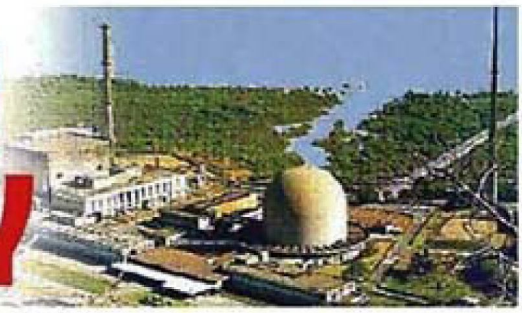
NUCLEAR SECURITY



A FORTNIGHTLY NEWSLETTER ON NUCLEAR DEFENCE, ENERGY AND PROLIFERATION FROM CENTRE FOR AIR POWER STUDIES

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CONTENTS

OPINION – Manpreet Sethi

Why did India Go Nuclear in 1998?

On May 11, 2023, India will mark 25 years as a state with nuclear weapons. The momentous decision to conduct five nuclear tests in 1998 — three on May 11 and two more on May 13 — was taken in complete secrecy. The world woke up to the new reality only when the news was officially announced by PM Atal Bihari Vajpayee to India and the world at large. Why did India choose to exercise the nuclear option in 1998 after having followed a policy of ambivalence for long? Since India had given a hint of its nuclear capability through the conduct of a peaceful nuclear explosion (PNE) in 1974, why did it continue to sit on the fence for 25 years before taking the nuclear plunge? What precipitated the need to test, instead of just keeping the nuclear option open?

The answer to these questions lies in two developments from that time. The first of these was an increasingly nuclearised regional environment, and the second was the progressively constraining non-proliferation instruments that were limiting India's choices. But, before analysing these further, it is necessary to understand that India could take the call to go nuclear only because the programme had been built by visionary nuclear scientists and engineers, and was sustained by political leaders who, irrespective of their personal predilections, were conscious of the realpolitik that drove international relations.

What precipitated the need to test, instead of just keeping the nuclear option open? The answer to these questions lies in two developments from that time. The first of these was an increasingly nuclearised regional environment, and the second was the progressively constraining non-proliferation instruments that were limiting India's choices.

India's nuclear programme had an early start. The Atomic Energy Commission of India was instituted on August 3, 1948, within one year of independence. It was fortuitous that Dr Homi Bhabha, the father of India's nuclear programme, had international exposure to nuclear technology and convinced a scientifically inclined Prime Minister, Jawaharlal Nehru, that the country should invest

in this pioneering technology. Peaceful uses of nuclear energy were the primary motivations in the minds of both of these Indian pioneers. But the fact that the technology and the expertise had the potential to be used to build a strategic capability was not lost on them.

When China conducted its first nuclear test in 1964, it led to a debate within the small strategic community in India on its own response options. Given that China had imposed a crushing defeat on India in 1962, this was only natural, especially since India was also aware of China's nuclear efforts. In August 1961, Nehru had asked Bhabha "to take precautionary measures." Bhabha had then set up a small group to study the high-pressure physics of nuclear explosions in January 1962. The result of the war with China compelled India to consider various modes of deterrence, including hastening efforts to demonstrate the capability to conduct a PNE. It needs to be recalled that the conduct of PNEs was not uncommon in the 1960s-70s. For instance, the US established Project Plowshare in 1957, which it claimed was a cost-effective option for undertaking tasks such as deep geological mining, building big tunnels, flattening mountains, etc. The USSR, too, stated that it had used such explosions for developmental work. In its general conference, even the IAEA discussed PNEs within the rubric of peaceful uses of nuclear technology. So, India was not contemplating anything out of the ordinary. However, it was well aware of the strategic implications of the activity.

Given that China had imposed a crushing defeat on India in 1962, this was only natural, especially since India was also aware of China's nuclear efforts. In August 1961, Nehru had asked Bhabha "to take precautionary measures." Bhabha had then set up a small group to study the high-pressure physics of nuclear explosions in January 1962.

China–Pakistan collusivity influenced PM Shastri's thinking on India's need for nuclear weapons. In December 1965, he asked Bhabha to speed up plans for a PNE. However, tragically, PM Shastri died in January 1966. And, later the same year, Bhabha too died in a plane crash.

Lal Bahadur Shastri, who became PM after Nehru's death in May 1964, was initially reluctant to approve a PNE. He explored other possibilities, such as seeking protection from the UK, asking the UN to offer a security umbrella to non-nuclear states, proposing a treaty on disarmament, and a freeze on the production of nuclear weapons. Of these, the idea that got some traction, mostly because it was a shared interest between the two superpowers who had just emerged from the scary experience of the Cuban missile crisis in 1962, was that of a NPT. Negotiations on this started in 1965 and India was a participant.

Meanwhile, Pakistan mounted another war on India in 1965. As Indian forces pushed Pakistan back and came within striking distance of Lahore, China threatened to broaden the conflict. China–Pakistan collusivity influenced PM Shastri's thinking on India's need for nuclear weapons. In December 1965, he asked Bhabha to speed up plans for a PNE. However, tragically, PM Shastri died in January 1966. And, later the same year, Bhabha too died in a plane crash. With the change in top political and nuclear leadership, the pace of the nuclear programme slackened a bit. While grappling with many domestic issues, PM Indira Gandhi took time to build her conviction on nuclear weapons. In fact, she too sent key officials to the US, UK, and USSR in search of nuclear guarantees. Meanwhile, by 1968, the NPT had clearly emerged as a non-proliferation tool with states divided into two neat categories. NWS were those that had conducted a nuclear test before January 1, 1967. The remaining were to join the treaty as non-nuclear weapon states (NNWS). Thus, China fell within the fold of the NWS while India was left to become a member of the NPT as a NNWS. India rejected the treaty, opting to keep the nuclear option open lest its security environment deteriorate further, which it soon did.

India faced nuclear coercion in 1971, when the US, in support of Pakistan (which had just about then secretly aided its rapprochement with China), sent in the powerful naval task force led by USS Enterprise to the Bay of Bengal. This act, followed by Pakistan's decision to develop nuclear weapons in 1972, made the Indian leadership reconsider its own choices. A go-ahead for a PNE was granted and it was conducted on May 18, 1974. Despite the test, however, India did not move towards weaponisation, even though the action certainly accelerated Pakistan's efforts towards nuclear weapons. Pakistan's indigenous developments were supplemented with designs of centrifuges for uranium enrichment that were stolen by AQ Khan from the Netherlands, along with liberal Chinese help on weapon designs, technology, and fissile material. Not surprisingly, in 1987, Khan bragged in an interview to an Indian journalist that his country was close to nuclearisation.

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Meanwhile, India was still leaning towards strategic restraint and keen to find an answer to its regional nuclear challenges through the idea of universal nuclear disarmament. In 1988, PM Rajiv Gandhi presented a comprehensive Action Plan for Ushering in a Nuclear Weapon Free and Non-violent World Order to the third Special Session on Disarmament at the United Nations. The recommendation was well thought out and expansive enough to include collateral steps across domains of conventional forces and outer space. It recommended measures to be taken in three stages spread over 22 years that would have made the world nuclear-free by 2010. The plan did not evoke a positive response since the superpowers were still steeped in Cold War politics. With the fall of the Berlin Wall in 1989, nuclear non-proliferation became an immediate concern. Consequently, the focus shifted to the perpetuation of the NPT, which was to come up for review and extension in 1995. Washington pressured the NNWS into granting an indefinite and unconditional extension to the treaty. For India, this meant a loss of leverage on their part to push the NWS towards disarmament.

Meanwhile, another instrument that India supported to facilitate nuclear disarmament in this period was the CTBT. But, the treaty emerged with the narrow objective of stopping new countries from developing nuclear weapons even though existing NWS could continue to modernise their arsenals through computer simulations and non-explosive testing. India had strong misgivings about this discriminatory stance, as well as the treaty's entry-into-force provision, which, contrary to customary practice, identified a list of 44 countries to sign the treaty mandatorily. India was one of them. As a result, India blocked the treaty at the Conference on Disarmament, where it was being negotiated. However, the draft text of the CTBT was taken to the UNGA by Australia, where it was adopted by Resolution A/RES/50/245 and opened for signature. Countries had only until October 1999 to sign the CTBT.

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The nuclear stranglehold was tightening around India. By this time, China had already conducted as many as 45 nuclear tests and had developed solid-fuelled, road-mobile, medium-range missiles and the first-generation SSBNs. China had also conducted a nuclear test for Pakistan, and the latter was fomenting insurgencies in J&K and Punjab,

its confidence boosted by its nuclear weapons capability. Caught in a security and non-proliferation bind, India was compelled to develop its own nuclear weapons to establish credible deterrence against nuclear coercion or blackmail by countries that held claims on Indian territories. As explained by Jaswant Singh, India's Minister of External Affairs in 1998, nuclear tests acquired for India "the much-needed strategic space and to break free from the new nuclear paradigm that had come into existence in the nineties". Prestige was a collateral benefit of India's tests. Since the world bestows a certain status on countries that possess nuclear weapons, India, too, became its beneficiary. But prestige was not the primary driver behind India's decision to acquire nuclear weapons. Security was, and still remains the rationale.

Caught in a security and non-proliferation bind, India was compelled to develop its own nuclear weapons to establish credible deterrence against nuclear coercion or blackmail by countries that held claims on Indian territories. As explained by Jaswant Singh, India's Minister of External Affairs in 1998, nuclear tests acquired for India "the much-needed strategic space and to break free from the new nuclear paradigm that had come into existence in the nineties".

Source: https://capsindia.org/wp-content/uploads/2023/01/CAPS_NuClearlyPut_MS_31_01-_23.pdf, 31 January 2023.

OPINION – Gavin Maguire

Europe Needs France to Get its Nuclear Act Together in 2023

A steep drop in France's nuclear power output in 2022 exacerbated Europe's power crisis by forcing French utilities to flip from net power exporters to importers just as Russia's invasion of Ukraine snarled energy markets across the continent. A combination of planned maintenance shutdowns along with unplanned shortages of reactor cooling water forced French nuclear power operators to cut electricity generation by 23% in 2022 from the year before to record lows, data from think tank Ember shows.

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As France historically relies on nuclear for more than 70% of total electricity supplies, this shortfall in reactor output forced French utilities to drastically adjust their power fuel mix by increasing imports and the use of natural gas by nearly 30% to record levels. In turn, France's higher gas consumption tightened regional natural gas markets at the worst possible time, just as other major European gas consumers scrambled for alternatives to Russian pipelined supplies that were being curtailed amid the fallout from Moscow's so-called special operation in Ukraine. Going forward, a sustained recovery in French nuclear output would help cut France's appetite for power and gas imports, and potentially help utilities export surplus power to other European nations that are still struggling with tight and expensive energy markets.

Role Reversal: From 2019 through 2021, France's average annual power exports were roughly 54 Terawatt hours (TWh), or as much as Greece's total electricity generation in 2021, according to data Ember and energy technology firm EnAppSys. In 2022, however, due to reduced nuclear output as well as a drop in hydropower generation because of dry conditions, France slashed power exports to less than 8 TWh, and lifted power imports to a record 26.84 TWh, EnAppSys data shows. France flipped from net power exporter to

net importer in 2022 This flip in French power flows not only tightened Europe's power markets, but also made a major dent in France's trade balance: The nearly 10-billion-euro cost of 2022's power imports surpassed France's total earnings from power exports from the previous three years, EnAppSys data shows.

Higher nuclear output in 2023 could also help France resume its status as a net exporter of power, with an ability to charge the prevailing record high market rates that could help the country recoup some of its expenses from 2022 while alleviating pressure on other power consumers.

Powering Up: So far in 2023, France's nuclear power output remains 17.5% below the average from 2020 and 2021, Refinitiv data shows, due in part to strikes against planned pension reforms for unionised workers. However, utilities have previously stated that nuclear output will climb once maintenance work is completed, although the ailing system may struggle to reach previous annual output levels of around 400 TWh as much-needed repairs and upgrades drag on. Even if average output remains below that previous target, any sustained increase in nuclear production from 2022 totals stands to have an impact on local power prices, as wel006C as France's overall power import needs. For example, in December, some previously curtailed reactors resumed operations and that boosted national nuclear output by 40% from the average of the previous eight months, Refinitiv data shows.

In January, average output was higher still, and even if production rates over the remainder of the year only match the average from the past three years - which includes 2022's record low sum - cumulative output by year end would still be roughly 14% above 2022's total. In turn, because a majority of France's electricity comes from nuclear stations, that potentially higher nuclear output total could help utilities curb generation from other sources, such as natural gas, freeing up those fuels for other users. Higher nuclear output in 2023 could also help France resume its status as a net exporter of power, with an ability to charge the prevailing record high market rates that could help the country recoup some of its expenses from 2022 while alleviating pressure on other power consumers. So, after a tumultuous 2022 that saw power markets upended by Russia's actions in Ukraine, Europe's power consumers may look to France in 2023 in the hopes that the country gets its nuclear shop in order and helps free up surplus power for other users in the months ahead.

Source: https://www.reuters.com/business/energy/europe-needs-france-get-its-nuclear-act-together-2023-maguire-2023-02-01/, 01 February 2023.

OPINION – Scott A. Snyder

How a New U.S.-South Korea Deal can Deter the North Korean Nuclear Threat

North Korean leader Kim Jong-un has threatened to preemptively use nuclear weapons against South Korea and pledged to "exponentially" increase his country's nuclear arsenal, possibilities that have spooked the South Korean public. President Yoon Suk-yeol mentioned in January that South Korea could develop its own nuclear arsenal or request the redeployment of U.S. tactical nuclear weapons to South Korea.

The United States and South Korea should pursue an expanded nuclear agreement that supports the production of civilian nuclear power and enhances extended deterrence against the North Korean threat. In recent months, North Korean leader Kim Jong-un has threatened to preemptively use nuclear weapons against South Korea and pledged to "exponentially" increase his country's nuclear arsenal, possibilities that have spooked the South Korean public. President Yoon Suk-yeol mentioned in January that South Korea could develop its own nuclear arsenal or request the redeployment of U.S. tactical nuclear weapons to South Korea. A more effective way of blunting Pyongyang's

efforts to drive a wedge between Washington and Seoul would be for the Yoon and Joe Biden administrations to commit to expanding on the original bargain that underpins U.S.-South Korean nuclear cooperation. Yoon's comments have roiled the waters around the possibility of South Korea independently developing nuclear weapons capability. Some American and South Korean experts have called on the U.S. government to help South Korea pursue nuclear arms parity with the North, but that has generated strong pushback from American nonproliferation specialists. While the United States and South Korea so far remain officially aligned on nuclear policy, North Korea clearly sees the potential frictions and costs South Korea would generate by pursuing such a path; Pyongyang's long-standing objective is to break the alliance and peel South Korea away from its reliance on U.S. protection.

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North Korea is keenly aware of the potential economic costs South Korea could incur by violating the NPT and obtaining nuclear weapons; doing so would distance South Korea from the international community and risk severely damaging its export-dependent economy. North Korean authorities would most likely conclude that South Korea's economic advantages over the North would be reduced if South Korea were to suffer the kind of debilitating international sanctions the North is experiencing.

The Return of Tactical Nuclear-Weapons: The U.S.-South Korean debate over reintroducing tactical nuclear weapons to the peninsula is equally fraught. The United States stationed tactical nuclear weapons in South Korea from the late 1950s to the end of the Cold War. Now, neither the weapons nor the storage facilities are available for redeployment. American non-proliferation specialists also note that stationing TNWs in South Korea would present North Korea with an additional high-value target and that the United States would maintain full control over its nuclear weapons, rather than "share" them with South Korea, no matter where they were stored or deployed. A recent CSIS report on extended deterrence recommended opening bilateral discussions on redeploying U.S. tactical nuclear weapons despite these obstacles. But to some South Koreans, this prospect may feel like an inadequate half-measure, leaving North Korean strategists with a lever through which they can continue to foment dissension between the United States and South Korea.

The U.S.-South Korea nuclear cooperation agreement, reached in 1974 and revised in 2015, provides a foundation for the countries to increase both peaceful civilian nuclear energy proliferation and nuclear weapons nonproliferation as a means of underscoring the benefits of alliance cooperation in the eyes of the South Korean public.

South Korea relies on nuclear energy for almost 12 percent of its energy consumption needs. Having nearly completed $20 billion in nuclear construction contracts in the United Arab Emirates, the Yoon administration envisions constructing new domestic reactors so nuclear power can fill 30 percent of South Korean energy needs by 2030.

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Both South Korean and U.S. nuclear energy firms stand to reap substantial gains from an expanded bargain, and they could team up to build civilian

nuclear reactors in other regions, which would help those areas diversify energy sources and reduce carbon emissions. Strengthening U.S.-South Korean civilian nuclear cooperation would heighten South Korean awareness of both the tangible commercial benefits of working with the United States and the economic costs of defection from the global non-proliferation regime. This approach would strengthen the foundations of peaceful U.S.-South Korean nuclear cooperation, underscoring the price South Korea would pay if it pursued weapons development instead.

Revising the Barack Obama---–era joint Tailored Deterrence Strategy, which outlined steps to discourage North Korean nuclear weapons use, and regularly holding what are known as "table-top exercises" on how to respond to North Korean tactical nuclear use will be important steps.

At the same time, Washington and Seoul should strengthen coordination on responses to deter or neutralize possible North Korean nuclear weapons use, regardless of whether the target is San Francisco or Seoul. Revising the Barack Obama---–era joint Tailored Deterrence Strategy, which outlined steps to discourage North Korean nuclear weapons use, and regularly holding what are known as "table-top exercises" on how to respond to North Korean tactical nuclear use will be important steps. At their November 2022 Security Consultative Meeting, Washington and Seoul agreed to hold such exercises, which typically involve testing their joint ability to plan for and respond to a simulated attack.

U.S. Secretary of State Antony Blinken has postponed a critical diplomatic visit to Beijing this weekend following the revelation of a Chinese surveillance balloon, carrying equipment roughly the size of three buses, floating over Montana close to sensitive nuclear sites. The Biden administration says it is monitoring the balloon closely, has neutralized any intelligence threat it poses.

This combination of expanded nuclear energy ties and ramped up coordination on how to respond to North Korean nuclear threats offers South Korea and the United States an effective counter to North Korea's provocations. It can demonstrate that the Washington-Seoul alliance is not vulnerable to such nuclear brinkmanship.

Source: https://www.cfr.org/in-brief/how-new-us-south-korea-deal-can-deter-north-korean-nuclear-threat, 03 February 2023.

OPINION – James Palmer

How a Chinese Spy Balloon Blew Up a Key U.S. Diplomatic Trip

U.S. Secretary of State Antony Blinken has postponed a critical diplomatic visit to Beijing this weekend following the revelation of a Chinese surveillance balloon, carrying equipment roughly the size of three buses, floating over Montana close to sensitive nuclear sites. The Biden administration says it is monitoring the balloon closely, has neutralized any intelligence threat it poses, and is considering how to bring it down, since there are concerns it could fall on inhabited areas. High-altitude balloons might seem unimpressive compared with satellite imagery that can already pick out minute details from way up in the heavens. But balloons, as analyst William Kim pointed out last year, have several advantages over satellites. They're cheap, they can last for months, they can loiter in place rather than following the predictable tracks of satellites, and they're surprisingly hard to take down. Previously, all of that was negated by one obvious factor: They were at the mercy of the wind. But new machine-learning techniques now allow balloons to use air currents to steer themselves in set directions, making the technology much more useful.

Why Now? Although balloons are a powerful potential surveillance tool, it's odd that Beijing would do something this provocative just before a

key U.S. diplomatic trip, especially since China has been pushing to repair relations with the United States post-pandemic. China certainly has a strong interest in monitoring U.S. nuclear sites, and Washington has been closely tracking China's own nuclear expansion. But the United States is also full of sensitive military sites of one kind or another, and an off-course balloon would be more likely than not to stray close to one. It's possible that this was a deliberate provocation by some anti-U.S. faction within the Chinese military or security state—perhaps in response to being weakened in the recent Chinese push for better relations with Washington. But it's more likely that this was a simple blunder—that an existing surveillance program got detected or possibly even that the balloon wasn't intended to enter U.S. territory at all.

It's possible that this was a deliberate provocation by some anti-U.S. faction within the Chinese military or security state—perhaps in response to being weakened in the recent Chinese push for better relations with Washington. But it's more likely that this was a simple blunder—that an existing surveillance program got detected or possibly even that the balloon wasn't intended to enter U.S. territory at all.

It's very likely that China has been using this technique for a while and that the United States was aware of it but diplomatically chose not to respond. At a briefing, a U.S. Defense Department spokesperson confirmed that such intrusions have happened before: "It is not the first time that you had a balloon of this nature cross over the continental United States. It has happened a handful of other times over the past few years, to include before this administration." The triggering factor for this incident seems to be that the balloon drifted low enough to be detectable by civilians, meaning that U.S. authorities had to respond.

After all, Washington and its allies have routinely used a range of surveillance techniques for decades to closely observe Chinese territory, from satellite imagery to undersea monitoring. That may already include spy balloons, which the Pentagon has been working on since at least 2020.

How will China Respond? Beijing has said the balloon is a weather balloon that drifted off course, affected by the westerlies, and that it "regrets the unintentional entry" of the balloon into U.S. airspace. It's very unlikely that it will switch positions on that—it's hard for Beijing to admit fault publicly. It's possible that there might be some behind-closed-doors admission or apology. But it's also easy to see how, from a Chinese perspective, the United States might look hypocritical here. After all, Washington and its allies have routinely used a range of surveillance techniques for decades to closely observe Chinese territory, from satellite imagery to undersea monitoring. That may already include spy balloons, which the Pentagon has been working on since at least 2020. U.S. experts have been thinking for years about the potential uses of near-space. Calling off or postponing Blinken's trip at the last moment could strengthen anti-U.S. hard-liners in the Chinese leadership, who will read this as showing that Washington wasn't ever serious about trying to rebuild a working relationship. Even those more sympathetic toward U.S. diplomatic efforts may see this as a sign that Washington is trapped by domestic anti-China politics.

What Happens Next? This is another confirmation that we're in the early days of Cold War 2.0, where mutual surveillance was one of the tensest issues. Take the 1960 U-2 spy plane incident, in which the United States was caught in an embarrassing lie after the Soviets not only shot down a supposedly undetectable plane but captured its pilot alive and had him confess on national television. That came at a relatively amenable stage of U.S.-Soviet relations and scrapped efforts at disarmament talks. In an eerie echo of today, the United States, before the revelation of the pilot's capture, claimed that the plane had been conducting meteorological work

and had accidentally entered Soviet territory. There's no Chinese balloon pilot who can be produced here, but some of the consequences may depend on how the balloon is brought down. Balloons like this are surprisingly tough and often need explosive force to destroy, which could leave its nature usefully ambiguous. If the United States manages to down it and retrieve surveillance equipment that's obviously for military—not meteorological—monitoring, however, things will become more embarrassing for Beijing.

Either way, this is fuel for the strong belief in Congress that China is a major threat to the United States. One U.S. official stated that Blinken's visit was postponed, not cancelled, and that Blinken didn't want the balloon to dominate talks.

Either way, this is fuel for the strong belief in Congress that China is a major threat to the United States. One U.S. official stated that Blinken's visit was postponed, not cancelled, and that Blinken didn't want the balloon to dominate talks. That seems likely: Washington has a keen interest in reading the mood on the ground in China following the tumult of last year's protests and reversals of its zero-COVID policies. But an already cold relationship between the world's two largest powers just got a bit frostier.

Source: https://foreignpolicy.com/2023/02/06/spy-balloon-united-states-china-still-nuclear-weapons/ , 06 February 2023.

OPINION – Connor Murray

There is No Alternative: US-Russian Nuclear Arms Control Must Restart. Now.

The nuclear landscape today is far more complicated than it was during the Cold War. Tensions between the United States and Russia are at highs not seen, perhaps, since the Cuban Missile Crisis. At the same time, China appears to be aggressively increasing its nuclear capabilities, while North Korea conducted far more missile tests in 2022 than in any year since 1984. This environment is all the more reason to champion arms control over a potentially escalatory new arms race.

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The New START is the only remaining arms control treaty between the United States and Russia. It limits the United States and Russia to 1,550 deployed strategic nuclear warheads each and provides a legally binding cap on what could otherwise become a nuclear arms race. New START is set to expire on February 5, 2026, and Russia's ongoing war on Ukraine has cast a shadow on prospects to negotiate a follow-on to this agreement. Retaining New START would be the most desirable outcome, but it would be wise to consider an alternative if no follow-on is agreed to by 2026.

We've done the Hard Work Before: The United States and the Soviet Union took many steps during the Cold War that made the world less safe. Nuclear saber-rattling by both countries enabled the nuclear arms race that culminated in a combined stockpile of over 70,000 nuclear warheads, putting much of the world's population at risk. Even today, the arsenals of the United States and Russia still account for 90 percent of global nuclear warheads, though the numbers now hover at around 4,000 warheads each.

How did we get from the peaks during the Cold War to the current numbers? The answer is simple: Arms control. Arms control is one of those terms that is thrown around by government officials, university professors, and other policy professionals as a semantic blanket for very intense, tiresome work. The work of arms control is often thankless, or at least it is not publicly recognized for its true value because it is hard to see how it makes

everyone safer. And yet, even the leaders of the United States and the Soviet Union—despite their global competition for much of the second half of the 20th century—understood the importance of arms control.

A Quick Look Back: As early as 1963, political leadership in the West and in the Soviet Union knew that an unbridled arms race was unsustainable. As a result, they signed the Limited Test Ban Treaty, also known as the Partial Test Ban Treaty, prohibiting explosive nuclear testing in the atmosphere, outer space, and under water. This treaty set the groundwork for a series of arms control treaties with the next one, almost 10 years later, going even further by addressing strategic nuclear weapons. Landmark agreements—such as the SALT I and the ABM Treaty, both in 1972—set a precedent for diplomatic dialogue and created the basis for the enduring arms control framework embodied in New START. If the United States and the Soviet Union were able to agree to limits on their nuclear arsenals during the peak of the Cold War, the United States and Russia can do the same today.

Where We Stand: Not only is there currently no process to negotiate a follow-on treaty to New START, but key components of the existing treaty are not functioning as they should. New START provides for 18 on-site inspections annually to allow experts from the United States and Russia to verify compliance with the treaty. The United States and Russia suspended these inspections at the onset of the COVID-19 pandemic, and Russia has continued "temporarily" suspending them following its invasion of Ukraine. There is no indication that either party is willing to resume them in the near future. The United States and Russia have also not met under the bilateral consultative commission (BCC)—a forum to discuss compliance with and implementation of New START—since 2021 after Moscow "unilaterally postponed" a commission meeting planned for late 2022. Yet, as I argued elsewhere, the postponement of BCC talks goes against Russia's own interests as the state of its economy, its military losses, and international isolation following its war in Ukraine leave the country ill-equipped to engage in a potential new arms race. On January 31, the US State Department confirmed in its annual New START implementation report to Congress that Russia is not in compliance with the verification provisions of the treaty. As John Erath, senior policy director at the Center for Arms Control and Non-Proliferation, correctly pointed out, however, Russia's noncompliance to New START "does not [necessarily] mean that they are building vast numbers of nuclear weapons secretly."

Prospects: Russia and the United States are unlikely to agree on a formal follow-on treaty to New START anytime soon. The geopolitical reality of the war in Ukraine, and the procedural barriers to passing any arms control treaty through the US Senate do not pave a realistic path to any formal nuclear arms control treaty. Still, there are prospects for continued arms control dialogue that can limit the size of the world's largest nuclear arsenals. There is no need for a formal treaty to keep New START's limits in place or even to further reduce existing nuclear arsenals. There is, however, a requirement for political will and the intense, tiresome work that went into previous arms control agreements. There is no doubt that willing officials in both the United States and Russia are up for this challenge, and they deserve our full support. For its part, the Kremlin should see, particularly given the financial cost of its war on Ukraine, that Russia is not in a position to keep pace in a new arms race with the United States and, potentially, China. These financial realities may provide an opening to dialogue. Realistically, a political agreement (rather than a formal treaty) to maintain existing New START limits is the most achievable outcome by the time the treaty expires in 2026. The priority, therefore, should be to *re-start* and expand ongoing efforts of nuclear arms control.

Where to Focus: Because they possess the world's two largest nuclear arsenals, the United States and Russia have a responsibility to lead by example by continuing to limit and reduce theirs. However, other nuclear-armed countries also have a responsibility to be honest participants in the arms control conversation so the entire world can move away from the ever-present threat of nuclear

weapons. In that context, multilateral communication in existing organizations and fora is crucial. This includes, for example, the review conferences of the NPT and meetings of the IAEA. While not all countries, including the United States, are parties to all existing agreements on arms control, such fora serve as important opportunities for dialogue and regular work on arms control. Russian thinly veiled nuclear threats in Ukraine demonstrate both the urgent need for arms control and the folly and unsustainability of relying on nuclear weapons for world security. Arms control will never be easy work, but the alternative of potentially unlimited nuclear arsenals is unacceptable.

Because they possess the world's two largest nuclear arsenals, the United States and Russia have a responsibility to lead by example by continuing to limit and reduce theirs. However, other nuclear-armed countries also have a responsibility to be honest participants in the arms control conversation so the entire world can move away from the ever-present threat of nuclear weapons.

Source: https://thebulletin.org/2023/02/there-is-no-alternative-us-russian-nuclear-arms-control-must-restart-now/, 06 February 2023.

OPINION – Tala Taslimi

Iran Diplomatic Strategy Hits Wall as Ukraine, Israel Derail Plans

The Iran nuclear deal, still considered by many as the key to avoiding a further escalation of tensions in the Middle East and preventing a nuclear arms race in the Persian Gulf, hangs in the balance. U.S. President Biden's efforts to revive the 2015 deal, after former U.S. President Donald Trump decided to scrap it and impose sanctions on Iran three years later, have stalled. During Biden's two years in office, there have been multiple occasions when an agreement seemed within reach. But each time the talks were about to cross the finish line, new factors disrupted progress, including the Russian invasion of Ukraine and strong opposition from Israel.

The Wall Street Journal reported that Israel carried out the strike to contain Tehran's nuclear and military ambitions. If Israel was behind the attack, this creates a new headache for Tehran. Until now, Iran had benefited from the gap between Israel, which has been steadfast in opposing any deal with Iran, and the U.S., which, under Biden, has sought to bring stability to the Middle East by reviving the Iran nuclear deal so it can focus its attention on China.

The latest wrench in the works was a drone attack over the weekend on an Iranian military plant in the city of Isfahan. *The Wall Street Journal* reported that Israel carried out the strike to contain Tehran's nuclear and military ambitions. If Israel was behind the attack, this creates a new headache for Tehran. Until now, Iran had benefited from the gap between Israel, which has been steadfast in opposing any deal with Iran, and the U.S., which, under Biden, has sought to bring stability to the Middle East by reviving the Iran nuclear deal so it can focus its attention on China.

Israel's refusal to assist Ukraine directly in its war with Russia has not helped. Israel has been cautious not to burn its bridges with Russia, which provides air defense systems to Syria. Moscow has turned a blind eye to Israel's repeated strikes at Iranian targets inside Syria, which may change if Israel were to assist Ukraine. But news of Iran providing drones to Russia, which have been effective on the battlefield in Ukraine, has altered the dynamics. Now both Israel and the U.S. have a common goal of thwarting Tehran's ability to help Russia. The WSJ quoted an expert, who described the Isfahan attack as a "smart trifecta," where Israel can hurt Iran, help Ukraine and not risk its strategic interests in Syria by directly confronting Russia.

Looking back, the first turning point in the nuclear talks came last February, when Iran was expecting a deal. Overnight, the Russian invasion of Ukraine

changed the priorities of European countries, who were the main mediators between Tehran and Washington. The second was in September, when talks in Vienna nearly concluded in success. Most parties had agreed on the basics, but Iran made a last-minute attempt to change some of the criteria that were agreed in hopes of extracting more concessions. ...

European countries expressed support for the protesters and pressed Tehran to respect its citizens' rights. Both the Iranians and Europeans summoned each other's senior diplomats in a reciprocal show of irritation. Yet just when it seemed the relations between Iran and Europe could not get worse, another factor changed the equation further: Ukrainian President Volodymyr Zelenskyy accused Iran of selling drones to Russia's invading troops. Iran has repeatedly rejected the accusations, challenging Zelenskyy to offer proof. ... Still, any possibility of Iran selling arms to Russia under the current circumstances is something the Europeans cannot ignore.

... The European Union has imposed new sanctions against Iran but so far has not designated the IRGC as a terrorist group. Amirabdollahian said in a speech that he believes the best way forward for Iran and the EU is to refrain from issuing any harsh statements that could have consequences for both sides. But Ali Vaez, director of the Iran Project at the International Crisis Group based in Washington, said Iran needs fundamental changes to both its foreign and domestic policies

Source: https://asia.nikkei.com/Politics/International-relations/Iran-diplomatic-strategy-hits-wall-as-Ukraine-Israel-derail-plans34, 31 January 2023.

NUCLEAR STRATEGY

CHINA

China to Triple Nuclear Warheads to 900 by 2035 Amid Taiwan Tensions

China is mulling tripling its stockpile of nuclear warheads to 900 by 2035, as tensions with the United States are expected to increase further over Taiwan, Kyodo News reported citing a source close to the matter on 11 February. The blueprint, prepared by the PLA, has been approved by Chinese President Xi Jinping, head of the military, who has been eager to strengthen Beijing's deterrence against Washington, the report said citing Chinese sources.

China is mulling tripling its stockpile of nuclear warheads to 900 by 2035, as tensions with the United States are expected to increase further over Taiwan, Kyodo News reported citing a source close to the matter on 11 February. The blueprint, prepared by the PLA, has been approved by Chinese President Xi Jinping, head of the military, who has been eager to strengthen Beijing's deterrence against Washington.

As the Chinese Communist Party has been strengthening the country's military capabilities, the United States in 2022 said that Beijing is on its way to increasing its stockpile of nuclear warheads to 1,500 by 2035 when it aims to complete the modernization of its military. Some foreign affairs experts have claimed that China could abandon its "no first use" if it achieves the goal of modernizing its military, as per the Kyodo News report.

The nuclear warheads held by China is likely to increase to 550 in 2027, which is the 100th anniversary of the foundation of the country's armed forces and to 900 in 2035.

In November, the Chinese military's top body spoke about the importance of lethal capabilities, analyzing that Russia's strong nuclear deterrence has stopped a head-on contest between NATO and Moscow despite its offensive against Ukraine, Kyodo News reported citing sources. The nuclear warheads held by China is likely to increase to 550 in 2027, which is the 100th anniversary of the foundation of the country's armed forces and to 900 in 2035, the sources said as per the news report. ...

Source: https://www.ndtv.com/world-news/china-plans-to-triple-nuclear-warheads-to-900-by-2035-report-3776806, 13 February 2023.

NORTH KOREA

North Korea Shows Off Large Number of Nuclear Missiles at Nighttime Parade

Nuclear-armed North Korea showcased its missile production muscle during a night-time parade, state media reported, displaying more ICBMs than ever before and hinting at a new solid-fuel weapon. North Korea held the widely anticipated night-time military parade in Pyongyang to mark the 75th anniversary of the founding of its army, state news agency KCNA said. Leader Kim Jong Un attended with his daughter, who is seen as playing a possible future leadership role in the hereditary dictatorship. The ICBMs showed North Korea's "greatest" nuclear strike capability, KCNA said, adding that the parade also featured tactical nuclear units. Imagery released by state media showed as many as 11 Hwasong-17s, North Korea's largest ICBMs, which are suspected to have the range to strike nearly anywhere in the world with a nuclear warhead.

North Korea held the widely anticipated night-time military parade in Pyongyang to mark the 75th anniversary of the founding of its army, state news agency KCNA said. Leader Kim Jong Un attended with his daughter, who is seen as playing a possible future leadership role in the hereditary dictatorship.

New Missiles: The country has forged ahead with its ballistic missile programme, launching larger and more advanced missiles despite United Nations Security Council resolutions and sanctions ... The Hwasong-17s were followed by what some analysts said could be a prototype or mock-up of a new solid-fuel ICBM in canister launchers. The canisterised ICBMs appeared different than those shown in a 2017 parade, Panda said. Most of the country's largest ballistic missiles use liquid fuel, which requires them to be loaded with propellant at their launch site - a time-consuming process. Developing a solid-fuel ICBM has long been seen as a key goal for the country, as it could make its nuclear missiles harder to spot and destroy during a conflict. It is unclear how close the suspected new missile could be to testing. North Korea has sometimes displayed mockups at the parades.

Source: https://www.ndtv.com/world-news/north-korea-shows-off-large-number-of-nuclear-missiles-at-nighttime-parade-3766427, 09 February 2023.

RUSSIA

Russian Warships Are Sailing With 'Tactical Nuclear Missiles' for the 1st Time Since End of Cold War: Norwegian Intelligence

The Russian Northern Fleet's warships started to sail with tactical nuclear weapons on board for the first time in 30 years, according to a report issued on February 13 by the Norwegian Intelligence Service. The document claims that during the Soviet era, the Northern Fleet's warships frequently deployed tactical nuclear weapons at sea, but no such incidents have been reported since the end of the Cold War. The significance of nuclear weapons for Russia has reportedly expanded dramatically since the start of Moscow's special operation in Ukraine, the intelligence report added.

Norwegian intelligence noted that the submarines and surface ships of the Northern Fleet are equipped with "a central part of the nuclear capability." Furthermore, the assessment added that tactical nuclear weapons represent a grave threat in several operational scenarios in which NATO countries may be involved.

In its assessment, Norwegian intelligence noted that the submarines and surface ships of the Northern Fleet are equipped with "a central part of the nuclear capability." Furthermore, the assessment added that tactical nuclear weapons represent a grave threat in several operational scenarios in which NATO countries may be involved. In 2022, a report

to the US Congress on Russia's nuclear doctrine and weapons modernization confirmed the development of several new short-range delivery systems capable of carrying tactical nuclear warheads.

Source: https://eurasiantimes. com/russian-warships-are-sailing-with-tactical-nuclear-missiles/, 15 February 2023.

SOUTH KOREA

US Defense Chief Pledges Increased Deployment of Strategic Assets to Korea

South Korea and the US pledged to consult closely on the timely and coordinated deployment of US strategic weapons on the Korean Peninsula in response to advancements in North Korea's nuclear and missile capabilities. In particular, the US announced plans for additional deployment of F-22s and other advanced fighter aircraft on the peninsula, along with an aircraft carrier strike group. In a joint press conference held after South Korea-US defense chief talks at the Ministry of National Defense complex in Seoul that day, South Korean Minister of National Defense Lee Jong-sup and US Secretary of Defense Lloyd Austin stressed their aim of increasing extended deterrence implementation capabilities.

South Korea and the US pledged to consult closely on the timely and coordinated deployment of US strategic weapons on the Korean Peninsula in response to advancements in North Korea's nuclear and missile capabilities. In particular, the US announced plans for additional deployment of F-22s and other advanced fighter aircraft on the peninsula, along with an aircraft carrier strike group.

Under the concept of extended deterrence, the US provides deterrence against any actual or threatened nuclear attack or threat against an ally, which is regarded as equivalent to an attack against its own territory. ... In the past, South Korea has asked the US to send more strategic weapons more frequently when crises have escalated on the Korean Peninsula. It is seen as unusual for a senior US official on security policies to publicly make statements along these lines. Austin's remarks are being interpreted as a warning message to North Korea, while also responding to scepticism that has been raised in the South over the US commitment to extended deterrence.

In terms of measures to reinforce extended deterrence implementation capabilities, Lee said these would be pursued in three different areas: information sharing, joint planning and execution, and consultation mechanisms. This signals that the two sides intend to bolster the role and content of their existing bilateral consultation. In the area of information sharing, South Korea and the US plan to expand the scope of information shared in connection with the North Korean nuclear threat. In the area of joint execution, they plan to revise their tailored deterrence strategy (TDS) ahead of their Security Consultative Meeting this fall.

In the area of joint execution, they plan to revise their tailored deterrence strategy (TDS) ahead of their Security Consultative Meeting this fall. The TDS is a joint South Korea-US deterrence strategy that is optimized to suit the situation on the Korean Peninsula in consideration of the nature of North Korea's leadership and the threats posed by North Korean nuclear weapons and other weapons of mass destruction.

The TDS is a joint South Korea-US deterrence strategy that is optimized to suit the situation on the Korean Peninsula in consideration of the nature of North Korea's leadership and the threats posed by North Korean nuclear weapons and other weapons of mass destruction. Also, in the area of joint execution, the two sides announced plans to conduct a Deterrence Strategy Committee table-top exercise (DSC TTX) this month. The two ministers further agreed to expand and reinforce the scope and level of joint military exercises and training. In addition, the two defense chiefs discussed plans for increasing trilateral security cooperation with Japan, including Defense

Trilateral Talks (DTT) in the near future to promote real-time sharing of North Korea missile warning information as agreed upon by the three sides' leaders last November.... Meeting with Austin the same day at his presidential office in Seoul's Yongsan neighborhood, South Korean President Yoon Suk-yeol stressed the importance of "realistic" joint exercises between South Korea and the US.

Source: https://www. hani.co.kr/arti/ english_edition/e_ national/1077895.html, 01 February 2023.

USA

AUKUS: Biden Urged to Fast-Track Research into Submarines Using Non-Weapons Grade Uranium

The Biden administration is being urged to fast-track research into submarines that do not use weapons-grade uranium, as four Democratic politicians warn the Aukus deal with Australia makes the task "even more pressing".

The Biden administration is being urged to fast-track research into submarines that do not use weapons-grade uranium, as four Democratic politicians warn the Aukus deal with Australia makes the task "even more pressing". Australia's deputy prime minister, Richard Marles, arrived in the United States for crucial talks with the defense secretary, Lloyd Austin, (US time), amid renewed congressional concerns about aspects of the flagship Aukus project. With March looming as the deadline for key decisions on how Australia acquires at least eight nuclear-powered submarines with help from the US and the UK, all three countries maintain the work remains on track. But in the latest sign of congressional jitters, four politicians from Biden's party have sounded the alarm about broader risks to the global nuclear non-proliferation system.

Biden had authorised funding of $20m to the NNSA for nuclear fuels development. But in a letter to the administrator of the NNSA and the navy secretary, the politicians formally requested a detailed report on "the feasibility and performance impact of a Virginia-Class replacement SSN(X) nuclear-powered attack submarine" that is fuelled by a LEU reactor with a life-of-the-ship core.

A newly published letter coordinated by Bill Foster, a physicist serving as US representative for an Illinois congressional district, asks the Biden administration to ramp up research into alternatives to using weapons-grade uranium to power submarines. It adds to concerns already raised by experts that if the Australian submarines are powered by HEU, other countries may seek to follow the precedent – even though they will not be armed with nuclear weapons. ... They noted Biden had authorised funding of $20m to the NNSA for nuclear fuels development. But in a letter to the administrator of the NNSA and the navy secretary, the politicians formally requested a detailed report on "the feasibility and performance impact of a Virginia-Class replacement SSN(X) nuclear-powered attack submarine" that is fuelled by a LEU reactor with a life-of-the-ship core. They said previous reports indicated it "may be feasible for the navy to use LEU fuel for naval nuclear propulsion, as France and China already do". "A leading technical challenge is that a greater volume of LEU fuel is required to produce the same amount of energy as HEU fuel," the letter said. "The Naval Reactors office has suggested this would not pose a problem for existing aircraft carriers, which have sufficient space for a larger LEU reactor core. However, submarines face more severe space constraints, raising a question that we request you address in a report to Congress." The politicians said this research was "even more pressing with the September 2021 Aukus agreement under which the US and UK will provide nuclear submarine technology to Australia". "Minimizing the global presence of HEU by reducing its use in military applications would reduce the risks associated with making and transporting HEU and demonstrate significant leadership on

nonproliferation," the letter said.

The Australian government has said it will comply with the highest non-proliferation standards and pledged to work with the IAEA. The NPT does not ban non-nuclear weapon countries like Australia from having nuclear-powered ships. ... With concerns that the first Australian-built nuclear-powered submarines may not be ready until about 2040 there has been speculation that Australia could seek to buy the first couple of boats from offshore.

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Austin promised in December that the US would not allow Australia to have a capability gap between the retirement of its existing Collins class conventional fleet and the entry into service of new nuclear-powered submarines. That has prompted a vigorous debate within US politics about how to help Australia in the short to medium term without undermining its own submarine needs. ...

Source: https://www.theguardian.com/australia-news/2023/feb/03/aukus-biden-urged-to-fast-track-research-into-submarines-using-non-weapons-grade-uranium, 03 February 2023.

BALLISTIC MISSILE DEFENSE

CHINA

China has More Ballistic Missile Launchers than US, Military Tells Congress

The United States military has informed the Congress that China has more land-based fixed and mobile ICBM launchers than the US, according to a report in *Wall Street Journal*. The message has come in the form of a letter General Anthony Cotton, commander of US Strategic Command, which oversees the US nuclear arsenal, sent to the Congress on January 26. The letter has, however, said that China does not have more ICBMs or nuclear warheads than the US. The letter comes at a time when a debate is happening among security experts and politicians in the US about the response to the Chinese balloon that appeared over Montana, where a part of its military's ICBM is deployed. After the letter was received, Republican leaders of Congress' Armed Services committees issued a joint statement in which it called the document "a wake-up call for the United States" ....

ICBMs are an important part of the US military arsenal. According to US Defence Department, they are distributed across 400 "hardened, underground silos" with another 50 silos "kept in 'warm' status". The US military also has more than a dozen submarines that are capable of launching ballistic missiles, the *CNN* report further said. It further said that the US has more than 5,000 nuclear warheads, while China recently surpassed 400.

Beijing has been constantly making efforts to modernise its military and increase its nuclear capabilities. China's progress has caught the eye of US military leaders who have warned the government. ICBMs are an important part of the US military arsenal. According to US Defence Department, they are distributed across 400 "hardened, underground silos" with another 50 silos "kept in 'warm' status". The US military also has more than a dozen submarines that are capable of launching ballistic missiles, the *CNN* report further said. It further said that the US has more than 5,000 nuclear warheads, while China recently surpassed 400.

Source: https://www.ndtv.com/world-news/china-has-more-ballistic-missile-launchers-than-us-military-tells-congress-3763945, 08 February 2023.

RUSSIA

Russian Military Destroys NASAMS Air Defense Systems for the 1st Time in Ukraine

On February 3, the Russian Ministry of Defense (RuMoD) claimed that its military finally managed to destroy the US-supplied NASAMS air defense system months after the Ukrainian military first deployed it. Even though these claims remain unverified, they were extensively reported by the local Russian media. "A Tochka-U tactical missile launcher and a NASAMS anti-aircraft missile system manufactured by Norway were destroyed in the settlement of Krasnoarmeysk in the Donetsk People's Republic," RIA Novosti reported citing the Russian MoD. Russian missile strikes against Ukraine have intensified in recent weeks as Ukraine continues to secure more lethal aid from NATO countries. A fresh barrage of missiles ripped through the city of Kramatorsk in Ukraine's eastern district, hitting the residential buildings and sending civilians running for cover ….

US Defense Secretary Lloyd Austin stated that the NASAMS had a 100% kill rate in Ukraine and was efficiently thwarting Russian attacks. The US has so far delivered two of the eight batteries of NASAMS that were pledged to Ukraine last year.

The Ukrainian troops have deployed the National Advanced Surface to Air Missile Systems (NASAMS) with cutting-edge precision. The Norway-manufactured system, delivered to Ukraine in November last year, has been effectively taking down Russian cruise missiles and kamikaze drones. Besides the two batteries delivered by Washington, Kyiv is also hopeful of securing this state-of-the-art air defense system from other NATO countries. Last month, Canadian Prime Minister Justin Trudeau said that Canada would purchase a US-manufactured National Advanced Surface-to-Air Missile System (NASAMS) for Ukraine. The Kremlin lambasted the decision, which accused Ottawa of funneling money to fuel the Ukrainian war. However, adding to the woes of the Russian troops, Ukraine is also geared to receive an even more lethal PAC-3 Patriot missile defense system which will also protect its cities from Russian ballistic missiles.

Further, the Russian claims of destroying the NASAMS come weeks after Raytheon Technologies CEO Greg Hayes said last month that US officials were in talks with NATO and Middle Eastern allies to send NASAMS interceptors from their respective inventories to Ukraine. … Making a case for second-hand NASAMS to be delivered to Ukraine, Hayes said that redirecting these air defense systems from third countries to Kyiv would be faster than building them. However, for any transfer of the air defense systems from a third country to Ukraine to materialize, it must be approved by the Biden administration.

NASAMS Bolstered Ukrainian Defense: US Defense Secretary Lloyd Austin stated that the NASAMS had a 100% kill rate in Ukraine and was efficiently thwarting Russian attacks. The US has so far delivered two of the eight batteries of NASAMS that were pledged to Ukraine last year. The system, developed by the Kongsberg Defense of Norway and Raytheon of the US, is the first short to medium-range ground-based air defense system. As a result of its deadly precision, even the US deploys NASAMs to guard the delicate airspace surrounding the White House and US Capitol in Washington. This system sports some advanced features like a net-centric design, numerous simultaneous engagements, beyond visual range (BVR) capabilities, and is tightly integrated and tailored to a country's integrated air and missile defense system (IAMD).

The NASAMS is a point defense system designed to thwart attacks on high-value targets from drones, helicopters, cruise missiles, and aircraft. For this, it uses AIM-120 AMRAAM air-to-air missiles, which have been modified for ground launch and have an engagement range of about 30 kilometers. Ukraine has likely received the NASAMS-2 variant, which has a Link-16 data link and may be cued toward the

target by an airborne surveillance asset like the E-3 Sentry AWACS, which monitors Ukraine's airspace. As previously noted by *EurAsian Times*, this significantly distinguishes NASAMS from most air defense systems currently being used by Ukrainian forces that cannot leverage the E-3 capability. Additionally, NASAMS can also be mounted on HIMARS, which the US has explored as part of its 'common launcher' concept. Ukraine already operates HIMARS, which has become its most formidable weapon against Moscow. If the Russian claims about the NASAMS being destroyed in Ukraine are true, it might be a major setback for the war-torn nation, which only has two of these systems and is currently facing an unrelenting onslaught of Russian missiles.

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Source: https://eurasiantimes. com/first-kill-russian-military-destroys-nasams-air-defense-systems/, 03 February 2023.

SOUTH KOREA

South Korea Planning Ballistic Missile Test Launch

South Korea announced plans to test-launch a ballistic missile on 3rd February to bolster its deterrence against growing nuclear and missile threats from the North. The state-run Agency for Defense Development will launch the Hyunmoo-5 from the Anheung test site in Taean, 150 kilometers (93 miles) southwest of Seoul, *Yonhap News Agency* revealed, citing sources. Seoul released the missile's first video during Armed Forces Day in October, claiming it could carry the world's heaviest warhead. The missile is said to be able to carry a warhead of up to nine tons at a speed of up to Mach 10. A senior analyst at the Australian Strategic Policy Institute Malcolm Davis told *South China Morning Post* that the missile could strike as far as 3,000 kilometers (1,864 miles) away if armed with a lighter warhead. Ryu Yongwook from the Lee Kuan Yew School of Public Policy at the National University of Singapore estimated the missile's range to be 300-800 kilometers (186-497 miles), in the short to medium-range category ….

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Intended Roles: The missile could destroy an underground target 100 meters (328 feet) deep, *The Dong-a Ilbo* wrote, adding that it enables Seoul to take out a North's nuclear missile site in the event of conflict. The missile is one of the three axes of the South's deterrence strategy against the North, including kill chain pre-emptive strike and the air and missile defense system, according to *Yonhap*. The missile is part of the South's "Massive Punishment and Retaliation" plan to incapacitate the North's leadership should war erupt.

Source: https://www.thedefensepost.com/2023/02/03/south-korea-missile-test/, 03 February 2023.

NUCLEAR ENERGY

BELGIUM

Belgium Considers Extended Use of Older Reactors

The Belgian government has asked Engie to investigate whether the operation of the country's three oldest reactors - Doel units 1 and 2 and

Tihange 1 - can be extended until 2027. The reactors are currently scheduled to shut down in 2025. By making the reactors produce less electricity during the summer months the government hopes that their operation can be extended in order to ensure energy supply security through the winters of 2025-2026 and 2026-2027. ... The government has requested Engie carry out a safety assessment of the proposed "micro-extensions" of the three units and submit a report to the country's Federal Agency for Nuclear Control on its findings by mid-March.

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Prime Minister Croo and Energy Minister Straeten will lead negotiations with operator Electrabel, the Belgian subsidiary of France's Engie. The government is expected to decide on the extensions "by the end of March", an energy ministry spokeswoman was cited as saying by *Montel*. Doel 1 and 2 and both 445 MWe (net) pressurised water reactors (PWRs) that began operating in 1974 and 1975, respectively. They are currently scheduled to shut down in February 2025 and December 2025. Tihange 1 is a 962 MWe (net) PWR, which began supply power in 1975, and is set to close in October 2025. Belgium's nuclear plants account for almost half of the country's electricity production. The country's federal law of 31 January 2003 requires the phase-out of all nuclear electricity generation in the country. Under the current arrangement, most of Belgium's nuclear generation capacity will be phased out by 2025.

There are technical, financial and civil nuclear liability issues that both sides have to resolve. India has announced plans to construct six 1,650 MW nuclear power plants at Jaitapur in Ratnagiri which could become the nation's largest nuclear power site once completed with a 9,900 MW capacity.

Under a plan announced by Belgium's coalition government in December 2021, Doel 3 was shut down in September last year and Tihange 2 was shut down at the end of last month. The newer Doel 4 and Tihange 3 would be shut down by 2025, together with Doel units 1 and 2, which had their operating licences extended in 2014. However, on 10 January this year, Engie and the Belgian federal government signed an agreement with a view to restarting the Doel 4 and Tihange 3 nuclear power reactors in 2026 and operating them for a further ten years.

Source: https://www.world-nuclear-news.org/Articles/Belgium-considers-extended-use-of-older-reactors, 07 February 2023.

INDIA

Govt. Trying to Resolve Issues with France on Jaitapur Nuclear Reactors

The Indian government informed Parliament that it was earnestly trying to sort out with France the issues pertaining to the construction of 1650 MW nuclear power reactors in Jaitapur in Maharashtra. "Much of the conflict of views on the two sides happened because of geopolitical reasons. We are, very earnestly, trying to sort it out and we are moving forward," Minister of State for Atomic Energy Jitendra Singh said in the Rajya Sabha during the Question Hour. ... There are technical, financial and civil nuclear liability issues that both sides have to resolve. India has announced plans to construct six 1,650 MW nuclear power plants at Jaitapur in Ratnagiri which could become the nation's largest nuclear power site once completed with a 9,900 MW capacity. ... In 2017, the cabinet had approved setting up of power reactors in four states with an outlay of Rs 1.05 lakh crore. Two power reactors each will come up in Karnataka, Haryana, Madhya Pradesh and Rajasthan. These projects will be implemented in a phased manner by 2031.

Highlighting the steps taken to boost the atomic power generation in the country, the minister said the government took out-of-the-box and path-breaking decisions which resulted in increase in

the country's total atomic energy generation from 35,333 million units to 47,112 million units at present. He said the government has kept aside a budget of Rs 3,000 crore exclusively for atomic energy generation for the next 10 years. The target is to increase the generation capacity three times by 2024-25 ... The minister further said the government has for the first time permitted joint venture with public sector undertakings in the area of atomic energy generation, a move that will help in addressing the financial constraints. "We are making good progress in two such JVs," he said, adding that the JVs have been signed with NTPC and Indian Oil Corporation (IOC).

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Source: https://www.business-standard.com/article/current-affairs/govt-trying-to-resolve-issues-with-france-on-jaitapur-nuclear-reactors-123020900892_1.html, 09 February 2023.

Azad Engineering is India's First Supplier of Parts for Nuclear Turbines

Azad Engineering Private Limited, a Hyderabad based market leader in precision engineering, has been approved as the first Indian company to supply critical rotating parts for nuclear turbines. The company has delivered its first set of critical parts. These will now be assembled on nuclear turbines manufactured in Belfort, France. Azad Engineering has signed a long-term supply agreement with GE Steam Power for supply of nuclear turbine parts. This, the company says, opens up a very big supply opportunity.

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The world is rapidly moving towards generating energy from green and zero-emission clean energy sources. At present, nuclear power is the one of the most cost-effective, clean zero-carbonised electricity sources. It is one of the best alternatives available to coal-based power plants. Azad Engineering, an end-to-end solution provider, says it expects to deepen its relationship as a preferred partner and continue to enjoy the flagship position with a new facility coming up over the next 18-24 months.

Source: https://www.ajaishukla.com/2023/02/azad-engineering-is-indias-first.html, 03 February 2023.

NTPC to have 2,000 MW of Nuclear Power by 2032

State-run NTPC Limited, India's largest energy generator, will construct several nuclear power facilities to help the nation reach its goal of having net-zero emissions by 2070. According to its first plan, the power giant will begin producing nuclear energy at a rate of 2,000 MW by 2032, 4,200 MW by 2035, and ultimately 20,000 MW by 2050, senior NTPC executives told Moneycontrol.

In addition to expanding nuclear capacity using PHWR, NTPC also intends to do so using small modular reactors. To guarantee the supply of the necessary feedstock, it also plans to collaborate with Uranium Corporation of India Ltd. on fuel projects. "So far, two nuclear power stations with a combined 4,200 MW of capacity have been completed. In Chutka, Madhya Pradesh, a 1,400 MW project with two units of 700 MW each will be built. The second one, near Mahi Banswara in Rajasthan, will have a capacity of 2,800 MW (4x700 MW). The two plants will use PHWR, which is nearly indigenous, and their electricity tariff will

amount to about Rs 7.36 per unit, according to a senior official who asked to remain anonymous. The IAEA estimates that the capacity of nuclear power worldwide must increase from 413 GW in 2022 to 812 GW by 2050. It went on to say that by the 2030s, yearly nuclear power capacity expansions must exceed 27 GW.

It also: "Condemns Russia's illegal occupation of Ukraine's Zaporizhzhia nuclear power plant and, in order to mitigate the risk of a nuclear or radiological incident, supports the proposal to set up a nuclear safety and security protection zone around it, as proposed by the IAEA.

Source: https://www.constructionworld.in/energy-infrastructure/power-and-renewable-energy/ntpc-to-have-2-000-mw-of-nuclear-power-by-2032/39227, 15 February 2023.

RUSSIA

European Parliament Calls for Russia Sanctions to Include Nuclear

The European Parliament has urged EU leaders to extend the sanctions introduced as a result of the war with Ukraine to include nuclear energy. The resolution "calls for the list of individuals and entities targeted by the sanctions to be expanded to include Russian companies still present on EU markets, such as Lukoil and Rosatom ... reiterates its call for an immediate and full embargo on imports of fossil fuels and uranium from Russia, and for the Nord Stream 1 and 2 pipelines to be completely abandoned". It also: "Condemns Russia's illegal occupation of Ukraine's Zaporizhzhia nuclear power plant and, in order to mitigate the risk of a nuclear or radiological incident, supports the proposal to set up a nuclear safety and security protection zone around it, as proposed by the IAEA." The motion, backed by 489 votes to 36, with 49 abstentions, was designed to provide parliamentarians' expectations ahead of the summit of Ukraine and EU leaders. In addition to expanding the sanctions it also calls for further military assistance to Ukraine and steps towards the country joining the union. Ukraine, whose largest nuclear power plant, Zaporizhzhia, has been under Russian military control since early March 2022, has been calling for the sanctions to include the nuclear energy sector.

The Ministry of Energy said that earlier Energy Minister Herman Halushchenko and his UK counterpart Grant Shapps had "discussed the importance of consolidating joint efforts in the international arena for the introduction of sanctions against the Russian nuclear industry". EU sanctions have to be approved unanimously by its member countries, and Hungary's Prime Minister Viktor Orban has said that his country will veto any plan by the 27-member union for sanctions which affect nuclear energy. Hungary has plans for two new Russian reactors at its existing Paks nuclear power plant, which gets its nuclear fuel from Russia. ...

Materials with better resilience to the extreme conditions in fusion energy power plants are to be developed in a new partnership between the UK Atomic Energy Authority (UKAEA) and the University of Birmingham. UKAEA will also sponsor a Chair in Fusion Materials at the University.

Source: https://www.world-nuclear-news.org/Articles/European-Parliament-calls-for-Russia-sanctions-to, 03 February 2023.

UK

Partnership for UK Fusion Materials Development

Materials with better resilience to the extreme conditions in fusion energy power plants are to be developed in a new partnership between the UK Atomic Energy Authority (UKAEA) and the University of Birmingham. UKAEA will also sponsor a Chair in Fusion Materials at the University. UKAEA is developing a fusion power plant design with plans to build a prototype known as STEP (Spherical Tokamak for Energy Production) at West Burton in Nottinghamshire, which is due to begin operating by 2040. The project is to be delivered by the newly-created UK Industrial Fusion Solutions Ltd. "In order to make fusion commercially viable, new materials will need to be designed, developed and modelled," UKAEA said. "These materials will need to withstand the

highly energetic neutrons released by the fusion reactions."

UKAEA and the University of Birmingham have now announced a partnership under which they will focus initially on carrying out irradiation studies on materials, developing new metal alloys that are more radiation tolerant, and additive manufacturing of materials that can withstand ultra-high temperatures. The partnership will also work to develop a pipeline of skilled fusion engineers for this growing sector. A Master of Research (MRes) degree in Materials for Fusion Energy has been established. It is expected this will attract collaborations from a wider range of industrial partners who will be able to sponsor students and work in partnership with them on research projects. The partnership with UKAEA follows the University of Birmingham's recent commissioning of its High Flux Accelerator-Driven Neutron facility. Added to the existing MC40 Cyclotron facility, this installation makes University of Birmingham an ideal place at which to study damage sustained by materials in fusion machines.

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Source: https://www.world-nuclear-news.org/Articles/Partnership-for-UK-fusion-materials-development, 09 February 2023.

NUCLEAR COOPERATION

MYANMAR–RUSSIA

Myanmar, Russia Sign Pact on Developing Nuclear Power

Myanmar's military-led government, working with Russia's state atomic energy company, has inaugurated a nuclear power information centre as a step toward developing atomic power to fill energy shortages in the strife-torn Southeast Asian nation. Myanmar state media reported on February 7 that the head of the military government, Senior Gen. Min Aung Hlaing, met with Alexey Evgenievich Likhachev, director general of the Russian State Atomic Energy Corp., or Rosatom. Officials from the two sides met at the newly opened Nuclear Technology Information Centre in Myanmar's largest city, Yangon. ...

The two sides signed memorandums of understanding in Moscow in July on nuclear energy, training and promotion of public understanding of atomic power. ... The development is likely to ignite concerns that Myanmar's military would like to develop a nuclear weapons capability. There were suspicions a decade ago that North Korea was supplying nuclear arms technology to Myanmar, but there was no definitive evidence. ... The United States and other nations have imposed political and economic sanctions against the ruling generals, while Russia supplies the military with arms, including fighter aircraft that are sometimes used against civilians. Russia has been promoting cooperation on nuclear power with several Southeast Asian nations including Vietnam, Indonesia and the Philippines.

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Source: https://www.thehindu.com/news/international/myanmar-russia-sign-pact-on-developing-nuclear-power/article66484101.ece, 08 February 2023.

SOUTH KOREA–TURKEY

South Korea's KEPCO Submits Bid to Build Nuclear Plant in Türkiye

A South Korean energy giant has conveyed its preliminary proposal to Ankara for constructing a major nuclear power plant in Türkiye, media reports

said. KEPCO presented the proposal regarding the construction of four reactors capable of providing 1,400 MW of electricity in the northern province of Sinop, South Korea-based Yonhap news agency said, citing the company. Türkiye has already said it plans to build the nation's second nuclear power plant in Sinop. Deputy Energy and Natural Resources Minister Alparslan Bayraktar last November said Türkiye had started negotiations with Russia's state-owned atomic energy agency Rosatom for the plant .... Bayraktar had disclosed that Türkiye was also in talks with South Korean and U.S. companies for nuclear energy development. Official negotiations were also held with the Chinese government for the third power plant. Talks for the plant in Sinop first began with Japan before they switched to Rosatom, which is already building Türkiye's first nuclear power plant, Akkuyu, on the Mediterranean coast.

A South Korean energy giant has conveyed its preliminary proposal to Ankara for constructing a major nuclear power plant in Türkiye, media reports said. KEPCO presented the proposal regarding the construction of four reactors capable of providing 1,400 MW of electricity in the northern province of Sinop, South Korea-based Yonhap news agency said, citing the company.

The scheduled completion of the first unit and nuclear fuel delivery is set for the first half of 2023. The remaining three reactors are due to start operation by the end of 2026, at a rate of one per year to have a total installed capacity of 4,800 megawatts ultimately. KEPCO's proposal came on the sidelines of its chief Cheong Seung-il's trip to Ankara this week, where he held talks with Türkiye's Energy and Natural Resources Minister Fatih Dönmez. Yonhap reported that the project is forecast to be worth about 40 trillion won ($32.55 billion). It said the Turkish government asked KEPCO to submit a proposal in December last year. The company reportedly said the proposal includes South Korea's plan to carry out the project and information on its nuclear power plant construction capabilities. ... It said KEPCO and the Turkish government are promoting the construction of four next-generation Korean nuclear power reactors (APR1400).

The scale of the project is expected to exceed that of the three nuclear reactors at the Barakah Nuclear Power Plant in the UAE, South Korean business magazine *Business Korea* suggested. The Barakah project marked KEPCO's first overseas export of nuclear reactors after a deal signed in 2009. A total of 10 APR1400 reactors are running stably at home and abroad, proving their technological prowess and safety, Cheong was cited as saying by Business Korea. "Among nuclear power plant builders worldwide, KEPCO is currently the only operator that has gained customer trust by meeting budgets and deadlines," he stressed. South Korea is said to have set a target of exporting 10 nuclear power reactors by 2030.

Source: https://www.dailysabah.com/business/energy/south-koreas-kepco-submits-bid-to-build-nuclear-plant-in-turkiye, 01 February 2023.

SMALL MODULAR REACTORS

BRAZIL

Brazilian Parliamentary Group to Promote New Nuclear

Federal Deputy Julio Lopes has launched the Joint Parliamentary Front for Nuclear Technology and Activities, as the industry took a high profile at the *Welcome Energia 23* event in Brasilia, including discussions about SMRs and a fourth Angra unit. ... He said the goal was for work on Angra 3 to be completed swiftly and steps taken towards a fourth unit.

Federal Deputy Julio Lopes has launched the Joint Parliamentary Front for Nuclear Technology and Activities, as the industry took a high profile at the *Welcome Energia 23* event in Brasilia, including discussions about SMRs and a fourth Angra unit. ... He said the goal was for work on Angra 3 to be completed swiftly and steps taken towards a fourth unit. After a separate meeting with executive leaders at Nuclep, INB, ABDAN and ENBPar, he added: "I can say that the

expectations are great and we have great plans for the nuclear sector for the coming years." Lopes also pointed to the use of nuclear technology in other fields, such as medicines, and food, and said he hoped for the development of SMRs, which were important in terms of creating jobs and in playing a key role in decarbonisation. ...

Federal Deputy Lopes also gave more detail on the parliamentary group, in an interview with *Petronoticias,* in which he said its goals included to "promote the development and application of nuclear technology and activities in Brazil, defending the common interests of the companies that are part of the nuclear-based production chains and promote actions to strengthen the business environment and the conditions of systemic, sectoral and regulatory competitiveness in the market internally and at the international level".

Industria is state-owned, part of Industrial Development Agency JSC (IDA), and has selected the Rolls-Royce SMR for the Central Hydrogen Cluster, with plans to produce 50,000 tonnes of low-carbon hydrogen each year. There could be "up to three" SMRs as part of the scheme to decarbonise the regional energy infrastructure.

Brazil currently has two reactors - Angra 1 and Angra 2 - which generate about 3% of the country's electricity. Work on the Angra 3 project - to feature a Siemens/KWU 1405 MW pressurised water reactor - began in 1984 but was suspended two years later, before construction began. The scheme was resurrected in 2006, with first concrete in 2010. But, amid a corruption probe into government contracts, construction of the unit was halted for a second time in 2015, at the time it was 65% complete. Since the project's revitalisation, Eletronuclear's aim has been to start operations by the end of 2026. Brazil began a process to identify sites for new nuclear power plants last year.

Source: https://www.world-nuclear-news.org/Articles/Brazilian-parliamentary-group-pushing-for-new-nucl, 09 February 2023.

POLAND

Poland's Industria Selects Rolls-Royce SMR for Green Energy Plans

Industria is state-owned, part of Industrial Development Agency JSC (IDA), and has selected the Rolls-Royce SMR for the Central Hydrogen Cluster, with plans to produce 50,000 tonnes of low-carbon hydrogen each year. There could be "up to three" SMRs as part of the scheme to decarbonise the regional energy infrastructure. Rolls-Royce SMR said there may also be "opportunities to replace more than 8GW of coal-fired power plants in southern Poland with SMRs throughout the 2030s". ... The Industrial Development Agency wants to support projects to transform energy intensive industry, which will be able to benefit from both renewables and nuclear energy, which will be available in Poland in the next decade or faster."... Central Hydrogen Cluster and the hydrogen valleys' (Lower Silesia, Silesia-Lesser Poland and Subcarpathian) aim is to secure clean energy sources for grid, industry and clean hydrogen production. Plans for deployment of Rolls-Royce SMR power plants in central and southern Poland will help meet these goals in the 2030s." The Rolls-Royce SMR is a 470 MWe design based on a small pressurised water reactor, with the company hoping to get the first one online in the UK by the end of the decade.

Poland is in the process of a large-scale switch towards nuclear energy as part of its decarbonisation plans. Its government last year selected Westinghouse's AP1000 for the first part of the country's six-reactor plan to build up to 9 GWe capacity by 2040 and South Korean's Korea Hydro & Nuclear Power has agreed a separate plan for a nuclear power plant in Patnow with Polish companies ZE PAK and Polska Grupa Energetyczna.

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with Polish companies ZE PAK and Polska Grupa Energetyczna. There are also various initiatives to bring SMRs to Poland, at various stages of progress. PKN Orlen said it was preparing to announce locations for up to 79 GE Hitachi Nuclear Energy BWRX-300 SMRs. EDF last month signed an agreement with Respect Energy about developing nuclear power projects based on the Nuward SMR technology. In July 2022, copper and silver producer KGHM Polska Miedz SA submitted an application to Poland's National Atomic Energy Agency for assessment of NuScale's VOYGR SMR power plant. KGHM says its aim is to deploy a first NuScale VOYGR SMR power plant in Poland as early as 2029.

Source: https://www.world-nuclear-news.org/Articles/Poland-s-Industria-selects-Rolls-Royce-SMR-for-hyd, 09 February 2023.

URANUIUM PRODUCTION

AUSTRALIA

Aura Signs Mining Convention for Tiris

Minerals developer Aura Energy has signed a mining convention with the government of Mauritania for its Tiris uranium project. The mining convention covers an initial 30-year period, and provides stability for the project by defining the legal and economic conditions that would allow mining at the site. The mining convention includes a tax rate of 25%, a royalty rate of 3.5% free-on-board value, value added tax exemption for the import of movable goods, materials, equipment, vehicles and other inputs, the right to import and transport mineral substances required for mining, a defined State participation of up to 20%, and an accelerated depreciation in the first three years following the start of commercial production.

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Aura has now also inked a shareholder agreement with the Mauritanian government's gence Nationale de Recherches Géologiques et du Patrimoine Minier (ANARPAM) to partner in the development and operation of the uranium mine. ANARPAM will hold a 15% free participating interest in Tiris, which cannot be diluted, and will hold the right to an option to acquire a further 5% interest in the project at an independently determined value.

Source: https://www.miningweekly. com/article/aura-signs-mining-convention-for-tiris-2023-02-01, 01 February 2023.

UKRAINE

Cameco to Supply Ukraine's Uranium Needs to 2035

Ukraine's state-owned nuclear energy utility Energoatom and Cameco Corporation have agreed commercial terms for a major supply contract that would see Cameco meeting Ukraine's needs for natural uranium for nuclear fuel until 2035. The contract will see the Canada-based fuel producer "provide sufficient volumes of natural uranium hexafluoride, or UF6 (consisting of uranium and conversion services), to meet Ukraine's full nuclear fuel needs through 2035." The agreement will run from 2024 to 2035, with all deliveries in the form of UF6.

Ukraine's state-owned nuclear energy utility Energoatom and Cameco Corporation have agreed commercial terms for a major supply contract that would see Cameco meeting Ukraine's needs for natural uranium for nuclear fuel until 2035. The contract will see the Canada-based fuel producer "provide sufficient volumes of natural uranium hexafluoride, or UF6 to meet Ukraine's full nuclear fuel needs through 2035.

The contract - which the companies said they anticipate will be finalised during the first quarter of this year - will "contain a required degree of flexibility, given present

circumstances in Ukraine". Cameco will supply 100% of Energoatom's UF6 requirements for the nine nuclear reactors at the Rivne, Khmelnitsky and South Ukraine nuclear power plants for the duration of the contract. These plants have combined requirements over the contract term of some 15.3 million kgU as UF6, the companies said - equivalent to 40.1 million pounds U3O8 (15,424 tU). "The contract will also contain an option for Cameco to supply up to 100% of the fuel requirements for the six reactors at the Zaporizhzhia nuclear power plant, currently under Russian control, should it return to Energoatom's operation," they said. Zaporizhzhia would require roughly 10.4 million kgU as UF6 (the equivalent of around 27.2 million pounds U3O8) over the entire contract period ....

Iran's atomic energy organization dismissed a report by the United Nations nuclear watchdog that said Iran had made an undeclared change to uranium enriching equipment at its Fordo plant. The IAEA said its inspectors found a modification to an interconnection between two clusters of centrifuges that was substantially different than what Iran had declared to the agency.

Cameco President and CEO Tim Gitzel said the contract would help Ukraine gain supply security for significant nuclear fuel components in "extraordinarily challenging" times for the country.... Financial terms of the contract are confidential and will not be released. Energoatom's efforts to diversify its nuclear fuel supply have been ongoing for many years: by 2021, Westinghouse-supplied fuel was already in operation at six of Ukraine's Russian-designed VVER-1000 reactors. In December, the company held talks with Urenco about increasing the supply of enriched uranium to Westinghouse for the production of nuclear fuel for its plants in 2024-25. Last week Ukraine's President Volodymyr Zelensky said the country had introduced sanctions against Russia's nuclear industry.

Source: https://www.world-nuclear-news.org/Articles/Cameco-to-supply-Ukraine-s-uranium-needs-to-2035, 09 February 2023.

NUCLEAR PROLIFERATION

IRAN

Iran Dismisses IAEA Report on Undeclared Changes at Nuclear Site

Iran's atomic energy organization dismissed a report by the United Nations nuclear watchdog that said Iran had made an undeclared change to uranium enriching equipment at its Fordo plant. The IAEA said its inspectors found a modification to an interconnection between two clusters of centrifuges that was substantially different than what Iran had declared to the agency. IAEA chief Rafael Grossi said in a statement that the change is "inconsistent with Iran's obligations" under the Nuclear Non-Proliferation Treaty and undermines the IAEA's ability to "implement effective safeguards measures" at the Fordo site. Iranian state media quoted Behrouz Kamalvandi, spokesman for the Atomic Energy Association of Iran, saying the IAEA report was based on a mistake made by an IAEA inspector who mistakenly flagged the issue, and that the matter had been resolved.

France, Germany, the UK and the USA have called on Iran to comply with all its legally-binding international obligations under its Comprehensive Safeguards Agreement after the IAEA reported changes to the configuration of centrifuges at Iran's Fordow plant.

Source: https://www.voanews.com/a/iran-dismisses-iaea-report-on-undeclared-changes-at-nuclear-site/6944485.html, 02 February 2023.

Four Nations Call on Iran to Comply with its Obligations

France, Germany, the UK and the USA have called on Iran to comply with all its legally-binding international obligations under its Comprehensive Safeguards Agreement after the IAEA reported changes to the configuration of centrifuges at Iran's Fordow plant. In a statement issued on 3 February, the three governments said they "take

note" of an IAEA report that Iran has implemented a "substantial change" in the configuration of some of its centrifuges that can produce HEU containing up to 60% uranium-235, without first notifying the agency as it is obliged to do under its Comprehensive Safeguards Agreement. ... The newly reported change in configuration of centrifuge cascades used to produce near-weapons-grade uranium underscores the need for Iran to meet all its safeguards reporting obligations, and to accept whatever safeguards monitoring the IAEA sees as necessary in light of Iran's production of such highly enriched uranium.

The IAEA's director general said this undermined the agency's ability to implement safeguards measures at Fordow. Responding to the statement, Iranian Foreign Ministry Spokesman Nasser Kanaani said the IAEA had been notified of the 60% enrichment at Fordow on 17 November and that "all the modes of enrichment have been specified in the data questionnaire".

"Iranian claims that this action was carried out in error are inadequate," they said, adding that the production of HEU by Iran at the Fordow Enrichment Plant "carries significant proliferation-related risks and is without any credible civilian justification". The nations called on Iran "to comply with all its legally-binding international obligations under its Comprehensive Safeguards Agreement with the IAEA and to fully cooperate with the Agency in the application of effective safeguards at Fordow". ...

The IAEA report referred to by the four governments is confidential, but according to press reports the agency found that an interconnection between two centrifuge clusters at the Fordow plant had been significantly modified without it being notified. According to *Anadolu Agency*, the issues were raised by an IAEA inspector following a recent visit to the site. The IAEA's director general said this undermined the agency's ability to implement safeguards measures at Fordow. Responding to the statement, Iranian Foreign Ministry Spokesman Nasser Kanaani said the IAEA had been notified of the 60% enrichment at Fordow on 17 November and that "all the modes of enrichment have been specified in the data questionnaire". The ministry said that at the time of the January 2023 inspection "no new measure happened that would be contradictory to the November 17, 2022 questionnaire and would, thus, make it necessary to inform the IAEA thereof."

Source: https://www.world-nuclear-news.org/Articles/Four-nations-call-on-Iran-to-comply-with-its-oblig, 07 February 2023.

NUCLEAR DISARMAMENT

USA–RUSSIA

US Accuses Russia of Endangering Nuclear Arms Control Treaty

Russia's refusal to allow on-the-ground inspections to resume is endangering the New START nuclear treaty and U.S.-Russian arms control overall, the Biden administration charged. The finding was delivered to Congress and summarized in a statement by the State Department. It follows months of more hopeful U.S. assessments that the two countries would be able to salvage cooperation on limiting strategic nuclear weapons despite high tensions over Russia's war on Ukraine.

Inspections of U.S. and Russian military sites under the New START treaty were paused by both sides because of the spread of the coronavirus in March 2020. The U.S.-Russia committee overseeing implementation of the treaty last met in October 2021, but Russia then unilaterally suspended its cooperation with the treaty's inspection provisions in August 2022 to protest U.S. support for Ukraine.

Inspections of U.S. and Russian military sites under the New START treaty were paused by both sides because of the spread of the coronavirus in March 2020. The U.S.-Russia committee overseeing implementation of the treaty last met in October 2021, but Russia then unilaterally

suspended its cooperation with the treaty's inspection provisions in August 2022 to protest U.S. support for Ukraine. "Russia's refusal to facilitate inspection activities prevents the United States from exercising important rights under the treaty and threatens the viability of U.S.-Russian nuclear arms control," the State Department said. The administration also blamed Russia for the two country's failure to resume talks required under the New START treaty.

It is a counterterrorism exercise aimed at enhancing cooperation and coordination between the two countries. The inclusion of a scenario simulating a validation exercise for a CBRN terror response mission is a significant development, given the increasing threat posed by non-conventional weapons in the hands of terrorists.

Russia's Foreign Ministry said last August that it had told the U.S. it was temporarily suspending on-site inspections required under the treaty. It said U.S. sanctions imposed over Russia's February 2022 invasion of Ukraine had changed conditions between the two countries and claimed that the U.S. was blocking Russians from carrying out their own inspections at U.S. sites. The State Department denied that the U.S. was blocking inspections by the Russians. It insisted the U.S.-Russia nuclear arms control efforts were essential to the security of the U.S., its allies and the world at large. "It is all the more important during times of tension when guardrails and clarity matter most," the State Department said.

A CBRN terror response mission typically involves multiple agencies working together to contain and neutralize the threat, rescue hostages or civilians, and provide medical treatment to those affected. The objective is to minimize the impact of the attack and prevent the further spread of dangerous materials.

Source: https://apnews.com/article/russia-ukraine-politics-f910671d0d8f831ce0f8b65cd32523d1, 01 February 2023.

NUCLEAR SECURITY

INDIA–USA

CBRN Terror Response: Indo-US First-Time Joint Exercise to Counter It

An ongoing Indo-US joint exercise for the first time included a drill on the "Chemical, Biological, Radiological, and Nuclear terror response." Both countries are cognizant of the fact that chemical and biological warfare are becoming new threats to the world.

TARKASH 2023: An exercise is currently underway in Chennai. It was a joint exercise by the National Security Guard (NSG) and US Special Operations Forces (SOF). The current exercise is the sixth edition, which began on January 16 and will reach its conclusion on February 14. It is a counterterrorism exercise aimed at enhancing cooperation and coordination between the two countries. The inclusion of a scenario simulating a validation exercise for a CBRN terror response mission is a significant development, given the increasing threat posed by non-conventional weapons in the hands of terrorists. This inclusion is important and comes against the backdrop of the Russia-Ukraine war, where a chemical attack took place in Kharkiv. Russia alleged that Ukraine orchestrated the attack on itself to gain military aid from the West. The joint exercise demonstrates the commitment of both countries toward addressing this emerging threat and improving their preparedness to respond to such incidents.

CRBN Terror Response Mission: A Chemical, Biological, Radiological, and Nuclear terror response mission refers to a scenario where a terrorist organization has acquired and is threatening to use chemical, biological, radiological, or nuclear weapons to carry out an attack. CBRN incidents can have significant consequences and require an immediate and coordinated response from emergency response organizations such as law enforcement, fire services, and medical agencies. A CBRN terror response mission typically involves multiple agencies working together to contain and neutralize the threat, rescue hostages or civilians, and provide medical treatment to those affected. The objective is to minimize the impact of the attack and prevent the further spread of

dangerous materials. To prepare for CBRN incidents, emergency response organizations regularly conduct exercises and drills to improve their readiness and coordination in responding to such incidents. These exercises can involve simulated CBRN attacks and test the response capabilities of the agencies involved. By preparing for such incidents, emergency response organizations can be better equipped to handle actual CBRN incidents and minimize their impact.

The coin-sized radioactive capsule that went missing in Western Australia last week has been found by country's emergency services. The authorities in Western Australia's sparsely populated Kimberley region said that they had "literally found the needle in the haystack".

Joint CBRN Drills: It was the first time that a joint exercise simulated a CBRN terror response mission. The detail of the mock validation exercise is that a terrorist group attacked a conventional hall with bioweapons during an international summit. The objective of this exercise was to neutralize the terrorists, safely rescue the hostages, and deactivate the bioweapons. According to sources, it even involves the insertion of IAF helicopters into the target area and successful intervention in the auditorium. This exercise was important as both forces gained proficiency and enhanced their skill sets for a CBRN terror response. NSG and US Special Forces CBRN subject matter experts exchanged perspectives and valuable knowledge in the handling of CBRN.

Anti-Terrorism Drills: CBRN drills were just one part of it. The main aspect of this joint exercise has always been anti-terrorism drills as a whole. This mock counterterrorism drill took place at multiple locations in Chennai. This exercise proved to be an effective method for sharing best practices and tactics in urban operations such as close-quarter battles, surveillance, long-range sniping, hostage rescue drills, building intervention drills, and many others.

The Danger of CBRN Weapons: CBRN weapons are classified as weapons of mass destruction. Chemical weapons, such as nerve agents and blister agents, can cause severe health effects and even death. Biological weapons, such as bacteria and viruses, can spread disease and cause mass illness. Radiological weapons, such as dirty bombs, can contaminate large areas with radioactive material, posing a long-term health risk to those exposed. Nuclear weapons are the most destructive and have the potential to cause widespread damage and loss of life on an unprecedented scale. These weapons were already used in the past. The most recent use was in the form of a sarin gas attack in Syria in 2017, in which more than 100 people died. It is important to note that the development, possession, and use of CBRN weapons are illegal under international law and are prohibited by various treaties, such as the Chemical Weapons Convention and the Biological Weapons Convention. However, it has persisted and is now gaining popularity.

Source: https://asianatimes.com/cbrn-indo-us-time-joint-exercise-to-counter/, 11 February 2023.

NUCLEAR SAFETY

AUSTRALIA

Missing Coin-sized Radioactive Capsule Found in Australia

The coin-sized radioactive capsule that went missing in Western Australia last week has been found by country's emergency services. The authorities in Western Australia's sparsely populated Kimberley region said that they had "literally found the needle in the haystack". The announcement of the loss sparked a frantic search, stoking unprecedented public health warning spanning hundreds of kilometres in the sparsely populated West Australian region ....

Who Found the Radioactive Capsule? The capsule was found by a team from the Australian Nuclear Science and Technology Organisation and the Department of Fire and Emergency Services.

Australia's Missing Radioactive Capsule: What Happened? An urgent public warning was issued after the Caesium-137 capsule was reported missing on January 25. It was reported that the capsule apparently fell off a truck transporting it from a Rio Tinto mine to Perth, a 1400-kilometre stretch. It vanished between January 11 and

January 16, but its loss was not reported for more than a week, local media reported.

What is the Radioactive Capsule Like? According to reports, the now found capsule measures 6mm in diameter by 8mm in height. it is used in mining equipment but can lead to dangerously high doses of radiation if mishandled. Western Australians were warned of the dangerous misplaced capsule in a press conference held.

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Source: https://www.msn.com/en-in/lifestyle/pets-animals/missing-coin-sized-radioactive-capsule-found-in-australia/ar-AA16YNFJ, 01 February 2023.

FRANCE

France Approves Study on Extending Nuclear Reactors' Life

France has approved looking into the possibility of extending the lifespan of nuclear reactors to 60 years and beyond if safety rules allow it, the French Presidency said. The Presidency announced the move in a statement after President Emmanuel Macron, who has announced plans to build at least six new reactors by 2050, on 3rd February chaired the first of a series of meetings on nuclear policy. France historically has relied on nuclear power for around 70% of its energy, although the share is likely to have fallen last year as the nuclear fleet suffered repeated outages.

The commissioning schedule for the new reactors will be established by a bill that will determine the speed of the procedures near the existing nuclear sites and the operation of the existing facilities, the statement said. The bill is expected to reduce delays in administrative procedure and allow for progress on the construction sites.

The commissioning schedule for the new reactors will be established by a bill that will determine the speed of the procedures near the existing nuclear sites and the operation of the existing facilities, the statement said. The bill is expected to reduce delays in administrative procedure and allow for progress on the construction sites. The statement also announced plans for the construction of the first pilot of a small advanced nuclear reactor by the 2030s. The extension of the plants will also require the launch of an examination of the issue of the fuel cycle, including the waste management, the statement said. Several studies are set to be launched on the matter and presented at the next meeting of the nuclear council in June 2023, the statement said. The presentation of the studies is expected to be followed with a debate in Parliament on the development of energy and climate laws.

Source: https://www.reuters. com/world/europe/french-presidency-green-light-looking-into-extending-lifespan-existing-nuclear-2023-02-03/, 03 February 2023.

GENERAL

Nuclear War Simulator

Nuclear War Simulator is a detailed realistic simulation and visualization of large-scale nuclear conflicts with a focus on humanitarian consequences. There are currently over 13000 nuclear weapons on this planet of which over 9000 are in military stockpiles. This software should help you answer the question: what will happen if Russia and the United States or India and Pakistan use their arsenals?

You can design warheads, missiles and carries, place them on the map and execute attack plans to tell a credible story about how nuclear conflicts play out and what are the consequences. Using a high-resolution population density map and realistic weapons effects like blast, heat and radiation you can make an estimate of how many people will die in a conflict.

Nuclear Conflict Scenarios: You can design realistic large-scale scenarios between major

powers with thousands of warheads. Scenarios can be created manually where you can assign each warhead individually or with the assistance of an AI for faster targeting. It is also possible to simulate whole conflicts with a few clicks on the map interactively. You can download scenarios created by other people and upload your scenarios to the mods.io server.

Realistic Effects of Nuclear Weapons: The simulation includes a high-resolution population density grid. The effects of blast, heat, fires and radiation are calculated and visualized for each population cell to estimate fatalities (similar to Alex Wellerstein's NUKEMAP). The destruction of military targets is simulated using a model considering the CEP of the weapon, target hardness and cratering.

There have been no reports of damage to the Akkuyu nuclear power plant after two large earthquakes struck Turkey. Following safety checks, construction is continuing, the project team says.

You can place yourself, your family and friends into the simulation to estimate the expected injuries and survival probability. The amount of burnt fuel and produced soot are also calculated to estimate the effects of nuclear winter using a simplified model.

Design and Placement of Objects: Using an intuitive UI you can design warheads, place them on missiles and into silos, on aircraft, TELs and submarines. You can then place the forces onto the map simply clicking on it or importing real-world locations from KMZ files. If you know how much uranium and plutonium is needed for one warhead, you can estimate how many can be build from today's stockpiles if a country wants to.

Specialists conducted a prompt, operational inspection of all buildings, structures, tower cranes, scaffolding and other structures under construction for deviations and damage. No damage was found as a result of the inspection. Construction and installation work continues.

Modding and Interfaces: The simulation supports some basic modding of unit textures, loading screens and background music. It is also possible to share unit blueprints and scenarios with others. If you have simulated a conflict in another tool you can import the list of detonations as a simple CSV file to calculate the humanitarian effects. On the other hand, you can also export the list of detonations together with the burnt soot into other tools like detailed climate simulations.

Source: https://www.matrixgames.com/game/nuclear-war-simulator, February 2023.

TURKEY

'No Damage' Reported at Akkuyu Site After Turkey Earthquakes

There have been no reports of damage to the Akkuyu nuclear power plant after two large earthquakes struck Turkey. Following safety checks, construction is continuing, the project team says. ... Later on 6th February Russia's *Tass* news agency reported an update from a spokesperson for Akkuyu Nuclear, saying "Specialists conducted a prompt, operational inspection of all buildings, structures, tower cranes, scaffolding and other structures under construction for deviations and damage. No damage was found as a result of the inspection. Construction and installation work continues."

The IAEA also tweeted about the situation, saying that: "As of now, no impact from earthquakes on nuclear safety & security in Türkiye, its Nuclear Regulatory Authority told IAEA." The agency's tweet added there were "no issues so far related to radiological safety & security of radioactive sources, & the country's under construction nuclear power plant is unaffected". ... The Akkuyu nuclear power plant is being built about 430 kilometres to the west of the epicentre of the quake. The Akkuyu plant, in the southern Mersin province, is Turkey's first. Rosatom is building four VVER-1200 reactors, under a so-called BOO (build-own-operate) model. Construction of the first unit began in 2018, with startup planned for 2023. The 4800 MWe plant is expected to meet about 10% of Turkey's electricity needs.

Source: https://www.world-nuclear-news.org/Articles/No-damage-reported-at-Akkuyu-site-after-Turkey-e, 06 February 2023.

UKRAINE

Ukraine Conflict – Day 345: Air Raid Sirens in Kyiv, Putin Hints at Nuclear Weapons Use

Air raid sirens rang out in Kyiv and across Ukraine before the start of a summit bringing together senior Ukrainian officials and EU representatives. EU chief Charles Michel arrived in Kyiv to join a summit with Ukraine's President Volodymyr Zelenskyy and vowed support for Ukraine's bid to join the bloc. "Back in Kyiv for the EU-Ukraine summit with Zelenskyy, (European Commission chief) Ursula von der Leyen and (EU senior diplomat) Josep Borrell.

... NATO called on Russia to fulfil its obligations under the nuclear reductions treaty START, it said in a statement. "We note with concern that Russia has failed to comply with legally-binding obligations, including on inspection and call on Russia to fulfill its obligations under the Treaty," NATO Secretary-General Jens Stoltenberg said in a tweet. President Vladimir Putin leveraged a World War II commemoration to whip up support for his army's intervention in Ukraine, comparing the fighting to Nazi Germany's invasion and hinting Moscow could use nuclear weapons. Russia, determined to make progress before Ukraine gets newly-promised Western battle tanks and armored vehicles, has picked up momentum on the eastern front and it announced advances north and south of Bakhmut. Russian forces are pushing from both the north and south to encircle Bakhmut, using superior troop numbers to try to cut it off from re-supply and force the Ukrainians out, Ukrainian military analyst Yevhen Dikiy said... .

President Vladimir Putin leveraged a World War II commemoration to whip up support for his army's intervention in Ukraine, comparing the fighting to Nazi Germany's invasion and hinting Moscow could use nuclear weapons.

Source: https://newseu.cgtn.com/news/2023-02-03/Ukraine-Air-raid-sirens-in-Kyiv-Putin-hints-at-nuclear-weapons-use-1h7NLoOVspG/index.html, 03 February 2023.

NUCLEAR WASTE MANAGEMENT

FRANCE

France Seeks Strategy as Nuclear Waste Site Risks Saturation Point

At a nuclear waste site in Normandy, robotic arms guided by technicians behind a protective shield manoeuvre a pipe that will turn radioactive chemicals into glass as France seeks to make safe the byproducts of its growing reliance on atomic power. The fuel-cooling pools in La Hague, on the country's northwestern tip, could be full by the end of the decade and state-owned Orano, which runs them, says the government needs to outline a long-term strategy to modernise its ageing facilities no later than 2025. While more nuclear energy can help France and other countries to reduce planet-warming emissions, environmental campaigners say it replaces one problem with another. To seek solutions, President Emmanuel Macron, who has announced plans to build at least six new reactors by 2050, on 3rd February chairs the first of a series of meetings on nuclear policy that will discuss investments and waste recycling. ... La Hague is the country's sole site able to process and partially recycle used nuclear fuel.

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France historically has relied on nuclear power for around 70% of its energy, although the share is likely to have fallen last year as the nuclear fleet suffered repeated outages. Since the launch of the site at La Hague in 1976, it has treated nearly 40,000 tonnes of radioactive material and recycled some into nuclear fuel that can be re-used. The waste that cannot be recycled is mixed with hardening slices of glass and buried for short-term storage underground. But its four existing cooling pools for spent fuel rods and recycled fuel that has been reused risk saturation by 2030, according to French power giant EDF (EDF.PA), which runs France's 56-strong fleet

of reactors, the world's second biggest after the United States. Should saturation happen, France's reactors would have nowhere to place their spent fuel and would have to shut down - a worst-case scenario that led France's Court of Audit to designate La Hague as "an important vulnerability point" in 2019.

EDF is hurrying to build an extra refrigerated pool at La Hague, at a cost of 1.25 billion euros ($1.37 billion), to store spent nuclear fuel - a first step before the waste can be treated - but that will not be ready until 2034 at the earliest. Meanwhile, France's national agency for managing nuclear waste last month requested approval for a project to store permanently high-level radioactive waste. The plan, called Cigéo, would involve placing the waste 500 metres (1,640 ft) below ground in a clay formation in eastern France. Construction is expected in 2027 if it gets approval. Among those opposed to it are residents of the nearby village of Bure and anti-nuclear campaigners. ... Orano, for which EDF accounts for 95% of its recycling business, says it needs clear direction from the government no later than 2025, to give it time to plan the necessary investments. The costs are likely to be high. Just keeping up with current operations at La Hague costs nearly 300 million euros a year.

France's national agency for managing nuclear waste last month requested approval for a project to store permanently high-level radioactive waste. The plan, called Cigéo, would involve placing the waste 500 metres (1,640 ft) below ground in a clay formation in eastern France. Construction is expected in 2027 if it gets approval.

Options EDF and Orano are considering include finding a way to recycle the used fuel more than once, but critics say the recycling itself creates more radioactive waste and is not a long-term solution. For now, the backup plan is to fit more fuel containers into the existing pools. After being cooled in a pool for about seven years, used nuclear fuel is separated into non-recyclable leftovers that are turned into glass (4% of the material), plutonium (1%) to create a new nuclear fuel called MOX, on which around 40% of France's reactors can run, and reprocessed uranium (95%). The uranium in the past was sent to Russia for re-enrichment and return for use in some EDF reactors, but EDF stopped doing that in 2013 as it was too costly.

Source: https://www.reuters.com/business/environment/france-seeks-strategy-nuclear-waste-site-risks-saturation-point-2023-02-03/, 03 February 2023.

Centre for Air Power Studies

The Centre for Air Power Studies (CAPS) is an independent, non-profit think tank that undertakes and promotes policy-related research, study and discussion on defence and military issues, trends and developments in air power and space for civil and military purposes, as also related issues of national security. The Centre is headed by Air Marshal Anil Chopra, PVSM AVSM VM VSM (Retd).

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