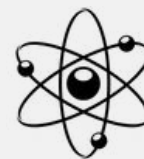




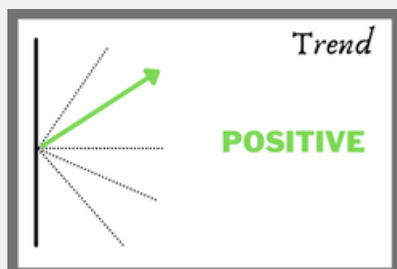
CAPS Nuclear Tracker



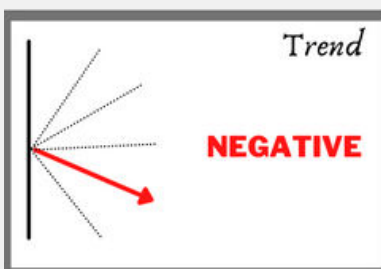
Issue 12: April - June 2024

Half way into 2024, nuclear arms control and disarmament are sections that have fallen off our Nuclear Tracker. Unfortunately, there is nothing to report on both the issues. As we see more and more trends turning negative, it appears that the world is on a slow march to marshy swamplands. The nuclear action-reaction spirals are evident in capability build up, in behaviour, in statements and changing doctrines. There does not appear to be any off ramps on the horizon and nor can one see any visionary leaders who could turn the tide. We still have two more trackers to bring out this year. Do you think the situation would change on any of the fronts by the end of the year? Do send us your sense of the trends over the next six months at capsnetdroff@gmail.com by writing 'Nuclear Tracker - My Trends' in the subject line. NukeNerds at CAPS are eager to hear from you. Select responses will feature in our next two issues.

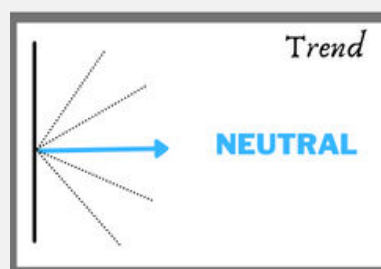
TREND OVERVIEW



- **Nuclear Energy**
Dr Dhruva Tara Singh
Ms Rishika Singh
Ms Ritika Maurya



- **Missile Developments**
Mr Javed Alam
- **Vertical Nuclear Proliferation**
Dr Manpreet Sethi
- **Nuclear Proliferation**
Dr Manpreet Sethi
- **North Korea**
Dr Silky Kaur
- **Iran**
Dr Silky Kaur

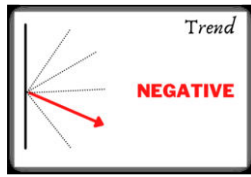


- **Sea-Based Nuclear Developments**
Mr Javed Alam
- **Nuclear Security**
Ms Prachi Lokhande

Missile Developments

Javed Alam

Previous Trend: Negative



North Korea's missile tests in the first six months of 2024 have been a significant development in global security. Following a series of tests, including the [firing](#) of an intermediate-range Hwasong-16B missile into the East Sea on April 2, the country has continued to escalate its missile program. This was the third ballistic missile launch by North Korea this year. On April 22, North Korea further intensified its activities by [firing](#) multiple short-range ballistic missiles towards the East Sea, including a KN-25 with a range of 380 km. On May 30, North Korea [fired](#) around ten short-range ballistic missiles- KN-25 into the East Sea. These tests came after North Korea's failed attempt to launch a second military spy satellite, as the space rocket carrying the satellite exploded during the first-stage flight shortly after liftoff. On June 27, it was [reported](#) that North Korea had tested a multi-warhead missile in the first known launch of a developmental weapon. North Korea's state media said the launch tested the separation and guidance control of individual mobile warheads to ensure the capability of the Multiple Independent Re-entry Vehicles. It said the separated warheads "were guided correctly to the three coordinate targets," and a decoy that separated from the missile was verified by radar.

China [tested](#) its most-awaited air-launched ballistic missile on May 1. The missile—YJ-21/KD-21—was dropped from the H-6K strategic bomber. The missile, which has the tentative designation of KD-21, is not shown igniting its engine. The KD-21 ALBM is likely powered by a solid-propellant rocket engine. The ALBM was first unveiled at AirShow China 2022 in Zhuhai.

In South Asia, **India's** Strategic Forces Command (SFC) and the Defence Research and Development Organisation (DRDO), on April 5, [conducted](#) the successful flight test of the new generation ballistic missile Agni-Prime. It was reported that the test met all the trial objectives, validating its reliable performance, as confirmed by the data captured by a number of range sensors deployed at different locations, including two downrange ships placed at the terminal point. India also, on April 23, successfully [tested](#) its new 250 km strike range air-launched

ballistic missile. The missile, also referred to as ROCKS or Crystal Maze 2, originated from Israel and underwent a test launch.

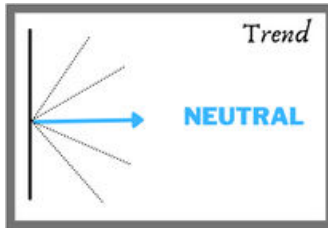
Meanwhile, Russia, while still at war with Ukraine on April 12, successfully [launched](#) “an intercontinental ballistic missile from a road-mobile launcher.” The missile is believed to be a modified Topol-M ICBM, sometimes called Topol-ME, used to test re-entry vehicles of intercontinental ballistic missiles. This appears to be the second test of the missile, following the first one in April 2023.

The US on June 4, [launched](#) an unarmed Minuteman III ICBM equipped with a re-entry vehicle. The launch was conducted by a joint team of Air Force Global Strike Command Airmen supported by Space Force Guardians. A second test of the same Minuteman III ICBM was again [conducted](#) on June 6. On June 18, the US test-[launched](#) an unarmed MK21 A re-entry vehicle board a Minotaur I rocket. The Mk21A RV will be integrated into the nation’s ICBM weapon system. The Mk21A program is currently in early development and overseen by the Air Force Nuclear Weapons Centre. On June 16, it was [reported](#) that the 3d Multi-Domain Task Force (3MDTF) and 1-181 Artillery Regiment of the Tennessee National Guard participated in the Valiant Shield 24 (VS24) Combined Joint Live Fire SINKEX on June 16, 2024, utilising the U.S. Army Autonomous Multi-Domain Launcher (AML) and two Precision Strike Missiles (PrSM). During the SINKEX, the AML was able to engage a moving maritime target in conjunction with other Joint assets. The VS24 SINKEX is the first employment of the AML and the PrSM outside of the U.S and is a significant milestone in the Army’s development of long-range fire capabilities.

Sea-Based Nuclear Development

Javed Alam

Previous Trend: Neutral



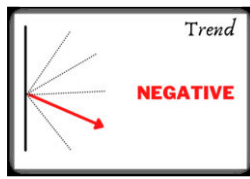
On April 18, it was [reported](#) that the US is in the process of building its first new nuclear warhead in 40 years. The warhead-W93 will be used on submarine-launched ballistic missiles. It is being built with \$19.8 billion requested by the National Nuclear Security Agency, or NNSA, for weapons in fiscal 2025. Modernisation of nuclear forces is the Pentagon's top priority, and the Navy's nuclear-missile submarines are considered the linchpin of U.S. strategic nuclear forces.

On April 23, it was [reported](#) that the Chinese navy released a rare footage of the launch of its JL-2 SLBM, which was displayed for the first time during a Chinese military parade in 2019. The video footage also confirmed that the Shandong carrier strike group includes at least four submarines, including a nuclear one.

Nuclear Proliferation

Manpreet Sethi

Previous Trend: Neutral



After Poland in April 2024, Sweden became the second country to express its readiness to host nuclear weapons in war time. Sweden, which joined NATO in March, is planning to vote on a [Defence Cooperation Agreement](#) (DCA) with the U.S. that would forge a closer security partnership and allow the U.S. to access Swedish military bases and store weapons.

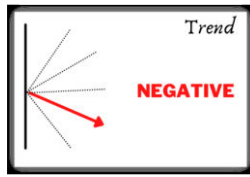
Japan is expected [to contribute US\\$1 billion](#) to a US\$3 billion missile-intercepting system under joint development with the United States. This is meant to counter the reported deployment of highly advanced weapons – including hypersonic missiles – by regional rivals. The US will provide an estimated US\$2 billion for the Glide Phase Interceptor project, according to 2025 budget estimates released by the US Department of Defence in March 2024. Washington and Tokyo aim to achieve full operational capability for the system by the end of 2032. Missiles launched from US Navy warships will be able to intercept hypersonic projectiles during their vulnerable glide phase. This has been referred to as “credible collective deterrence” to fend off a “belligerent China intimidating its neighbours and an unpredictable North Korea test-firing ballistic missiles into waters around Japan.”

On June 11, Russia and its ally Belarus launched a second stage of [drills](#) intended to train their troops in [tactical nuclear weapons](#). While announcing the nuclear manoeuvres, the Russian [Defense Ministry](#) had said they were in response to “provocative statements and threats of certain Western officials regarding the Russian Federation.”

Vertical Nuclear Proliferation

Manpreet Sethi

Previous Trend: Negative

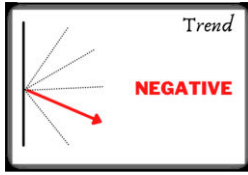


The recently released [SIPRI](#) yearbook 2024 highlights the growth in nuclear arsenals around the world. The nine nuclear-armed states—the United States, Russia, the United Kingdom, France, China, India, Pakistan, the Democratic People’s Republic of Korea (North Korea) and Israel—continued to modernize their nuclear arsenals and several deployed new nuclear-armed or nuclear-capable weapon systems in 2023. Out of the approximately 12,121 warheads in the global inventory as of January 2024, around 9,585 were stored in military depots for potential deployment. A total of 3904 warheads were deployed with missiles and planes, which is an increase of 60 compared to January 2023. The remaining warheads were kept in central storage. Approximately 2100 warheads were maintained in a condition of heightened operational readiness on ballistic missiles. The majority of these warheads were owned by Russia or the USA. However, it is now thought that China has, for the first time, placed some warheads on high operational alert. Russia and the USA collectively own about 90 per cent of the world's nuclear arsenal.

Iran

Silky Kaur

Previous Trend: Negative



On May 9, 2024, Kamal Kharrazi, an adviser to Supreme Leader Ayatollah Ali Khamenei, [declared](#) that Iran has no plans to develop nuclear weapons. However, he warned that if Iran's existence were threatened, a shift in their military doctrine would be inevitable, and any attack on Iran's nuclear facilities by Israel would change their deterrence strategy. These statements have renewed scrutiny over Iran's claim that its nuclear program is for peaceful purposes.

The following day, Iranian politician Ahmad Bakhshayesh Ardestani [suggested](#) that Iran might already possess nuclear weapons, linking recent aggression towards Israel to this capability. He argued that Iran, while maintaining an official stance of a peaceful nuclear program, has likely achieved nuclear weapons to be on par with countries like the US and Israel. This contradicts Iran's long-standing assertion of peaceful nuclear intentions.

On June 14, 2024, the IAEA [reported](#) that Iran had activated new cascades of advanced centrifuges at its Natanz facility, with plans to install more. The United States described these actions as "nuclear escalations." The IAEA confirmed that Iran had begun using three cascades of IR-4 and IR-6 centrifuges to enrich uranium up to 2% purity. However, Iran has already been enriching uranium to 60% purity elsewhere, which is close to weapons-grade levels. This advancement further enhances Iran's nuclear capabilities. The situation remains tense between Iran and Western nations, particularly in the context of the ongoing Israel-Hamas conflict in Gaza.

On June 15, 2024, France, Germany, and Britain jointly [criticized](#) Iran's nuclear program expansion. The trio viewed this as a significant escalation and emphasized Iran's legal obligation under the Non-Proliferation Treaty. In response, on June 17, Iranian Foreign Ministry spokesman Nasser Kanaani [condemned](#) the E3's statement as "absurd and invalid," rejecting their claims and emphasizing the peaceful nature of Iran's nuclear activities. Kanaani criticized the E3's "political and unconstructive" stance, noting the irony of their accusations

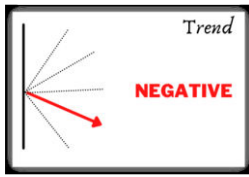
given their role in the current issues with the 2015 Joint Comprehensive Plan of Action (JCPOA). He reaffirmed Iran's commitment to cooperating with the IAEA and pursuing peaceful nuclear development within its international rights and obligations.

On 17 June 2024, IAEA Director General Rafael Grossi [stated](#) that Iran's 2015 nuclear agreement is no longer being followed or applied. This comes after IAEA reported losing track of Iran's nuclear activities and warned that Iran could be close to developing nuclear weapons. The situation raises concerns about the effectiveness of international efforts to monitor and limit Iran's nuclear program.

North Korea

Silky Kaur

Previous Trend: Negative



On April 3, 2024, North Korea [announced](#) it tested a new solid-fueled hypersonic intermediate-range missile (IRBM), the Hwasong-16B. The launch, detected by South Korea and Japan, marks an expansion of North Korea's weapons program. According to state media KCNA, the missile flew about 1,000 km and reached an altitude of 101 km. Kim Jong Un, who oversaw the test, praised the missile as evidence of North Korea's "absolute superiority" in defense technology and vowed to continue enhancing the country's arsenal to counter threats from Japan, South Korea, and the United States.

On April 23, 2024, North Korea [tested](#) a new nuclear command-and-control system by firing projectiles with simulated nuclear warheads from multiple rocket launchers. Leader Kim Jong Un oversaw the drill, which simulated a nuclear counterattack in response to what North Korea described as "provocative" joint air force exercises by the U.S. and South Korea. According to state media KCNA, this was the first test of the "Haekbangashoe" system, which purportedly allows rocket launchers to switch from conventional to nuclear weapons.

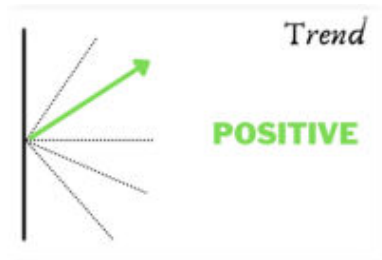
On May 27, 2024, North Korea [denounced](#) China, Japan, and South Korea for their commitment to denuclearize the Korean peninsula, calling their joint declaration after a rare summit in Seoul a "grave political provocation" that infringes on its sovereignty.

On June 20, 2024, Russian President Vladimir Putin [suggested](#) Russia might provide weapons to North Korea, framing it as a potential response to Western support for Ukraine. This statement came after Putin's visit to North Korea, where he signed a defense agreement with leader Kim Jong Un. The deepening Russia-North Korea relationship has raised concerns among Western nations, given North Korea's controversial nuclear and missile programs. On June 22, 2024, the nuclear-powered USS Theodore Roosevelt [arrived](#) in South Korea for a joint exercise with Japan, aimed at countering North Korean threats. This follows heightened tensions after North Korea and Russia signed a significant security pact.

Nuclear Energy

Rishika Singh, Ritika Maurya, Dhruba Tara Singh

Previous Trend: Positive



A renewed global push for nuclear energy is underway as countries look to decarbonize. According to Rafael Grossi, Director General of the International Atomic Energy Agency (IAEA), achieving this goal by 2050 will be “almost impossible” without nuclear power. This sentiment is echoed by new projects around the world, from the United Arab Emirates’ plan to double its nuclear capacity to the development of the first small modular reactor in South Africa.

In Asia, the **United Arab Emirates** [intends](#) to soon initiate a bidding process for the construction of a new nuclear power plant. This plant would result in a doubling of the current number of nuclear reactors in state. In 2021, the UAE became the first Arab nation to commence operations of a nuclear power station, the Barakah facility in Abu Dhabi, which was constructed by South Korea. During a meeting with **Russian** President Vladimir Putin in May, **Uzbek** President Shavkat Mirziyoyev [announced](#) that Russia plans to construct a small nuclear power plant in Uzbekistan. This project will be the first of its kind in post-Soviet Central Asia. President Putin announced that Russia will contribute \$400 million to a joint investment fund totaling \$500 million, which will be used to support projects in Uzbekistan.

In **Africa**, on April 10, 2024, Stratek Global, a nuclear firm based in **South Africa**, signed a cooperation agreement with Koya Capital, a technology consultant, to obtain the necessary funding and oversee the [building](#) of a reactor in South Africa. The project is estimated to cost R9bn (\$480m). The new HTMR-100 reactor, currently under development near Pretoria, would generate 35 MWe. The origins of this technology may be traced back to the South African Pebble Bed Modular Reactor (PBMR) programme. The program’s objective was to construct a compact, high-temperature reactor that utilised graphite-coated spherical uranium oxycarbide tristructural isotropic (TRISO) fuel and helium as a coolant. During the ‘Africa Nuclear Business Platform’ meeting in Accra on May 28, the US Foundational

Infrastructure for the Responsible Use of Small Modular Reactor Technology (FIRST) Programme [announced](#) two important agreements. These agreements aim to promote the deployment of a small modular reactor in **Ghana** and establish the country as a regional hub for SMR technology.

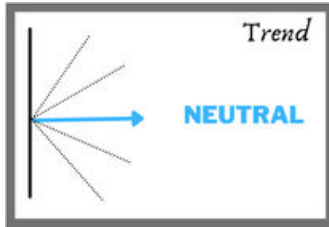
The National Nuclear Energy Public Opinion Survey was [performed](#) in the **United States** between April 30th and May 2nd. The survey comprised a sample of 1000 US adults who were representative of the nation as a whole. The survey was conducted by Bisconti Research Inc. and it indicates that public support for nuclear energy in the USA has reached an unprecedented level. Consistently for four consecutive years, over 75% of the American population expressed a preference for nuclear energy. Michigan Governor Gretchen Whitmer [declared](#) her intention to reopen a nuclear power plant on June 10, 2024, in order to meet the state's decarbonisation objectives. If she succeeds, it would signify the first instance where a nuclear power station is reactivated following its decommissioning.

Nuclearelectrica and Korea Hydro and Nuclear Power (KHNP) recently [conducted](#) a ceremony in **Romania** to commemorate the commencement of construction on Europe's first tritium removal facility, located at the Cernavoda nuclear power station. Norsk Kjernekraft, a company in **Norway**, has [presented](#) a proposal to the Ministry of Energy about the evaluation of building an SMR in Finnmark county. In May, 2024, the Ministry of Climate and Environment in **Poland** has granted [approval](#) to Industria, a Polish industrial firm, for their proposal to build a Rolls-Royce's SMR. This technology involves a 470 MWe design that relies on a small pressurised water reactor. Additionally, the power plant will include a used nuclear fuel storage facility.

Nuclear Security

Prachi Lokhande

Previous Trend- Neutral



The Zaphorizhzhya Nuclear Power Plant (ZNPP) remains under the scrutiny of the IAEA following its takeover by the Russian military in early March 2022. During the previous quarter, the situation at ZNPP had remained highly volatile. Drone strikes were [documented](#) at the site in early April, following which a cold [shutdown](#) for all six reactors was finalised on April 13, 2024. Following this, in May a [new team](#) of experts from the IAEA reached the ZNPP site as part of the IAEA's mission to help prevent a nuclear accident during the armed conflict. Towards the end of [May](#), ZNPP temporarily lost connection to its sole remaining 750 kilovolt (kV) off-site power line due to a reported short circuit, which exacerbated the precarious nuclear safety and security situation at the ZNPP. In his [statement](#) on 21 June on the situation in Ukraine, IAEA DG mentioned that the IAEA team stationed at the site has continued to hear indications of military activity over the past week, including an explosion close to the site on 16 and 17 June. [Recently](#) hosted "Summit on Peace in Ukraine" has highlighted wide international recognition of the crucial role of the International Atomic Energy Agency (IAEA) in preventing a nuclear accident during the conflict in Ukraine, IAEA DG Grossi said in his statement.

The International Conference on Nuclear Security: Shaping the Future ([ICONS 2024](#)) took place from the 20 - 24 May. ICONS provides a global forum for ministers, policymakers, senior officials and nuclear security experts to discuss the future of nuclear security worldwide, whilst providing opportunities for exchanging information, sharing best practices and fostering international cooperation. The IAEA also released the [2024 Factsheet](#) for the [IAEA Incident and Trafficking Database](#) (ITDB), citing 168 incidents reported by 31 States in 2023. A total of 4243 incidents of illegal or unauthorized activities involving nuclear and other radioactive material have been reported since 1993. The Co-Presidents of the conference released a [joint statement](#) in which they committed to sustaining and strengthening "effective and comprehensive nuclear security of all nuclear and other radioactive material and facilities."

More than one hundred statements were delivered by both Member States and international organizations, each reaffirming commitments to upholding the international nuclear security regime. The Ministerial segment also featured a [high-level panel discussion on collaborative approaches to bolstering international nuclear security efforts.](#)

According to the Safeguards Statement and Background for 2023 [published](#) recently, in 2023, the IAEA conducted more than 3,000 in-field verification activities at over 1,300 nuclear facilities and ‘locations outside facilities’ around the world. As a result of this verification effort, the IAEA was able to draw safeguards conclusions for 189 States with [safeguards agreements](#) in force. The Safeguards Statement presents the IAEA’s findings and conclusions for all countries for which the IAEA implemented safeguards during the year.

In Japan, President Biden and Japanese Prime Minister Fumio Kishida welcomed [news](#) of the successful removal of all remaining highly enriched uranium (HEU) from the Japan Atomic Energy Agency (JAEA)’s Japan Materials Testing Reactor Critical Assembly (JMTRC). The announcement also highlighted their continued commitment to minimize the use of HEU in civilian applications and reported progress since President Biden’s state visit to Japan in May 2022.

Romania’s regulatory [infrastructure](#) for nuclear safety and security has been strengthened by a five-year project that was completed in the end of April. Funded by the Norway Grants and supported by the IAEA, the Enhancement of Nuclear Safety, Security and Emergency Preparedness in Romania (NORROM) project stands as a testament to international cooperation to improve nuclear safety and security.

Kenya has [amplified](#) calls for collaboration in southern and eastern Africa in tackling threats associated with nuclear and radioactive material. This came as representatives of eight countries met in Nairobi for an East African symposium to explore ways of improving safety and security during the transportation of such material.

Disclaimer: The views and opinions expressed in this document are those of the authors and do not necessarily reflect the position of the Centre for Air Power Studies [CAPS].



Centre for Air Power Studies (CAPS) was established in 2001 as an autonomous defence research and analysis body for research and focused analyses on issues related to national security, defence, and aerospace issues in the evolving strategic and international security environment. Its objective is to facilitate a greater understanding of these issues amongst the Armed Forces, the strategic community, and the public besides contributing to policy generation and decision-making.

CAPS research faculty comprises senior retired and serving Armed Forces officers from the three services besides academic scholars from national universities and retired members from the diplomatic community. CAPS also conducts nuclear strategy capsules for the Armed Forces and officers of security and technological organisations.

