within three to four minutes'.[122] The 2025 report also notes that China's ground-based,

[118] 'Joint statement issued following Pakistan prime minister state visit to Saudi Arabia', Saudi Press Agency, 26 Mar. 2025; and 'Pakistan says its nuclear program can be made available to Saudi Arabia under defense pact', *Asharq Al-Awsat*, 19 Sep. 2025.

[119] Shah, S. and El Dahan, M., 'Saudi pact puts Pakistan's nuclear umbrella into Middle East security picture', Reuters, 19 Sep. 2025.

[120] Chinese Ministry of National Defense, 'Defense Policy', [n.d.].

[121] See e.g. Havrén, S. A., 'China's no first use of nuclear weapons policy: Change or false alarm?', Royal United Services Institute (RUSI), 13 Oct. 2023; and Kulacki, G., 'Would China use nuclear weapons first in a war with the United States?', The Diplomat, 27 Apr. 2020.

[122] US DOD, *Military and Security Developments Involving the People's Republic of China 2025* (note 18), pp. 23–24.

large phased-array radars 'probably can corroborate incoming missile alerts first detected by the TJS/Huoyan-1 [satellites] and provide additional data, with the flow of early warning information probably enabling a command authority to launch a counterstrike before inbound detonation'.[123] If this is accurate, it would appear that China is developing an early-warning capability that functions in a similar manner to those of Russia and the USA, which rely on dual phenomenology—the requirement for a nuclear launch to be detected by two independent methods—to confirm the validity of incoming attacks before authorizing retaliatory launches. Despite its apparent interest in moving towards a LOW posture, China has continuously reaffirmed its long-standing core nuclear policies, including its NFU policy—most recently in a white paper on arms control, disarmament and non-proliferation released in November 2025.[124]

For decades China maintained a separation between its warheads, missiles and launchers during peacetime, with specific procedures in place for loading warheads on to launchers in a crisis.[125] In recent years, however, the US DOD has assessed that China has begun 'near-continuous at-sea deterrence patrols' with its SSBN force, suggesting patrols with nuclear weapons onboard.[126] In addition, over at least the past five years, the People's Liberation Army Rocket Force (PLARF) has begun to conduct new drills. These include what the US DOD describes as 'combat readiness duty' and 'high alert duty' drills—which allow the PLARF 'to maintain a portion of its units on a heightened state of readiness'—as well as launch drills involving multiple successive launches and rapid missile launches, with the aim of firing before an adversary's missiles can hit the units' positions.[127] The US DOD asserted in 2025 that China had loaded more than 100 missiles into silos at its three new missile silo fields.[128] There is so far no publicly available evidence that those missiles have been armed with nuclear warheads, but it is possible that small

[123] US DOD, *Military and Security Developments Involving the People's Republic of China 2025* (note 18), p. 24.

[124] Chinese Ministry of Foreign Affairs, 'China releases white paper on arms control in new era', 27 Nov. 2025.

[125] Stokes, M. A., *China's Nuclear Warhead Storage and Handling System* (Project 2049 Institute: Arlington, VA, 12 Mar. 2010), p. 8; and Li, B., 'China's potential to contribute to multilateral nuclear disarmament', *Arms Control Today*, vol. 41, no. 2 (Mar. 2011).

[126] US DOD, *Military and Security Developments Involving the People's Republic of China 2024* (note 17), p. 104.

[127] US DOD, *Military and Security Developments Involving the People's Republic of China 2024* (note 17), p. 107. See also Lu, Z. and Liu, X., [The missile was successfully launched, but all the personnel were 'killed'. Is it a victory?], PLA Daily, 7 Dec. 2021 (in Chinese); and Baughman, J., 'An assessment of People's Liberation Army Rocket Force survivability training', China Aerospace Studies Institute, 15 Aug. 2022.

[128] US DOD, *Military and Security Developments Involving the People's Republic of China 2025* (note 18), p. 24.

portions of the silo fields participate in the 'combat readiness duty' and 'high alert duty' drills described by the US DOD.[129]

IV. Conclusions

While the global total inventory of nuclear warheads continues to fall as retired weapons are gradually dismantled, year-on-year increases can be seen in the number of operational (stockpiled) nuclear warheads. This trend seems likely to continue and will probably accelerate in the coming years. These developments are made more concerning by the fact that states are becoming increasingly secretive about their nuclear arsenals. While this is partly due to a general reduction in transparency in several nuclear-armed states, it is also due to the degradation of arms control agreements such as New START that included transparency measures requiring states to exchange data about their arsenals. Under these circumstances, not only are nuclear stockpiles expected to expand, but the numbers of deployed weapons will also most likely increase.

[129] US DOD, *Military and Security Developments Involving the People's Republic of China 2024* (note 17), p. 107.

Appendix 8A. Nuclear forces, by state, January 2026

HANS M. KRISTENSEN AND MATT KORDA

Table 8A.1. World nuclear forces, January 2026

All figures are approximate and are estimates based on public information or assessments by the authors.

	First nuclear test year	Deployed warheads[a]		Stored warheads[b]		Military stockpile[c]		Retired warheads[d]		Total inventory[e]	
		2025	2026	2025	2026	2025	2026	2025	2026	2025	2026
USA	1945	1 770	1 770[f]	1 930	1 930[g]	3 700	3 700	1 477	1 342	5 177	5 042
Russia	1949	1 718	1 796[h]	2 591	2 604[i]	4 309	4 400[j]	1 150	1 020	5 459	5 420
UK	1952	120	120	105	105	225	225	–	–	225	225
France	1960	280	280	10	10	290	290	. .	80	290	370
China	1964	24	34[k]	576	586	600	620	–	–	600	620
India	1974	–	12[l]	180	178	180	190	. .	. .	180	190
Pakistan	1998	–	–	170	170	170	170	. .	. .	170	170
North Korea	2006	–	–	50	60	50	60	. .	. .	50	60[m]
Israel	. .	–	–	90	90	90	90	. .	. .	90	90
Total		**3 912**	**4 012**	**5 702**	**5 733**	**9 614**	**9 745**	**2 627**	**2 442**	**12 241**	**12 187**

. . = not applicable or not available; – = nil or a negligible value.

Notes: SIPRI revises its world nuclear forces data each year based on new information and updates to earlier assessments. The data for Jan. 2026 replaces all previously published SIPRI data on world nuclear forces.

[a] These are warheads placed on missiles or located on bases with operational forces.

[b] These are warheads in central storage that would require some preparation (e.g. the installation of certain components and loading on to launchers) before they could be deployed.

[c] This refers to all deployed warheads as well as warheads in central storage (but not retired warheads) that could potentially be deployed after some preparation.

[d] These warheads have been retired from the military stockpile but have not yet been dismantled.

[e] This refers to both stockpiled and retired warheads.

[f] This figure includes *c.* 1370 warheads deployed on ballistic missiles and *c.* 300 stored at bomber bases in the United States, as well as *c.* 100–120 non-strategic (tactical) nuclear bombs thought to be deployed across 6–7 airbases in 5–6 North Atlantic Treaty Organization member states (Belgium, Germany, Italy, the Netherlands, Türkiye and, possibly, the United Kingdom). These non-strategic bombs remain in the custody of the USA.

[g] This figure includes *c.* 80–100 non-strategic nuclear bombs stored in the USA. The remainder are strategic nuclear warheads.

[h] This figure includes *c.* 1596 strategic warheads deployed on ballistic missiles and *c.* 200 deployed at heavy bomber bases.

[i] This figure includes *c.* 810 strategic and *c.* 1794 non-strategic warheads in central storage.

[j] The year-on-year increase in SIPRI's estimate of Russia's stockpile was largely due to a reassessment by SIPRI of the number of warheads assigned to non-strategic nuclear forces.

[k] US intelligence reports claim that a growing number of China's missile launchers might be in a state of heightened operational readiness. Moreover, US government officials privately suggest that nuclear-powered ballistic missile submarines (SSBNs) conducting deterrence patrols might be carrying nuclear-armed missiles. Partly based on these assumptions, SIPRI assesses that a small number of China's missiles might be equipped with nuclear warheads (*c*. 34 as of Jan. 2026), but this assessment comes with considerable uncertainty.

[l] As of Jan. 2026, SIPRI assesses that India may have started occasionally deploying a small number of its warheads (*c*. 12) on 1 of its SSBNs, but this assessment comes with considerable uncertainty.

[m] North Korea might have produced enough fissile material to build at least 90 nuclear warheads; however, it is likely that it has assembled fewer warheads, perhaps *c*. 60.

Table 8A.2. United States nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type	Designation	No. of launchers	Year first deployed	Range (km)	No. of warheads x warhead type x yield	Total no. of warheads
Strategic nuclear forces		**745**				**3 500**
Aircraft (bombers)		*65*				*805*
B-52H	Stratofortress	76/46	1961	16 000	Up to 20 x AGM-86B ALCMs x 5–150 kt	500
B-2A	Spirit	19/19	1994	11 000	Up to 16 x B61-11 x 400 kt, -12 x 0.3–50 kt	305
Land-based ICBMs		*400*				*800*
LGM-30G Minuteman III						
	Mk12A	200	1979	13 000	1–3 x W78 x 335 kt	600
	Mk21 SERV	200	2006	13 000	1 x W87-0 x 300 kt	200
SLBMs		*280*				*1 895*
UGM-133A Trident II D5LE						
	Mk4A	. .	2008	>12 000	1–8 x W76-1 x 90 kt	1 486
	Mk4A	. .	2019	>12 000	1–2 x W76-2 x 8 kt	25
	Mk5	. .	1990	>12 000	1–8 x W88 x 455 kt	384
Non-strategic nuclear forces						**200**
F-15E	Strike Eagle	. .	1988	3 840	5 x B61-12 x 0.3–50 kt	60
F-16C/D/ MLU	Falcon	. .	1985/1987	3 200	2 x B61-12 x 0.3–50 kt	30
PA-200	Tornado	. .	1983	2 400	2 x B61-12 x 0.3–50 kt	30
F-35A	Lightning II	. .	2024	2 200	2 x B61-12 x 0.3–50 kt	80
Total stockpile						**3 700**
Deployed warheads						1 770
Reserve warheads						1 930
Retired warheads awaiting dismantlement						**1 342**
Total inventory						**5 042**

. . = not available or not applicable; ALCM = air-launched cruise missile; ICBM = intercontinental ballistic missile; kt = kiloton; SERV = security-enhanced re-entry vehicle; SLBM = submarine-launched ballistic missile.

Notes: **Strategic nuclear forces**: Of the 3500 strategic warheads, *c*. 1670 were deployed on land- and sea-based ballistic missiles and at bomber bases. The remaining warheads were in central storage.

The USA has a total of 95 B-2 and B-52 bombers in its inventory, but only 65 were counted as nuclear capable under the now-expired 2010 Russian–US Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START). The USA has declared under New START that it would deploy no more than 60 nuclear bombers at any given time; normally only *c*. 50 are deployed, with the remaining aircraft in overhaul. Of the *c*. 805 bomber weapons, *c*. 300 (200 ALCMs and 100 bombs) were deployed at the bomber bases; all the rest were in central storage. Following completion of production and deployment of the new B61-12 bomb in 2024, the B61-7 and B83-1 bombs are thought to have been withdrawn from operational service and are not counted in this table. A small number of B61-7 warheads will be used for some of the new B61-13 bombs in production, while the B83-1 is in the process of being retired.

Of the 800 ICBM warheads, only 400 were deployed on the missiles. The remaining warheads were in central storage. Only 200 of the 600 W78 warheads were deployed, as each ICBM has had its warhead load reduced to carry a single warhead; all of the remaining warheads were in central storage. Although only 200 W87 warheads are listed, SIPRI estimates that another 340 W87 warheads might be in long-term storage outside the stockpile for use in the W87-1 warhead production to replace the W78.

There are 14 nuclear-powered ballistic missile submarines (SSBNs) in the US fleet that can carry a maximum of 280 missiles. However, SIPRI assesses that 2 vessels are probably undergoing long-term maintenance work at any given time and are not assigned missiles. The remaining 12 SSBNs can carry up to 240 missiles, but 1–2 of these vessels are usually undergoing some form of maintenance at any given time and may not be carrying missiles.

Of the 1895 SLBM warheads, *c.* 970 were deployed on submarines as of Jan. 2026; all the rest were in storage. Under an earlier strategic arms reduction treaty, each D5 was declared as carrying 8 warheads, although the missile was initially flight-tested with 14. Each SLBM is estimated to have an average warhead load of 4–5 warheads under normal circumstances. D5 missiles equipped with the new low-yield W76-2—with 1 or 2 missiles thought to be deployed on each SSBN on patrol in the Atlantic and Pacific oceans—are estimated to carry only 1 or 2 warheads each.

Non-strategic nuclear forces: Of the 200 non-strategic B61-12 bombs, *c.* 100–120 are thought to be deployed at 6–7 airbases in 5–6 North Atlantic Treaty Organization (NATO) member states (Belgium, Germany, Italy, the Netherlands, Türkiye and, possibly, the United Kingdom). As of Jan. 2026, Belgium, Germany, Italy and the Netherlands (as well as Greece and Türkiye on a contingency basis) participate in the so-called nuclear-sharing arrangement where the USA provides nuclear weapons for delivery by the NATO partner's aircraft—although the weapons remain in the custody of the US Air Force. The remaining *c.* 80–100 bombs were in central storage in the USA.

Other issues: Up until 2018, the US government published the number of warheads dismantled each year, but the first administration of President Donald J. Trump ended this practice. The administration of President Joe Biden temporarily restored transparency, but publication of the 2018, 2019 and 2020 data showed that far fewer warheads had been dismantled than assumed (e.g. only 184 in 2020). Nonetheless, dismantlement of the warheads has continued, leaving an estimated 1342 warheads in the dismantlement queue as of Jan. 2026.

In addition to the estimated 5042 intact warheads, nearly 20 000 plutonium pits were stored at the Pantex Plant, Texas, and perhaps 4000 uranium secondaries were stored at the Y-12 facility at Oak Ridge, Tennessee.

Table 8A.3. Russian nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/Russian designation (NATO designation)	No. of launchers	Year first deployed	Range (km)	No. of warheads x yield	Total no. of warheads
Strategic nuclear forces	**592**				**2 606**
Aircraft (bombers)	*60*				*586*
Tu-95MS/M (Bear-H)	45	1984/2015	6 500–10 500	Up to 14 x 200 kt ALCMs, bombs	430
Tu-160M1/M2 (Blackjack)	15	1987/2021	10 500–13 200	Up to 12 x 200 kt ALCMs, bombs	156
Land-based ICBMs	*324*				*1 092*
RS-20V Voevoda (SS-18 Mod 5 Satan)	40	1988	11 000–15 000	1–10 x 500–800 kt	400
Avangard (SS-19 Mod 4)	12	2019	10 000	1 x HGV	12
RS-12M1/2 Topol-M (SS-27 Mod 1/mobile/silo)	68	1997/2006	10 500	1 x 800 kt	68
RS-24 Yars (SS-27 Mod 2/ mobile/silo)	204	2010/2014	10 500	1–3 x 250 kt	612
SLBMs	*208*				*928*
RSM-54 Sineva/Layner (SS-N-23 M2/3)	80	2007/2014	9 000	1–4 x 100 kt	256
RSM-56 Bulava (SS-N-32)	128	2012	>8 050	1–6 x 100 kt	672
Non-strategic nuclear forces					**1 794**
Navy weapons	. .				767
Air force weapons	292				488
Air, coastal and missile defence	822				307
Army weapons	188				232
Total stockpile					**4 400**
Deployed strategic warheads					1 796
Reserve warheads					2 604
Strategic					810
Non-strategic					1 794
Retired warheads awaiting dismantlement					**1 020**
Total inventory					**5 420**

. . = not available or not applicable; ALCM = air-launched cruise missile; HGV = hypersonic glide vehicle; kt = kiloton; ICBM = intercontinental ballistic missile; NATO = North Atlantic Treaty Organization; SLBM = submarine-launched ballistic missile.

Notes: **Strategic nuclear forces**: Of the *c.* 2606 warheads estimated to be assigned to nuclear-capable delivery systems, only *c.* 1796 are estimated to have been deployed on missiles and at airbases, with *c.* 810 estimated to be held in reserve in central storage. It is assumed that the numbers of deployed strategic launchers and warheads are close to the numbers reported under the now-expired 2010 Russian–US Treaty on Measures for the Further Reduction and Limitation of Strategic Offensive Arms (New START).

Because of ongoing bomber modernization and reported losses during 2025, there is considerable uncertainty about how many bombers are operational. The maximum possible payload on the bombers is estimated to be *c.* 650 nuclear weapons but, given that only some of the bombers are fully operational, SIPRI estimates that only *c.* 586 weapons have been assigned to the long-range bomber force. Of these, *c.* 200 might be deployed and stored at the 2 strategic bomber bases. The remaining weapons are thought to be in central storage facilities.

Russia's land-based ICBMs can carry a total of *c.* 1092 warheads, but SIPRI estimates that they have had their warhead load reduced to *c.* 892 warheads, with the remaining warheads in storage.

Russia operates 13 nuclear-powered ballistic missile submarines (SSBNs) that can carry a maximum of 208 missiles. It is assumed that *c.* 2 SSBNs are in complex refit at any given time and therefore not assigned weapons. The warhead load on SLBMs is also thought to have been reduced for Russia to stay below the New START warhead limit. Therefore, it is estimated here that only *c.* 704 of the 928 stockpiled SLBM warheads have been deployed.

Non-strategic nuclear forces: Most Russian delivery systems for non-strategic nuclear weapons are dual capable, meaning that they can also deliver conventional warheads. They are intended for use by ships and submarines, aircraft, air- and missile-defence systems, and in army missiles. According to the Russian government and Western intelligence sources, non-strategic nuclear warheads are not deployed with their delivery systems under normal circumstances but kept in storage facilities. Some storage facilities are near operational bases. It is possible that there are more unreported nuclear-capable non-strategic systems. Despite widespread public claims that Russia is expanding its non-strategic nuclear forces, SIPRI assesses that this has so far not resulted in a significant increase in the number of nuclear warheads assigned to those forces.

Table 8A.4. British nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/ designation	No. of launchers	Year first deployed	Range (km)	No. of warheads x yield	Total no. of warheads
SLBMs	*64*				*120*
Trident II D5	48	1994	>10 000	1–8 x 100 kt	120
Total operationally available warheads					**120**
Other stored warheads					*105*
Total stockpile					**225**

kt = kiloton; SLBM = submarine-launched ballistic missile.

Notes: The United Kingdom operates 4 nuclear-powered ballistic missile submarines (SSBNs) that can carry a maximum of 64 missiles. Of the 4 SSBNs, 1 is in overhaul at any given time, meaning that the total number of SLBMs in service is lower (48)—enough to equip the 3 operational SSBNs. The UK has purchased the right to 58 missiles from a pool shared with the United States Navy.

The Trident II D5 missiles on British SSBNs are identical to the Trident II D5 missiles on US Navy SSBNs, which have demonstrated a range of more than 11 000 kilometres in test flights.

The British warhead is called the Holbrook, a modified version of the USA's W76 warhead, with a potential lower-yield option.

Of the 120 operationally available warheads, *c*. 40 are deployed on the single SSBN that is at sea at any given time, with the remaining warheads assigned to the 2 other deployable SSBNs.

The 'other stored warheads' figure includes retired warheads that have not yet been dismantled. It seems likely that they will be reconstituted to become part of the UK's total stockpile over the coming years.

The British government declared in 2010 that its inventory would not exceed 225 warheads, and that the UK would reduce the number of warheads in its overall nuclear stockpile to no more than 180. Despite these stated intentions, the UK's nuclear stockpile appears to have remained at *c*. 225 warheads. The UK's Integrated Review of Security, Defence, Development and Foreign Policy, published in 2021, introduced a new ceiling of 260 warheads, indicating that the UK intends to increase the number of warheads in its stockpile.

Table 8A.5. French nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/ designation	No. of launchers	Year first deployed	Range (km)	No. of warheads x yield	Total no. of warheads
Land-based aircraft					
Rafale BF3/4	40	2010–11	2 000	ASMPA-R/1 x [<300 kt] TNA	40
Carrier-based aircraft					
Rafale MF3/4	10	2010–11	2 000	ASMPA-R/1 x [<300 kt] TNA	10
SLBMs	*64*				*240*
M51.2	32	2016	>9 000	4–6 x 150 kt TNO	160
M51.3	16	[2026]	>9 500	4–6 x 150 kt TNO-2	[80]
Total stockpile					**290**
Retired warheads awaiting dismantlement					**80**
Total inventory					**370**

[ ] = uncertain SIPRI estimate; kt = kiloton; SLBM = submarine-launched ballistic missile; TNA = *tête nucléaire aéroportée* (air-launched nuclear warhead); TNO = *tête nucléaire océanique* (sea-based nuclear warhead).

Notes: The Rafale B and M aircraft both carry the ASMPA-R (*air–sol moyenne portée–améliorée rénové*) air-launched cruise missile (ALCM), which first entered into service in 2024. Most sources report that the previous version (the ASMPA) had a range of 500 kilometres. It is possible that the new ASMPA-R has a range of about 600 km. The Rafale BF3 and MF3 aircraft continued to be upgraded to the F4 standard in 2025. They will be further upgraded to the F5 standard in the coming years. The 10 warheads assigned to France's carrier-based aircraft are thought to be kept in central storage and are not normally deployed on the ship.

There is uncertainty as to the yield of the TNA warhead. Some non-official sources continue to attribute a yield of 300 kt to the TNA, the same yield as the previous TN 81 warhead carried by the original ASMP missile. However, MBDA, the manufacturer of the ASMPA missile that carries the TNA, has stated that the warhead has a 'medium energy' yield, which is thought to imply less than 300 kt. The TNA also appears to be based on the same design as the TNO, which is believed to have a yield of 150 kt.

France operates 4 nuclear-powered ballistic missile submarines (SSBNs) that can carry a maximum of 64 missiles. Of the 4 SSBNs, 1 is in overhaul at any given time, meaning that the total number of SLBMs in service is lower (48)—enough to equip the 3 operational SSBNs. Two are thought to carry the M51.2 SLBM with the TNO warhead, while another (*Le Vigilant*) is being upgraded to carry the new M51.3 SLBM with the new TNO-2 warhead.

In Feb. 2020 President Emmanuel Macron reaffirmed that the arsenal 'is currently under 300 nuclear weapons'. Since then, the new TNO-2 has replaced the older TN 75, which is being dismantled. In Mar. 2026 Macron announced that France would increase the number of warheads in, but no longer disclose the size of, its stockpile.

Table 8A.6. Chinese nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/Chinese designation (US designation)	No. of launchers	Year first deployed	Range (km)	Total no. of warheads
Aircraft	*20*			*20*
H-6N (B-6N)	20	2020	3 100	20
Land-based missiles	*775*			*509*
DF-5A (CSS-4 Mod 2)	6	1981	12 000	6
DF-5B (CSS-4 Mod 3)	12	2015	13 000	60
DF-5C (CSS-3 Mod 4)	5	[2025]	13 000	5
DF-26 (CSS-18)	300	2016	>3 000	100
DF-31A/AG (CSS-10 Mod 2)	104	2007/2018	11 200	104
DF-31B (silo version) (CSS-10 Mod 3)	320	2023	11 200	150
DF-41 (mobile version) (CSS-20)	28	2020	12 000	84
SLBMs	*72*			*72*
JL-3 (CSS-N-20)	72	2022	>10 000	72
Other stored warheads				[*19*]
Total stockpile	**867**			**620**

[ ] = uncertain SIPRI estimate; SLBM = submarine-launched ballistic missile.

Notes: The yields of China's nuclear warheads are not known, except that older and less accurate missiles were equipped with megaton-yield warheads. Newer long-range missile warheads probably mainly have yields of several hundred kilotons, and a smaller number have multi-megaton warheads. It is possible that some warheads assigned to forces aimed at regional deterrence have even lower yield options.

Most of China's warheads are not thought to be deployed on launchers under normal circumstances but kept in storage facilities. However, intelligence reports from the United States claim that some of China's land-based missiles are in a state of heightened operational readiness during exercises. Moreover, US government officials privately suggest that nuclear-powered ballistic missile submarines (SSBNs) conducting deterrence patrols might be carrying nuclear-armed missiles. Partly based on these assumptions, SIPRI assesses that a small number of China's missiles might be equipped with nuclear warheads (*c.* 34 as of Jan. 2026), but this assessment comes with considerable uncertainty.

Figures are based on estimates of an average of 1 warhead per nuclear-capable launcher, except for the DF-5B and DF-41, which are assessed to have multiple independently targetable re-entry vehicle (MIRV) capability. The DF-5B is thought to carry up to 5 warheads while the DF-41 is thought to carry up to 3 warheads. SIPRI assesses that, as of Jan. 2026, one third of China's DF-26 dual-capable launchers had been assigned a nuclear role. China is introducing a new DF-27 (CSS-24) missile, which has a hypersonic glide vehicle and a range of 5000–8000 kilometres, but it is believed to have been assigned a conventional role.

The number of bombers includes only those estimated to be assigned a nuclear role.

China operates 6 SSBNs that can carry a maximum of 72 SLBMs. SIPRI assesses that, as of Jan. 2026, all 6 were carrying the JL-3 SLBM. China's SSBNs are thought to be conducting near-continuous deterrence patrols. The future Type 096 SSBN will be equipped with the new longer-range JL-4.

SIPRI's estimate of China's total stockpile includes *c.* 19 'other stored warheads' that might have been produced for missiles nearing operational status.

Table 8A.7. Indian nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/ designation	No. of launchers	Year first deployed	Range (km)	Total no. of warheads
Aircraft	*48*			*48*
Jaguar IS	16	1981	1 600	16
Mirage 2000H	32	1985	1 850	32
Land-based missiles	*88*			*104*
Prithvi-II	24	2003	250–350	24
Agni-I	16	2007	>700	16
Agni-II	16	2011	>2 000	16
Agni-III	16	2018	>3 200	16
Agni-IV	8	2022	>3 500	8
Agni-V	8	2023	>5 000	24
Agni-P	. .	[2027]	1 000–2 000	. .
SLBMs	*16*			*12*
K-15 (B-05)	4	2018	700	12
K-4	. .	[2027]	3 500	. .
Other stored warheads				[*26*]
Total stockpile	**152**			**190**

. . = not available or not applicable; [ ] = uncertain SIPRI estimate; SLBM = submarine-launched ballistic missile.

Notes: The yields of India's nuclear warheads are not known. The 1998 nuclear tests demonstrated yields of up to 12 kilotons. Since then, it is possible that boosted warheads have been introduced with a higher yield, perhaps up to 40 kt. There is no open-source evidence that India has developed and fielded two-stage thermonuclear warheads.

As of Jan. 2026, SIPRI assesses that India may have started occasionally deploying a small number of its warheads (*c*. 12) on 1 of its nuclear-powered ballistic missile submarines (SSBNs), but this assessment comes with considerable uncertainty.

Aircraft and several missile types are dual capable—that is, they can be armed with either conventional or nuclear warheads. Figures are based on estimates of an average of 1 warhead per launcher, except the Agni-V intermediate-range ballistic missile (IRBM), which has multiple independently targetable re-entry vehicle (MIRV) capability and is assessed to have up to 3 warheads per launcher.

Two additional land-based missiles are under development: a medium-range ballistic missile (Agni-P) and an intercontinental ballistic missile (Agni-VI).

India has launched 4 SSBNs, although only 3 were assessed to be potentially operational as of Jan. 2026. Of the 4 SSBNs, 2 have 4 missile tubes each, while the other 2 SSBNs have 8 tubes each. The INS *Arihant* SSBN is capable of carrying up to 12 smaller K-15 SLBMs in its 4 tubes. The other 3 submarines are being equipped for the larger and longer-range K-4 SLBM, with 1 missile per launch tube.

SIPRI's estimate of India's total stockpile includes *c*. 26 'other stored warheads' that might have been produced for additional Agni-V IRBMs as well as missiles nearing operational status, including the Agni-P and the K-4.

Table 8A.8. Pakistani nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/ designation	No. of launchers	Year first deployed	Range (km)	Total no. of warheads
Aircraft	*36*			*36*
Mirage III/V	36	1998	2 100	36
Land-based missiles	*126*			*126*
Abdali (Hatf-2)	10	2002	200	10
Ghaznavi (Hatf-3)	16	2004	300	16
Shaheen-I/IA (Hatf-4)	16	2003/2022	750/900	16
Shaheen-II (Hatf-6)	24	2014	2 000	24
Shaheen-III (. .)	–	[2024]	2 750	–
Ghauri (Hatf-5)	24	2003	1 250	24
Nasr (Hatf-9)	24	2013	70	24
Ababeel	–	. .	2 200	–
Babur/-1A GLCM (Hatf-7)	12	2014/[early 2020s]	350/450	12
Babur-2/-1B GLCM	–	. .	900	–
Sea-based missiles				
Babur-3 SLCM	–	[2027]	450	–
Other stored warheads				[*8*]
Total stockpile	**162**			**170**

. . = not available or not applicable; – = nil or a negligible value; [ ] = uncertain SIPRI estimate; GLCM = ground-launched cruise missile; SLCM = sea-launched cruise missile.

Notes: The yields of Pakistan's nuclear warheads are not known. The 1998 nuclear tests demonstrated a yield of up to 12 kilotons. Since then, it is possible that boosted warheads have been introduced with a higher yield. There is no open-source evidence that Pakistan has developed and fielded two-stage thermonuclear warheads. Pakistan does not deploy its warheads on launchers but keeps them in separate storage facilities.

Aircraft and several missile types are dual capable—that is, they can be armed with either conventional or nuclear warheads. Cruise missile launchers can carry more than 1 missile. Figures are based on estimates of an average of 1 warhead per launcher. Some land-based launchers might have 1 or more missile reloads.

SIPRI's estimate of Pakistan's total stockpile includes *c.* 8 'other stored warheads' that might have been produced to arm future Shaheen-III missiles.

Table 8A.9. Operational North Korean forces with potential nuclear capability, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/North Korean designation (US designation)	Year first displayed	Estimated no. of launchers	Description
Short-range ballistic missiles (land based)			
Hwasong-5/-6 (Scud-B/-C)	1984/1990	[50]	Single-stage, liquid-fuelled
Hwasong-11A/B/D (KN23/KN24), (KN25)	2018/2019/ 2022	. .	Solid-fuelled
Medium-range ballistic missiles (land based)			
Hwasong-7 (Nodong/Rodong)	1993	>100	Single-stage, liquid-fuelled
Hwasong-9 (KN04/Scud-ER)	2016	. .	Single-stage, liquid-fuelled Scud extended-range variant
Pukguksong-2 (KN15)	2017	. .	Two-stage, solid-fuelled
Hwasal-1/-2	2021	. .	Land-attack cruise missiles
Intermediate-range ballistic missiles (land based)			
Hwasong-12 (KN17)	2017/2022	. .	Single-stage, liquid-fuelled
Intercontinental ballistic missiles (land based)			
Hwasong-15 (KN22)	2017	. .	Two-stage, liquid-fuelled
Hwasong-17 (KN28)	2020	. .	Two-stage, liquid-fuelled
Hwasong-18	2023	. .	Three-stage, solid-fuelled
Hwasong-19	2024	. .	Three-stage, solid-fuelled
Submarine-launched ballistic missiles			
None thought to be operational, but Pukguksong-1 (KN11) and Pukguksong-3 (KN26) have been flight-tested and other variants are under development			
Total warheads	**60**		

. . = not available or not applicable; [ ] = uncertain SIPRI estimate.

Notes: Information about the status and capability of North Korea's missiles comes with significant uncertainty. There is no publicly available evidence that North Korea has produced an operational nuclear warhead for delivery by an intercontinental ballistic missile. SIPRI estimates that North Korea might have produced enough fissile material to build at least 90 nuclear warheads; however, it is likely that it has assembled fewer warheads, perhaps *c*. 60. Of these, it is likely that nearly all would be lower-yield single-stage fission warheads and only a few would be thermonuclear warheads.

Table 8A.10. Israeli nuclear forces, January 2026

All figures are approximate and some are based on assessments by the authors.

Type/ designation	No. of launchers	Year first deployed	Range (km)	Total no. of warheads
Aircraft	*50*			*30*
F-15	25/25	1998	4 450	. .
F-16I	100/25	1980	1 600	30
Land-based missiles	*50*			*50*
Jericho II/III	50	1990/2011	1 500–4 000	50
Sea-based missiles	*20*			*10*
Popeye Turbo SLCM	20	[2002]	[<1 500]	10
Total stockpile	**120**			**90**

. . = not available or not applicable; [ ] = uncertain SIPRI estimate; SLCM = sea-launched cruise missile.

Notes: Given the unique lack of publicly available information about Israel's nuclear arsenal, the estimates presented here come with a considerable degree of uncertainty.

It is assumed that Israel does not deploy its warheads on launchers but keeps them in separate storage facilities.

Israel has *c.* 125 combat aircraft in its inventory that are potentially nuclear capable (25 F-15s and 100 F-16Is), but SIPRI estimates that only *c.* 50 aircraft (all 25 F-15s and 25 F-16Is) might serve a nuclear strike role. It is not known whether the Israeli Air Force has added nuclear capability to the F-15 aircraft as the United States has done, but a US official has privately described Israel's F-15s as its 'nuclear squadron'.

The Jericho III is gradually replacing the older Jericho II and it is possible that this process might already have been completed. A longer-range version of the Jericho missile with a new solid rocket motor may be under development.

Israel operates 5 potentially nuclear-capable Dolphin-class diesel–electric submarines. SIPRI estimates that these submarines could carry a maximum of 20 missiles that could potentially be nuclear-armed. The submarines have 6 standard 533-millimetre torpedo tubes, but are reportedly equipped with 4 other specially designed 650-mm tubes that could be used to launch larger nuclear-armed SLCMs. Israel's 6th submarine, the INS *Drakon*, appears to be equipped with a vertical-launch system for launching additional missiles, although it remains unclear what those missiles would be and whether they would be nuclear-armed.

Appendix 8B. Global stocks and production of fissile materials, 2025

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INTERNATIONAL PANEL ON FISSILE MATERIALS

Materials that can sustain an explosive fission chain reaction are essential for all types of nuclear explosives, from first-generation fission weapons to advanced thermonuclear weapons. The most common of these fissile materials are highly enriched uranium (HEU) and plutonium. This appendix gives details of military and civilian stocks, as of the beginning of 2025, of HEU (table 8B.1) and separated plutonium (table 8B.2)—including in weapons—and details of the capacity to produce these materials (tables 8B.3 and 8B.4). The information in the tables is based on estimates prepared for the International Panel on Fissile Materials (IPFM). The most recent annual declarations on civilian plutonium and HEU stocks to the International Atomic Energy Agency (IAEA) give data for 31 December 2024 (INFCIRC/549). China stopped reporting under this scheme in 2016.

The production of both HEU and plutonium starts with natural uranium. Natural uranium consists almost entirely of the non-chain-reacting isotope uranium-238 (U-238) and is only about 0.7 per cent uranium-235 (U-235). The concentration of U-235 can be increased through enrichment—typically using gas centrifuges. Uranium that has been enriched to less than 20 per cent U-235 is known as low-enriched uranium (LEU). Most current power reactors use LEU with enrichment of up to 5 per cent in their fuel. High-assay low-enriched uranium (HALEU), defined as having an enrichment range of 5–20 per cent U-235, has been proposed as fuel in some small modular reactor concepts and there is interest in HALEU production. Studies show that HALEU enriched to more than 10 per cent U-235 could be used to make a practical weapon.[1] The IAEA historically has taken the position, however, that uranium should contain at least 20 per cent U-235 to be considered a material that can be directly used in weapons. This approach is also adopted by most international and national regulations governing the physical protection of nuclear materials. To minimize the mass of the nuclear explosive, weapon-grade uranium is usually enriched to over 90 per cent U-235.

Plutonium is produced in nuclear reactors when U-238 in the fuel is exposed to neutrons. The plutonium is subsequently chemically separated from spent fuel in a reprocessing operation. Plutonium comes in a variety

[1] Scott Kemp, R. et al., 'The weapons potential of high-assay low-enriched uranium', *Science*, 6 June 2024; and Lyman, E., 'Declassified cable reinforces proliferation concerns about high-assay low-enriched uranium fuel', *Bulletin of the Atomic Scientists*, 7 Nov. 2025.

of isotopic mixtures, most of which are weapon-usable. Weapon designers prefer to work with a mixture that predominantly consists of plutonium-239 (Pu-239) because of its relatively low rate of spontaneous emission of neutrons and gamma rays and the low level of heat generation from alpha decay. Weapon-grade plutonium usually contains more than 90 per cent Pu-239. The plutonium in typical spent fuel from power reactors (reactor-grade plutonium) contains 50–60 per cent Pu-239 but is weapon-usable, even in a first-generation weapon design.

All states that have a civil nuclear industry (i.e. that operate a nuclear reactor or a uranium-enrichment plant) have some capability to produce fissile materials that could be used for weapons. The categories for fissile materials in tables 8B.1 and 8B.2 reflect the availability of these materials for weapon purposes. Material described as 'Not directly available for weapons' and 'Unsafeguarded' is either material produced outside weapon programmes or weapon-related material that states have pledged not to use in weapons. This material is not placed under international safeguards (e.g. IAEA or Euratom) or under bilateral monitoring. The category 'Safeguarded/monitored' includes material that is subject to such controls. The data presented in tables 8B.1 and 8B.2 accounts only for unirradiated fissile material, a category that corresponds to the IAEA definition of 'unirradiated direct use material'.

Table 8B.1. Global stocks of highly enriched uranium, 2025

All figures are tonnes and are for unirradiated highly enriched uranium (HEU) as of the beginning of 2025. Most of this material is 90–93% enriched uranium-235 (U-235), which is typically considered weapon-grade. Important exceptions are noted. Final totals are rounded to the nearest 5 tonnes.

			Not directly available for weapons		
State	Total stock	In or available for weapons	Unsafeguarded	Safeguarded/ monitored	Production status
China	14	14 ± 3	–[a]	–	Stopped 1987
France[b]	29	25 ± 6	–	3.8	Stopped 1996
India[c]	6	–	6.1 ± 2.4	–	Continuing
Iran[d]	0.3	–	–	0.3	Uncertain
Israel[e]	0.3	0.3	–	–	Unknown
Korea, North[f]	Uncertain	Uncertain	–	–	Uncertain
Pakistan[g]	6	5.5 ± 1.6	–	–	Continuing
Russia[h]	680	672 ± 120	6[i]	–	Continuing[j]
UK[k]	23	22	0.5[l]	–	Stopped 1962
USA[m]	476	361	115	–	Stopped 1992
Other states[n]	>4	–	–	>4	
Total	**1 240**	**1 100**	**130**	**10**	

[a] China receives HEU in fuel for its fast-neutron reactors from Russia. Since it is assumed that this fuel is irradiated soon after the delivery, it is not included here.

[b] A 2014 analysis offers grounds for a significantly lower estimate of France's stockpile of weapon-grade HEU (between 6 ± 2 tonnes and 10 ± 2 tonnes) based on evidence that the Pierrelatte enrichment plant may have had both a much shorter effective period of operation and a smaller capacity to produce weapon-grade HEU than previously assumed.

[c] It is believed that India is producing HEU (enriched to 30–45%) for use as naval reactor fuel. The estimate is for HEU enriched to 30%.

[d] The data for Iran is the estimate by the International Atomic Energy Agency (IAEA) as of 8 Feb. 2025 (274.8 kg HEU enriched up to 60%). The IAEA reported that, as of 17 May 2025, this stockpile was 408.6 kg. As of Mar. 2026, the status of the material was 'unsafeguarded' and the status of production was uncertain.

[e] Israel may have acquired *c.* 300 kg of weapon-grade HEU illicitly from the United States in or before 1965. Some of this material may have been consumed in the process of producing tritium.

[f] North Korea is known to have a uranium-enrichment plant at Yongbyon and possibly others elsewhere. Independent estimates of uranium-enrichment capability and possible HEU production extrapolated to the beginning of 2025 suggest a potential accumulated HEU stockpile in the range 330–1860 kg.

[g] This estimate for Pakistan assumes total HEU production of 5.6 tonnes, of which *c.* 100 kg was used in nuclear weapon tests.

[h] This estimate assumes that the Soviet Union stopped all HEU production in 1988. It may therefore understate the amount of HEU in Russia (see also note j).

[i] This material is believed to be in use in various research facilities, civilian as well as military-related.

[j] The Soviet Union stopped production of HEU for weapons in 1988 but kept producing HEU for civilian and non-weapon military uses. Russia continues this practice. It is assumed that the HEU for naval and other reactors is newly produced material.

[k] The estimate for the United Kingdom reflects a declaration of 21.9 tonnes of military HEU as of 31 Mar. 2002, the average enrichment of which was not given.

[l] As the UK has left the European Union, this material is no longer under Euratom safeguards.

[m] The amount of US HEU is given in actual tonnes, not 93%-enriched equivalent. The material not available for weapons as of the end of 2024 is estimated to include 84.7 tonnes of HEU in naval reserve and 14 tonnes reserved for research reactors. It is also estimated to include 16.1 tonnes of HEU that will be down-blended for low-enriched uranium or high-assay low-enriched uranium.

[n] The IAEA's 2024 annual report lists 158 significant quantities of HEU under comprehensive safeguards in non-nuclear weapon states and 2 significant quantities of HEU under INFCIRC/66-type safeguards agreements in nuclear-armed states. Without knowing the exact enrichment levels, that means these states hold at least 4 tonnes of HEU since, for HEU, a significant quantity is defined as 25 kg of U-235. In INFCIRC/912 (from 2017) more than 20 states committed to reducing civilian HEU stocks and providing regular reports. So far, only 2 states have reported under this scheme. At the end of 2018 (time of last declaration), Norway held less than 4 kg of HEU for civilian purposes. As of 30 June 2019, Australia held 2.7 kg of HEU for civilian purposes.

Sources: International Panel on Fissile Materials (IPFM), *Global Fissile Material Report 2022: Fifty Years of the Nuclear Non-Proliferation Treaty: Nuclear Weapons, Fissile Materials, and Nuclear Energy* (IPFM: Princeton, NJ, 2022). *China*: Zhang, H., *China's Fissile Material Production and Stockpile* (IPFM: Princeton, NJ, 2017). *France*: International Atomic Energy Agency (IAEA), 'Communication received from France concerning its policies regarding the management of plutonium', INFCIRC/549/Add.5/29, 11 Sep. 2025; and Philippe, S. and Glaser, A., 'Nuclear archaeology for gaseous diffusion enrichment plants', *Science & Global Security*, vol. 22, no. 1 (2014). *Iran*: IAEA, Board of Governors, 'Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council resolution 2231 (2015)', Report by the Director General, GOV/2025/8, 26 Feb. 2025; and IAEA, Board of Governors, 'Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council resolution 2231 (2015)', Report by the Director General, GOV/2025/50, 3 Sep. 2025. *Israel*: Myers, H., 'The real source of Israel's first fissile material', *Arms Control Today*, vol. 37, no. 8 (Oct. 2007), p. 56; Gilinsky, V. and Mattson, R. J., 'Revisiting the NUMEC affair', *Bulletin of the Atomic Scientists*, vol. 66, no. 2 (Mar./Apr. 2010); and Gilinsky, V. and Weiss, L., 'The US hypocrisy about Israel's nuclear weapons must stop', *Bulletin of the Atomic Scientists*, 21 Mar. 2025. *North Korea*: Hecker, S. S., Braun, C. and Lawrence, C., 'North Korea's stockpiles of fissile material', *Korea Observer*, vol. 47, no. 4 (winter 2016). *Russia*: Podvig, P. (ed.), *The Use of Highly-Enriched Uranium as Fuel in Russia* (IPFM: Washington, DC, 2017). *UK*: British Ministry of Defence, 'Historical accounting for UK defence highly enriched uranium', Mar. 2006; and IAEA, 'Communication received from the United Kingdom of Great Britain and Northern Ireland concerning its policies regarding the management of plutonium', INFCIRC/549/Add.8/28, 13 Jan. 2026. *USA*: US Department of Energy (DOE), National Nuclear Security Administration, *Highly Enriched Uranium, Striking a Balance: A Historical Report on the United States Highly Enriched Uranium Production, Acquisition, and Utilization Activities from 1945 through September 30, 1996* (DOE: Washington, DC, Jan. 2001); White House, 'Transparency in the US highly enriched uranium inventory', Fact sheet, 31 Mar. 2016; US DOE, 'Department of Energy FY 2024 Congressional Justification: National Nuclear Security Administration', vol. 1, DOE/CF-0192, Mar. 2023, p. 645; and US DOE, *Tritium and Enriched Uranium Management Plan through 2060*, Report to Congress (DOE: Washington, DC, Oct. 2015). *Other states*: IAEA, *IAEA Annual Report 2024: Annex Information* (IAEA: Vienna, 2024), table A4, p. 5; IAEA, 'Communication dated 19 July 2019 received from the Permanent Mission of Norway concerning a joint statement on minimising and eliminating the use of highly enriched uranium in civilian applications', INFCIRC/912/Add.3, 15 Aug. 2019; and IAEA, 'Communication dated 23 January 2020 received from the Permanent Mission of Australia concerning the joint statement on minimising and eliminating the use of highly enriched uranium in civilian applications', INFCIRC/912/Add.4, 5 Mar. 2020.

Table 8B.2. Global stocks of separated plutonium, 2025

All figures are tonnes and are for unirradiated plutonium as of the beginning of 2025. Important exceptions are noted. Final totals are rounded to the nearest 5 tonnes.

State	Total stock	In or available for weapons	Not directly available for weapons[a]		Military production status
			Unsafeguarded	Safeguarded/ monitored	
China	3	2.9 ± 0.6	0.04[b]	–	Stopped in 1991
France	105	6 ± 1.0	–	99.25	Stopped in 1992
India	12	0.73 ± 0.17	11 ± 6[c]	0.4	Continuing
Israel[d]	0.9	0.87 ± 0.1	–	–	Continuing
Japan[e]	44.4	–	–	44.4	–
Korea, North[f]	0.04	0.04	–	–	Continuing
Pakistan[g]	0.62	0.62 ± 0.21	–	–	Continuing
Russia	193	88 ± 8	91.1[h]	15[i]	Stopped in 2010
UK[j]	120	3.2	116.8	–	Stopped in 1995
USA[k]	87.8	38.4	46.4	3[l]	Stopped in 1988
Total	**565**	**140**	**265**	**160**	

[a] The data for France, Japan, Russia, the United Kingdom and the United States is for the end of 2024, reflecting their most recent INFCIRC/549 declaration to the International Atomic Energy Agency (IAEA). Some states with civilian plutonium stocks do not submit an INFCIRC/549 declaration. Of these states, the Netherlands, Spain and Sweden store their plutonium abroad, but the total amounts are too small to be noted in the table. Italy had 1.58 tonnes of plutonium in the UK, which took ownership of the material in 2025.

[b] This figure is based on China's INFCIRC/549 declaration to the IAEA for the end of 2016. As of Mar. 2026, this is the most recent declaration.

[c] India's unsafeguarded civilian material is the plutonium separated from spent power-reactor fuel. While such reactor-grade plutonium can in principle be used in weapons, it is labelled as 'Not directly available for weapons' here since it is intended for breeder reactor fuel. It was not placed under safeguards in the 'India-specific' safeguards agreement signed by the Indian government and the IAEA on 2 Feb. 2009. India does not submit an INFCIRC/549 declaration to the IAEA.

[d] Israel is believed to be operating the Dimona plutonium-production reactor. The estimate assumes partial use of the reactor for tritium production from 1997 onwards. The estimate is for the beginning of 2025. Without tritium production, stockpiles could be as high as 1150 kg.

[e] Of Japan's plutonium stock, 35.8 tonnes are stored abroad in France (14.1 tonnes) and the UK (21.7 tonnes), the remaining 8.6 tonnes are under IAEA safeguards in Japan.

[f] North Korea reportedly declared a plutonium stock of 37 kg in June 2008. It is believed that it subsequently unloaded plutonium from its 5-MW(e) reactor 3 additional times, in 2009, 2016 and 2018. The stockpile estimate has been reduced to account for the 6 North Korean nuclear tests. North Korea's reprocessing facility operated again in 2021 for 5 months.

[g] At the beginning of 2025, Pakistan was operating 4 plutonium-production reactors at its Khushab site. This estimate assumes that Pakistan is separating plutonium from all 4 reactors.

[h] This material includes 66.1 tonnes of separated plutonium declared in Russia's 2024 INFCIRC/549 declaration as civilian. Russia does not make the plutonium it reports as civilian available to IAEA safeguards. This amount also includes 25 tonnes of weapon-origin plutonium stored at the Mayak Fissile Material Storage Facility, which Russia pledged not to use for military purposes. In Oct. 2025 Russia enacted a law that may have renounced this pledge, meaning that the future status of this material is uncertain.

[i] This material is weapon-grade plutonium produced between 1 Jan. 1995 and 15 Apr. 2010, when the last Russian plutonium-production reactor was shut down. It cannot be used for weapon purposes under the terms of a 1997 Russian–US agreement on plutonium-production reactors. The material is currently stored at Zheleznogorsk and is subject to monitoring by US inspectors.

[j] The civilian data is unchanged, reflecting the end of reprocessing in the UK. In addition to the amounts listed, the UK stores 24.1 tonnes of foreign plutonium. Japan owns 21.7 tonnes of this plutonium and, as at the end of 2024, Italy owned 1.58 tonnes. In Feb. 2025 the UK formally took ownership of the Italian plutonium.

[k] In 2012 the USA declared a government-owned plutonium inventory of 95.4 tonnes as of 30 Sep. 2009. In its INFCIRC/549 declaration of stocks as of 31 Dec. 2024, the USA declared 49.4 tonnes of unirradiated plutonium (both separated and in mixed oxide, MOX) as part of the stock identified as excess to military purposes.

[l] The USA has placed *c.* 3 tonnes of its excess plutonium, stored at the K-Area Material Storage Facility at the Savannah River Site, under IAEA safeguards.

Sources: International Panel on Fissile Materials (IPFM), *Global Fissile Material Report 2022: Fifty Years of the Nuclear Non-Proliferatieon Treaty: Nuclear Weapons, Fissile Materials, and Nuclear Energy* (IPFM: Princeton, NJ, 2022). *Civilian stocks (except for India)*: International Atomic Energy Agency (IAEA), 'Communication received from certain member states concerning their policies regarding the management of plutonium', INFCIRC/549, various dates. *China*: Zhang, H., *China's Fissile Material Production and Stockpile* (IPFM: Princeton, NJ, 2017). *Israel*: Glaser, A. and de Troullioud de Lanversin, J., 'Plutonium and tritium production in Israel's Dimona reactor, 1964–2020', *Science & Global Security*, vol. 29, no. 2 (2021). *North Korea*: Kessler, G., 'Message to US preceded nuclear declaration by North Korea', *Washington Post*, 2 July 2008; Hecker, S. S., Braun, C. and Lawrence, C., 'North Korea's stockpiles of fissile material', *Korea Observer*, vol. 47, no. 4 (winter 2016); and IAEA, Board of Governors and General Conference, 'Application of safeguards in the Democratic People's Republic of Korea', Report by the acting Director General, GOV/2019/33-GC(63)/20, 19 Aug. 2019. *Russia*: IPFM, 'Russia withdraws from the Plutonium Management and Disposition Agreement', IPFM Blog, 27 Oct. 2025. *UK*: British Ministry of Defence, 'Plutonium and Aldermaston: An historical account', 2000. *USA*: National Nuclear Security Administration (NNSA), *The United States Plutonium Balance, 1944–2009* (NNSA: Washington, DC, June 2012); and Gunter, A., 'K-Area overview/update', US Department of Energy, Savanah River Site, 28 July 2015.

Table 8B.3. Significant uranium-enrichment facilities and capacity worldwide, 2025

With the exception of 2 facilities (marked *) that continue to use gaseous diffusion to enrich uranium in uranium-235 (U-235), all facilities use gas centrifuge isotope-separation technology.

State	Facility name or location	Type	Status	Capacity (thousands SWU/yr)[a]
Argentina[b]	Pilcaniyeu*	Civilian	Uncertain	20
Brazil[c]	Resende	Civilian	Operational	50–60
China	Lanzhou	Civilian	Operational	4 100–4 600
	Hanzhong (Shaanxi)	Civilian	Operational	2 700
	Emeishan	Civilian	Operational	3 700–4 200
	Heping*	Dual-use	Operational	230
France	Georges Besse II[d]	Civilian	Operational	7 500
Germany	Urenco Gronau[e]	Civilian	Operational	3 600
India	Rattehalli	Military	Operational	17–31
Iran[f]	Natanz	Civilian	Uncertain	48–60
	Qom (Fordow)	Civilian	Uncertain	11–18
Japan	Rokkasho[g]	Civilian	Not operational	75
Korea, North	Yongbyon[h]	Uncertain	Operational	8–16
Netherlands	Urenco Almelo[i]	Civilian	Operational	5 100
Pakistan	Gadwal	Military	Operational	. .
	Kahuta	Military	Operational	30–45
Russia	Angarsk	Civilian	Operational	4 000
	Novouralsk	Civilian	Operational	13 300
	Seversk	Civilian	Operational	3 800
	Zelenogorsk[j]	Civilian	Operational	7 900
UK	Urenco Capenhurst[k]	Civilian	Operational	4 500
USA[l]	Urenco Eunice[m]	Civilian	Operational	4 300
	American Centrifuge Plant[n]	Civilian	Operational	3–4

[a] Separative work units per year (SWU/yr) is a measure of the effort required in an enrichment facility to separate uranium of a given content of U-235 into 2 components, 1 with a higher and 1 with a lower percentage of U-235. Where a range of capacities is shown, the capacity is uncertain. Expansions in capacity (planned or under construction) are noted.

[b] In Dec. 2015 Argentina announced the reopening of its Pilcaniyeu gaseous diffusion uranium-enrichment plant, which was shut down in the 1990s. There is no evidence of actual production.

[c] Brazil signed contracts for expansion in 2023.

[d] Work on an expansion with a capacity of 2 500 tSWU/yr had started as of Mar. 2026.

[e] Work on an expansion had started as of Mar. 2026.

[f] Figures for Iran are for Feb. 2025. After the attacks on Iran's nuclear sites by Israel and the United States in June 2025 and in early 2026, the status of the enrichment facilities is uncertain.

[g] Japan Nuclear Fuel Limited plans a capacity of 450 tSWU/yr by 2028 and had achieved a capacity of 112.5 tSWU/yr in early 2025. According to a company report from 31 Mar. 2026, no enriched uranium has been produced since 2019.

[h] North Korea revealed its Yongbyon enrichment facility in 2010. It appeared to be operational as of 2020. It is believed that North Korea is operating at least 1 other enrichment facility.

[i] Work on an expansion of 750 tSWU/yr started in 2025 and another expansion of similar capacity has been announced.

[j] Zelenogorsk operates a centrifuge cascade for highly enriched uranium (HEU) production of fuel for fast reactors and research reactors.

[k] Plans for an expansion were announced in 2024, including to produce high-assay low-enriched uranium (HALEU).

[l] In Sep. 2025 the US Department of Energy (DOE) awarded a contract for the Domestic Uranium Enrichment Centrifuge Experiment, a pilot plant producing low-enriched uranium for tritium production and HEU for naval reactors. In Jan. 2026 the DOE awarded task orders to 3 companies to provide civilian enrichment services. The number of US enrichment facilities will therefore increase.

[m] Work on an expansion of 700 tSWU/yr started in 2025. In Sep. 2025 Urenco Eunice received a licence to produce HALEU with an enrichment of up to 10%.

[n] The capacity given is for a pilot cascade to produce HALEU, which started operation in 2023.

Sources: Indo-Asian News Service (IANS), 'Argentina president inaugurates enriched uranium plant', *Business Standard* (New Delhi), 1 Dec. 2015; 'Brazil's INB launches new centrifuge cascade', *Nuclear Engineering International*, 25 Nov. 2021; Zhang, H., 'China's uranium enrichment complex', *Science & Global Security*, vol. 23, no. 3 (2015); Zhang, H., *China's Fissile Material Production and Stockpile* (International Panel on Fissile Materials, IPFM: Princeton, NJ, 2017); Zhang, H., 'China started operation of two new enrichment plants in 2023', IPFM Blog, 15 Dec. 2023; Orano, *Annual Activity Report 2024* (Orano: Paris, 2025); Urenco, 'Full year 2025 audited financial results', 12 Mar. 2026; International Atomic Energy Agency (IAEA), Board of Governors, 'Verification and monitoring in the Islamic Republic of Iran in light of United Nations Security Council Resolution 2231 (2015)', Report by the Director General, GOV/2025/8, 26 Feb. 2025; Albright, D. et al., 'Analysis of IAEA Iran Verification and Monitoring Report: February 2024', Institute for Science and International Security, 4 Mar. 2024; Ishii, N., 'JNFL receives uranium feed at enrichment plant for first time in 11 years', Atoms in Japan, 14 Oct. 2025; Japan Nuclear Fuel Limited, 'Operational status at Uranium enrichment plant', 31 Mar. 2026; Hecker, S. S. and Carlin, R. L., 'A closer look at North Korea's enrichment capabilities and what it means', 38 North, 18 Sep. 2024; Urenco, 'Further capacity expansion at Urenco's site in the Netherlands', 20 Oct. 2025; British Government, Department for Energy Security and Net Zero, 'UK first in Europe to invest in next generation of nuclear fuel', Press release, 8 May 2024; IPFM, 'BWXT receives contract to build a pilot enrichment facility', IPFM Blog, 16 Sep. 2025; IPFM, 'US Department of Energy selects companies to expand domestic enrichment capacity', IPFM Blog, 5 Jan. 2026; Urenco, 'Urenco USA expands US enrichment capacity with second new cascade', 10 Sep. 2025; Urenco, 'Urenco USA authorised to produce up to 10% enriched uranium by NRC', 2 Oct. 2025; and US Department of Energy (DOE), *Systems Analysis and Integration, Advanced Fuel Cycle: Cost Basis Report: Module C3: High Assay Low Enriched Uranium (HALEU) Enrichment and Deconversion/Metallization: Nuclear Fuel Cycle and Supply Chain*, INL/RPT-23-74582 (Idaho National Laboratory: Idaho Falls, 2023), p. C3-11. Enrichment capacity data is further based on IAEA, Integrated Nuclear Fuel Cycle Information Systems (iNFCIS); Urenco websites for separate facilities; US DOE, *Tritium and Enriched Uranium Management Plan through 2060*, Report to Congress (DOE: Washington, DC, Oct. 2015); and IPFM, *Global Fissile Material Report 2022: Fifty Years of the Nuclear Non-Proliferation Treaty: Nuclear Weapons, Fissile Materials, and Nuclear Energy* (IPFM: Princeton, NJ, 2022).

Table 8B.4. Significant reprocessing facilities worldwide, 2025

State	Facility name or location	Fuel	Type	Status	Design capacity (tHM/yr)[a]
China[b]	Jiuquan pilot plant	LWR	Civilian	Operational	50
	Jinta Project I	LWR	Uncertain	Construction completed	200
	Jinta Project II	LWR	Uncertain	Construction completed	200
France	La Hague UP2	LWR	Civilian	Operational	1 000
	La Hague UP3	LWR	Civilian	Operational	1 000
India[c]	Kalpakkam	HWR	Dual-use	Operational	100
	Tarapur	HWR	Dual-use	Operational	100
	Tarapur-II	HWR	Dual-use	Operational	100
	Trombay	HWR	Military	Operational	50
Israel	Dimona	HWR	Military	Operational	40–100
Japan	Rokkasho	LWR	Civilian	Start planned for 2027[d]	800
Korea, North	Yongbyon	GCR	Military	Operational	100–150
Pakistan	Chashma	HWR	Military	Starting up	50–100
	Nilore	HWR	Military	Operational	20–40
Russia	Mayak RT-1, Ozersk	LWR	Civilian	Operational	400
	EDC, Zheleznogorsk[e]	LWR	Civilian	Full capacity expected in 2026	220
UK	Sellafield[f]		Civilian	Shut down	
USA	H-canyon, Savannah River Site	LWR	Civilian	Operational	15

GCR = gas-cooled reactor; HWR = heavy water reactor; LWR = light water reactor.

[a] Design capacity refers to the highest amount of spent fuel the plant is designed to process and is measured in tonnes of heavy metal per year (tHM/yr), tHM being a measure of the amount of heavy metal—uranium in these cases—that is in the spent fuel. Actual throughput is often a small fraction of the design capacity. LWR spent fuel contains *c.* 1% plutonium; HWR and GCR fuel contain *c.* 0.4% plutonium.

[b] Near Jinta, Gansu province, China is constructing significant reprocessing facilities. Project I was started in 2015, Project II in about 2020. Construction at both facilities appears to be complete. Operation for Project I was expected to start in 2025, but the current status is uncertain, Project II might start before 2030. Construction activities for a third facility (Project III) seem to have started in the same location.

[c] As part of the 2005 Indian–US Civil Nuclear Cooperation Initiative, India has decided that none of its reprocessing plants will be opened for International Atomic Energy Agency safeguards inspections.

[d] Construction of the facility started in 1993. Since then, the planned start date has been postponed regularly.

[e] Russia opened a 220 tHM/yr reprocessing line in the Pilot Demonstration Centre (EDC) at Zheleznogorsk. A pilot reprocessing line with a capacity of 5 tHM/yr was launched in June 2018.

[f] The United Kingdom operated 2 large civilian reprocessing facilities, THORP and B205 at Sellafield. They were shut down in 2018 and 2022, respectively.

Sources: 'Japan approves 70-year plan to scrap nuclear reprocessing plant', Kyodo News, 13 June 2018; Suzuki, T., 'Japan's never ending reprocessing saga', IPFM Blog, 23 Nov. 2023; Japan Nuclear Fuel Limited, 'Change in schedule for completion of Rokkasho Reprocessing Plant and MOX fabrication plant', 29 Aug. 2024; International Panel on Fissile Materials (IPFM), 'Reprocessing line in Zheleznogorsk begins operations', IPFM Blog, 28 July 2025; Zhang, H., 'China starts construction of a third demonstration reprocessing plant', IPFM Blog, 24 Dec. 2024; and Sellafield Ltd and Nuclear Decommissioning Authority, 'Job done: Sellafield plant safely completes its mission', 19 July 2022. Data on design capacity is based on International Atomic Energy Agency, Integrated Nuclear Fuel Cycle Information Systems (iNFCIS); and IPFM, *Global Fissile Material Report 2022: Fifty Years of the Nuclear Non-Proliferation Treaty: Nuclear Weapons, Fissile Materials, and Nuclear Energy* (IPFM: Princeton, NJ, 2022).