



OPINION – Manoj Joshi

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## The N-Challenge and Beyond

Two recent tests of hypersonic glide vehicles by China have raised concerns over the rapid gains Beijing was making in harnessing a new generation of weapons. The tests were reported by *Financial Times*, and while US officials have remained tight-lipped, specialists are being cagey about the capability that was demonstrated.

These tests come on the heels of other reports based on satellite imagery, showing that the Chinese are constructing hundreds of missile silos capable of housing intercontinental ballistic missiles. In the tests described by FT, a Long March rocket boosted a hypersonic glide vehicle to a low earth orbit where it flew through space before hitting its target, which it apparently missed by 30-40 km. Because it is manoeuvrable and does not follow a parabolic trajectory of a ballistic missile, such glide vehicles are difficult to track and destroy.

Commenting on the FT reports, US spokesman Ned Price said the US was “deeply concerned about the rapid expansion of the PRC’s nuclear capabilities, including its development of novel delivery systems.” He said China appeared to be deviating “from its decades-long nuclear strategy based on minimum deterrence.” The Chinese say they only

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tested a reusable space plane, and that too, in mid-July, not in August, as claimed by FT.

China’s nuclear posture, like that of India, emphasises “assured retaliation” and both countries have committed themselves to a “no first use” posture. Both have small arsenals — China around 300 and India of 150 nuclear weapons — in contrast to the US and Russia who possess nearly 6,000 warheads each, though a substantial number of them are in storage. Yet, the US and Russia have no such restraints. The Americans, for example, make it clear that their nuclear posture is based on a

desire to maintain primacy in all areas, nuclear and conventional and they give no assurances about the pre-emptive use of their nuclear weapons.

What China seems to be reacting to are the enormous changes being wrought by technological advances in a range of areas from AI, robotics and quantum computing which could help the US develop capabilities to launch disarming conventional or nuclear first strikes that makes retaliation impossible. This is not just in the realm of nuclear weapons. Conventional technologies used in Prompt Global Strike, and now, hypersonic glide vehicles weapons, can very quickly and accurately take out nuclear weapons and missile systems of adversaries.

Another aspect has been the use of unmanned systems which has lowered the threshold of conventional conflict. They have been used for eliminating Iranian commander Qassem Soleimani, dropping weapons and explosives in Jammu & Kashmir and bombing oil facilities in Saudi Arabia. This will inevitably affect decision-making in the nuclear weapons' area. AI-controlled swarms of unmanned platforms, networked intelligence and surveillance capabilities, can be used to launch overwhelming and conventional attacks on aircraft carriers, missile launchers and nuclear weapons facilities and pose a "use or lose" dilemma for a country.

In a 2015 article, Fiona Cunningham and M Taylor Fravel of the MIT had argued that despite US efforts to achieve strategic primacy, China was unlikely to alter the basic tenets of its "assured retaliation" strategy. But they could alter the way they put it

into effect by "increasing the capabilities for the 'assuredness' of retaliation" by increasing the number and quality of missiles that can hit the US. That is what the Chinese seem to have been doing since. But in the process, they could be moving away from their "minimum deterrence" posture.

And this is where India comes in. Given their adversarial relations, a sharp accretion of Chinese capabilities — nuclear and conventional — has implications for us. The logic that compels China to expand its arsenal quantitatively and qualitatively also holds good for us vis-à-vis Beijing.

Our problem is that while Beijing is already operating at the level of the US in terms of technology such as AI and quantum computing, in India, the DRDO has not even been able to develop a useable UAV. According to the 2021 issue of the IISS Military Balance, as of now, India does not even have a fully formed force of intermediate-range ballistic missiles (Agni III), leave alone intercontinental-range ones (Agni V). While its force of short-range Agni I and Prithvi missiles is sufficient to take on Pakistan, it has a limited capacity to deal with China.

Most nuclear powers believe that they will use their nuclear weapons against an existential threat. Countries like India

and China have so far signalled that they will only do so to block nuclear coercion or retaliate against an attack. But the cycle of conventional technology developments is destabilising this logic since it makes smaller nuclear powers like China and India more vulnerable. The obvious answer is to somehow control the proliferation of technology, literally before critical decision-making slips out

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of the hands of human beings altogether. But as of now, arms control agreements are under severe stress.

In 2002, the US walked away from the Anti-Ballistic Missile Treaty. More recently, it also terminated the INF Treaty. The Biden Administration has extended the New START negotiations with Russia and says it is ready for more arms control measures. The challenge, however, now is to rope in China which has so far resisted efforts in that direction. The issue now is not just simply nuclear weapons and warheads, but the manner in which they are entangled with newly emerging technology.

Source: <https://www.orfonline.org/research/the-n-challenge-and-beyond/>, 26 October 2021.

### OPINION – Andrew Davies

#### Nuclear or Bust: Australia's High Risk Submarine Strategy

Australia's recent announcement that it is terminating its contract with the French Naval Group, and instead entering into a partnership with the US and UK to acquire nuclear submarines, was bold and decisive. But it glossed over the extremely high stakes here. Twenty years from now Australia could have the making of a fleet of world-class nuclear-powered attack submarines – or it could have no submarines at all.

At one level the decision makes perfect sense. There's no doubt that Australia's strategic geography is more suited to a nuclear submarine than a conventional one. The distance from bases in Australia to operating areas north of the Indonesian archipelago eats up most of the endurance of "off-the-shelf" conventional submarines.

That's the consideration that led us to design and build the large and long-ranged Collins class, and

why we signed up to an even bigger conventional boat for its replacement. We've been effectively chasing the range and endurance of nuclear attack submarines, while constraining ourselves to diesel-electric drives. It seems that the engineering mismatch finally caught up with us. But deciding that nuclear propulsion is the answer to our submarine requirement is the easy part.

Producing the submarines on a time frame that works will be a real challenge. And we need to get a lot of things in place to make them work effectively once they're delivered, including support infrastructure, a

logistic supply chain and an effective recruitment and training pipeline. Nuclear submarines will be more demanding than the conventional submarines we're used to in every respect.

In that context, it's worth recalling that we lost almost a decade of Collins class effectiveness because we badly mismanaged the fleet maintenance arrangements. That's been sorted now, and we currently have a world class conventional submarine fleet. But the clock is ticking – HMAS Collins was commissioned a quarter of a century ago. We're about to launch a multibillion-dollar "life of type extension" (LOTE) program to keep the Collins class operational well into the 2030s. That will buy us some time, though it's not without its own project risks, involving as it does a re-engineering of the submarine's propulsion systems.

To appreciate the risk here, it's instructive to look at what happened when the RAN transitioned from the Oberon class submarines it acquired in the 1970s to the Collins. Because the Collins program slipped by a few years, the fleet of six Oberons dwindled to two (which got a rapid refit to keep them effective) and there was an effective collapse of Australia's submarine capability. More than 20 submarine-years were lost and, with sea days limited, many submariners left the service

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for greener pastures. The navy spent the next 15 years rebuilding its submarine workforce and rebuilding the precious operational experience it had lost.

A repeat of that experience could be fatal to the nation's submarine capability, especially since the future nuclear fleet will require a substantially larger workforce. As has been painfully obvious for a long time, Defence isn't exactly overflowing with highly-skilled submarine engineering and project management personnel.

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Managing the LOTE in parallel with the acquisition of a nuclear submarine is a big ask for any organisation, let alone one that hasn't got a lot of runs on the board. There's almost no room for error in the timeline – we'll need at least a couple of new boats from mid-2030 to ensure smooth transition. So we need to find the lowest risk approach to acquiring nuclear submarines, recognising that the "lowest" might still be pretty risky.

At least our American and British partners in the venture have a long history of designing and building nuclear submarines. Realistically we have little option but relying on their help to the greatest extent possible. We should draw on their own designs (the American Virginia class or Britain's Astute class) to the greatest extent we can.

There are pros and cons to each. Virginias would allow us to draw on US support capabilities in theatre but have a crew of 132, compared to 98 on an Astute (and around 55 on a Collins). Given the RAN's manning problems, the relatively smaller crew would be attractive. And operating a different class of boat to the USN, with a different acoustic signature, would complicate

adversary anti-submarine operations. Given the history of schedule delays when we fiddle with established designs, any temptation to "Australianise" the chosen submarine should be resisted.

The more bespoke our future submarine is, the more project problems there will be and the later it is likely to be delivered. For the same reason, we should also push to have our submarines built in existing nuclear submarine production facilities. It is almost certainly cheaper and faster to expand

existing facilities than building new ones – the US has already scoped out and costed an expansion for itself.

There will be local squeals about that suggestion, as the politics of Australian shipbuilding has an established track record of trumping rational decision making. There's a real risk that the forthcoming federal election will pressure both sides of politics to commit to a local build. Deciding to have Australian submarines built somewhere else will require both political bravery and the willingness to explain the strategic rationale to the public.

Various naysayers and vested interests will argue against the approach sketched above. Some commentators are already saying that we won't get access to the innermost sanctum of US nuclear submarine technologies, and that we'll have to work with the British to get the best we can. But many of the same people were once saying that we wouldn't get in the door at all.

At the very least, Australia shouldn't ever be in the position of looking back and wondering what might have been had we pushed a bit harder. We



should explore the art of the possible to the extent that alliance politics allows. The American need for capable allies is only going to increase with strategic competition. They need us as much as we need them.

*Source: Andrew Davies is a senior fellow at ASPI and the former director of ASPI's defence and strategy program. <https://www.theaustralian.com.au/special-reports/nuclear-or-bust-australias-high-risk-submarine-strategy/news-story/140652bcb4af37294368114cb237f7d7>, 30 October 2021.*

**OPINION – Lauren Sukin and Toby Dalton**

**Why South Korea Shouldn't Build its Own Nuclear Bombs**

Are nuclear weapons the answer to Seoul's security challenges? Amidst a flurry of North Korean nuclear-capable missile testing and persistent stresses in the U.S.-South Korean security alliance, conservative candidates in South Korea's presidential primaries have called on the United States to redeploy tactical nuclear weapons to the Korean Peninsula. Some have even argued that South Korea should "independently seek nuclear armament" if the United States does not agree to redeploy. These views found support from two American academics, Jennifer Lind and Daryl Press, who contend in a provocative Washington Post op-ed that South Korean nuclear weapons may be "the only way" to save the alliance. Arguing for allied proliferation is a highly unusual policy prescription. In contrast, we believe that South Korean nuclear acquisition would be counterproductive and dangerous, leaving both the alliance and South Korean security worse off.

Lind and Press posit that South Korea is stuck between a rock and hard place, "pulled apart by

powerful geopolitical forces." For Seoul, joining U.S.-led regional security initiatives risks alienating China, South Korea's closest trade partner. Yet, resisting U.S. demands to more effectively counterbalance China could threaten the reliability of U.S. protection. Moreover, the authors suggest North Korea's improving ability to target U.S. cities with nuclear weapons challenges the credibility of U.S. commitments to come to

Seoul's aid in an inter-Korean conflict. The best course to resolve these dilemmas, according to Lind and Press, might be a South Korean nuclear arsenal, one they argue should enjoy U.S. political support.

Although the U.S.-South Korean alliance does face significant geopolitical challenges, nuclear proliferation would be an ill-advised solution. South Korean nuclear weapons would likely make the regional security situation more precarious. Moreover, alliance credibility problems have not reached a magnitude that calls for such a drastic measure. Instead, strengthening cohesion within the U.S.-South Korean alliance through non-nuclear means offers a viable — and safer — path to address regional challenges from North Korea and China.

**The China Problem:** South Korean leaders understand their regional security environment, including the mounting threats from China and North Korea and the centrifugal forces these

create in the U.S.-South Korean alliance. China's increasingly aggressive security policy toward its near abroad and its willingness to use economic coercion pose distinct threats for Seoul. Indeed, South Korean officials keenly recall the painful Chinese unofficial sanctions after Seoul agreed to host the U.S. Terminal High-Altitude Area Defense missile defense system in 2017 that cost the South Korean economy an estimated \$7.5 billion in losses.

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Understandably, South Korea has resisted U.S. overtures to join the Quad initiative with Australia, India, and Japan in order to avoid provoking more Chinese retaliation. Clearly, Seoul does not desire a “new Cold War” with Beijing, and it will encourage steps to prevent that outcome. Yet, in practice, South Korea’s efforts to strengthen relationships in Southeast

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Asia and with India through a “New Southern Policy” demonstrate it is contributing to U.S. counterbalancing initiatives, albeit in indirect ways. The May 2021 summit between Presidents Moon Jae-in and Joe Biden also affirmed a shared vision for how the alliance extends beyond the Korean Peninsula, including by “maintaining an inclusive, free, and open Indo-Pacific.” Remarkably, the summit statement also emphasized “the importance of preserving peace and stability in the Taiwan Strait.”

Thus, in both words and actions, South Korea is actively working with, and complementing, the United States to contend with the China problem.

China may yet become a more direct threat to South Korea in the future, such that an independent South Korean nuclear arsenal or nuclear sharing arrangement with the United States might become more relevant. For the foreseeable future, though, the allies appear quite capable of managing the China problem in ways that meet their respective interests without requiring nuclear weapons to keep the alliance together.

**An Alliance Credibility Deficit?** Lind and Press also point to alliance credibility challenges as a reason why South Korea should build its own nuclear weapons. They are certainly not alone in warning that U.S. nuclear credibility may be crumbling, yet there is plenty of evidence indicating the political

and military foundations of the U.S.-South Korean defense relationship remain strong. Recent public

opinion surveys by the Chicago Council for Global Affairs showed that 62 percent of Americans support the use of U.S. military forces to defend South Korea against a North Korean attack. This is matched by attitudes in South Korea, where the public also continues to

express high levels of support for, and confidence in, the alliance. A September 2021 Asan Institute poll, for example, showed 78 percent support for maintaining or strengthening the U.S.-South Korean alliance.

Proponents of a South Korean nuclear weapons program argue, however, that South Koreans are no longer confident in the United States — they point to high levels of public support for nuclear proliferation (70 percent in the recent Asan poll) and concerns that South Korea’s military alone is not sufficient to deter North Korea (72 percent, according to Asan). But deeper research paints a more nuanced picture of the credibility challenge.

For example, research by Lauren Sukin found that, in 2019, 58 percent of South Korean survey respondents believed the United States would use nuclear weapons to defend South Korea from a North Korean nuclear attack. Other work shows robust U.S. public support for the nuclear security guarantee to South Korea. Scholars have

similarly found that the U.S. public is willing to use nuclear weapons, including against North Korea, and even when there is a high risk of nuclear retaliation. So the claim by Lind and Press that “South Korea can’t be sure it can depend on its U.S. ally for protection” seems overblown.

This is not to argue that concerns about alliance credibility have no basis. Building confidence in

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the alliance among the South Korean public is an ongoing challenge, made much harder in the wake of the Trump administration's extortionate approach to alliance burden-sharing negotiations.

South Koreans were also alarmed in 2017 that President Donald Trump's "fire and fury" might result in a war they did not want. Yet, neither of these are problems are fundamentally about the reliability of U.S. promises to aid South Korea in a

security crisis. Rather, they point to a need for better alliance political and military cohesion, especially coordination about contingencies involving North Korea that could escalate to use of nuclear weapons. In sum, alliance credibility problems are real but not as severe as many have suggested, and nuclear weapons are far from a clear remedy for the problems that persist.

### ***Would Nuclear Weapons Improve South Korean Security?***

Even if the alliance problems were as profound as some analysts contend — and if South Korean nuclear proliferation did not somehow make them worse — a South Korean

decision to acquire nuclear weapons would not necessarily improve Seoul's security against North Korea or China, as advocates have claimed. Indeed, a lot would depend on how North Korea and China would react to South Korean proliferation.

South Korean nuclear weapons may not be especially useful politico-military tools against China. U.S. nuclear threats against China during the Korean War did not dissuade Beijing from continuing to fight. Nor has China hesitated to leverage its conventional military strength in territorial contests with nuclear-armed India. China's ongoing modernization of its nuclear forces — whether by constructing missile silos

or testing hypersonics — suggests Beijing may view the survivability and effectiveness of its arsenal as vital for deterring the United States, especially in the Taiwan Strait. Would South Korean

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nuclear weapons dissuade Beijing from undertaking coercive operations against Seoul? It seems unlikely. If anything, South Korean proliferation could plausibly invite more coercive Chinese economic and military pressures if Beijing interpreted Seoul's nuclear

arsenal as a direct challenge to its regional aspirations. Vis-à-vis China, then, South Korea could wind up counterintuitively less secure with nuclear weapons than without them.

South Korean nuclear weapons could similarly make the situation with North Korea much more dangerous. Already, joint U.S.-South Korean military

exercises, which Pyongyang calls "exercises for a nuclear war," have repeatedly prompted North Korea to issue aggressive rhetoric, engage in cross-border provocations, and conduct missile tests. In the face of a South Korean nuclear weapons program, it would be unreasonable to

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expect North Korea to take no countervailing actions. For example, it seems likely that South Korean proliferation could cause North Korea to further augment its nuclear arsenal, posture its nuclear weapons for first use, or take greater risks to gain the upper hand in an escalating military crisis. After all, even the United States, with its far superior nuclear arsenal, has had limited success deterring or compelling North Korea.

Moreover, even if South Korean nuclear weapons likely would deter large-scale violence by China or North Korea, they could make the threat of low-level conflict escalation greater than it already is today. This is especially important in the Indo-Pacific context, where the most prevalent threats

and sources of crisis escalation — such as China's overflights of contested territory or North Korea's offensive use of cyber capabilities — exist far below the nuclear threshold. The "stability-instability paradox" of nuclear weapons suggests that, although mutual possession of nuclear weapons may reduce the chances of nuclear war, it may, at the same time, make conventional wars and militarized crises more likely, as well as incentivize greater risk taking at lower levels. A more moderated version of this argument suggests that nuclear weapons may not necessarily make low-level conflict more likely, but neither do they prevent it.

For instance, a nuclear-armed South Korea could be emboldened to respond more aggressively to North Korean provocations with proactive deterrence or "quid pro quo plus" military operations, the inherent escalation risks of which are intended to dissuade North Korea in the first place. Facing perceived "use or lose" pressures, North Korea may be quicker to cross certain escalation thresholds, such as the use of long-range rocket systems, as it seeks escalation dominance. The potential for these action-reaction dynamics to spiral into a race up the escalation ladder is clear. To be certain, this potential is already present, but it seems likely to worsen if South Korea possessed nuclear weapons. Reaction times during moments of crisis would be shorter, tensions higher; miscommunication and misperception easier, and nuclear use more accessible. South Korean proliferation could, then, make conflict more likely at worst and fail to deter it at best.

**Alternatives to South Korean Nuclear Weapons:** Before South Korean leaders opt to acquire nuclear weapons, they should weigh these potential risks against the putative deterrence

benefits proliferation proponents claim. In our assessment, leaning into nuclear deterrence as the corrective for regional security challenges, as some experts have advocated, is likely to be counterproductive. This approach positions nuclear weapons — incorrectly — as the best solution to regional tensions, in turn making proliferation look more appealing. Prioritizing nuclear solutions to the primarily non-nuclear threats South Korea and the United States face also exacerbates the extended deterrence credibility challenges for Washington. The United States would simultaneously have to prove it is ready to use nuclear weapons in a broad range of contingencies, while also conveying it is appropriately restrained such that it would not drag South Korea into an unwanted conflict. The latter point is particularly important as the Biden administration seeks to mend damaged alliance relations in the wake of the Trump administration.

Rather than expand the role of nuclear weapons in addressing threats from China and North Korea — or, as Lind and Press suggest, accept the inevitability of South Korean nuclear proliferation in response to these threats — the United States and South Korea should focus on making the alliance more resilient to the types of conflict escalation scenarios that are most likely to occur. Prioritizing political and military cohesion makes a North Korean "wedging" strategy — intended to break apart the U.S.-South Korean alliance — less likely to succeed, while also creating more avenues to satisfy Washington's interests in engaging Seoul in broader regional security efforts. Peacetime consultations, improved crisis communications, and exercises intended to bolster military interoperability would all contribute to alliance reassurance, while improving military readiness for a variety of crisis situations. The alliance should especially prepare for threats below the nuclear threshold, including by planning for gray

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zone contingencies and adapting to new and emerging threats, like those posed by cyber operations.

One important avenue for strengthening alliance cohesion involves greater U.S. support to South Korea's development of conventional counterforce capabilities and strategies. A conventional counterforce strategy relies on accurate, secure, and sufficiently impactful conventional forces for damage-limiting first-strikes and secure and punitive second strikes. In the last decade, and especially under the Moon administration, South Korea has invested considerable sums in developing very precise ballistic and cruise missiles to deter and respond to North Korea's potential use of nuclear weapons. According to two senior South Korean military officers, Seoul's acquisition of conventional counterforce capabilities "raises the expected costs of North Korea's nuclear provocations and reduces the possibility of it achieving the desired political and military goals through the use of nuclear weapons."

From this perspective, the ongoing military developments in South Korea may be less harbingers of nuclear proliferation than evidence that Seoul is developing a serious non-nuclear approach to regional security. U.S. efforts to reduce the risk of nuclear conflict — whether through arms control, crisis management exercises, or improved interoperability in support of South Korean conventional counterforce options — could strengthen the alliance, stabilize the Peninsula, and reduce proliferation pressures.

Source: *War on the Rocks*, <https://warontherocks.com/2021/10/why-south-korea-shouldnt-build-its-own-nuclear-bombs/>?, 26 October 2021.

OPINION – Debak Das

**China's Missile Silos and the Sino-Indian Nuclear Competition**

This summer, U.S. analysts using commercial satellite imagery discovered that China was significantly expanding its nuclear forces and building hundreds of new missile silos. With the new silos, China could potentially double the size of its arsenal of intercontinental ballistic missiles. The news sent shockwaves through Washington.

The head of Strategic Command called the developments "breathtaking," and the news is sure to embolden efforts to fund U.S. nuclear modernization efforts on Capitol Hill. While the

United States has a much larger nuclear force than China — with 3,750 nuclear warheads in its nuclear weapons stockpile compared to China's 350 warheads — it will still likely take a forceful response to China's latest nuclear developments.

But how will India — China's other nuclear armed adversary — react to Beijing's new missile silos? India has a nuclear triad and is reported to have 150 nuclear warheads deployed on different air-, sea-, and land-based platforms.

China, meanwhile, is estimated to have its nuclear weapons stockpile of 350 nuclear warheads deployed across different platforms. However, with the new missile silos and fears of an increase in Chinese nuclear warheads, the strategic asymmetry in the Sino-Indian nuclear relationship may become more stark.

Moreover, China and India continue to engage in hostilities in the Himalayas. In August 2021, over a hundred soldiers from the Chinese People's Liberation Army crossed over to the Indian side of the border and damaged a bridge and other infrastructure before retreating. In June 2020, in the deadliest clash between the two countries in

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45 years, more than 20 soldiers were killed in the Galwan Valley in Ladakh. This led to a heightened state of tensions and a war scare between the two countries. High-level military talks between the two nuclear states remain deadlocked, with regular hostilities at different points along the 3,488-kilometer Line of Actual Control. An increase in Chinese nuclear capabilities in this context has the potential to destabilize the region and spark a nuclear arms race. But will it?

India has been cautious in its nuclear relationship with China and is unlikely to have a dramatic response to the new missile silos at the moment. It has two nuclear-armed adversaries to consider, and its focus will remain on Pakistan. India will continue to modernize its nuclear arsenal with new counterforce nuclear delivery systems and to test multiple independently targeted re-entry ballistic missiles, which will allow it to manage its nuclear relationship with both nations. While the counterforce missiles and short-range nuclear delivery systems are aimed at Pakistan, India's nuclear relationship with China will continue to be based on ensuring a secure second-strike capability.

**No First Use, Second-Strike, and Caution:** Despite the continuing military engagements along the Line of Actual Control, the Sino-Indian nuclear relationship remains stable. This is because India's nuclear relationship with China rests on its survivable second-strike nuclear doctrine. It has pledged not to use its nuclear weapons first as a part of a no first use policy. This doctrine means that as long as India has a secure-second-strike capability — that is, the capability to absorb a nuclear first strike on its soil and then retaliate using its remaining nuclear forces — it will not

need to build a large arsenal of nuclear weapons. It just needs to make sure that its nuclear weapons systems are well dispersed and survivable.

To do this, India has deployed its first nuclear-powered ballistic missile submarine, the INS Arihant, as well as road- and rail-mobile ballistic missile launch systems. The rail-mobile Agni II ballistic missiles are likely aimed at targets in western, central, and southern China.

Meanwhile, apart from the Arihant, India will deploy three more nuclear submarines by 2024. These submarines will be armed with the K-15 submarine-launched ballistic missile (750 km range) and are intended to increase the survivability of Indian nuclear forces. Subsequently, the submarines will be armed with K-4 submarine-launched ballistic missiles that have a range of 3,500 kilometers (these missiles are currently under development).

India's diversification of second-strike capabilities and the increased ranges on missile systems are aimed primarily at China — and the latter has taken note. However, given that both states have declared no first use and credible minimum deterrence policies (i.e., they profess to

rely on small numbers of nuclear weapons to deter their adversaries) there is unlikely to be a race to acquire a significantly higher number of nuclear weapons than the other.

**Manageable Historical Asymmetry:** China's additional nuclear silos do not represent a new strategic problem for India. India has been on the weaker end of asymmetry in nuclear capability against China ever since the latter's first nuclear test in 1964. Visibly concerned by Chinese nuclearization at the time, India sought the assurance of a nuclear umbrella from the United

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States and the Soviet Union, hoping this would deter China from attack. The United States and the Soviet Union did not comply. While India conducted its “peaceful nuclear explosion” in 1974, it chose to not overtly weaponize its nuclear capability at the time. Despite an adversarial relationship with China, the lack of any serious military engagements between the two countries (apart from a standoff in 1986-1987) meant that India could stop worrying and learn to live with the nuclear neighbor with whom it had a strategic asymmetry.

After India conducted nuclear weapons tests in 1998, Prime Minister Atal Bihari Vajpayee wrote to President Bill Clinton that China was one of the main reasons for Indian nuclearization. However, at no point did India seek nuclear parity (i.e., attempting to build the same number of bombs as China). Instead, it remained content with a much smaller nuclear arsenal, owing to its belief in “credible minimum deterrence.”

India’s calculus will not have changed in 2021. Despite China building new missile silos, India’s vulnerability to Chinese nuclear forces remains unaltered. Even if not all the new Chinese silos contain missiles, it makes no difference for India. Whether China deploys 250 extra DF-41 intercontinental ballistic missiles in these silos, or whether it uses the silos as a part of a “shell game” strategy where some have missiles and others are simply decoys, there will be no fundamental change to the strategic asymmetry with China that India has historically been able to manage.

**Border Conflict Remains at Low Escalation Level:** Sino-Indian hostilities based on a longstanding boundary dispute have led to loss of life on both sides. In June 2020, there was fighting with fists, stones, and nail-studded bamboo poles near the

Galwan valley that led to at least 20 casualties, sparking fears of war between the two countries.

Both sides have deployed tens of thousands of troops and military equipment along the border. There have been two other major standoffs between India and China in the last decade: at Doklam on the Bhutan-China border in 2017, and at Daulat Beg Oldi in 2013 (also known as the Depsang Standoff).

The Sino-Indian security competition is not driven by nuclear weapons. While the boundary remains disputed, Chinese incursions into India’s territory will likely continue. However, these standoffs have remained at low levels of escalation. Even at Galwan, there was no exchange of gunfire, and future confrontations are likely to remain at the

same level. Escalation to a higher level of conventional conflict is unlikely and further escalation to nuclear signaling or competition is extremely improbable.

During the Galwan crisis, India’s sole nuclear submarine, INS Arihant, was

sent out to sea. This was seen by some as a potential nuclear signal. However, the deployment was likely part of the Indian navy’s standard operating procedure to move its operational platforms out to sea during a national security crisis. Furthermore, the lack of communication or clarity on whether the submarine was armed with nuclear weapons or not makes it very unlikely to be a nuclear signal.

**Looking Ahead:** China’s recent nuclear modernization efforts are likely to affect the strategic balance with the United States. American officials are already expressing their concern, and strategic planners have begun to account for the qualitative improvement Beijing’s nuclear forces. The reaction in India will be much different. New Delhi believes, for the most part, that its more modest nuclear arsenal meets its deterrence

**Whether China deploys 250 extra DF-41 intercontinental ballistic missiles in these silos, or whether it uses the silos as a part of a “shell game” strategy where some have missiles and others are simply decoys, there will be no fundamental change to the strategic asymmetry with China that India has historically been able to manage.**

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goals, and additional Chinese capabilities won't significantly change that. To be sure, Indian nuclear modernization will continue. Likewise, India will keep a close eye on China and bolster its survivable second-strike capability by greater dispersal of its strategic nuclear forces. While these forces will see both qualitative (i.e., the addition of multiple independently targeted re-entry systems) and quantitative improvements, they will neither be drastic nor introduced as a reaction to China's silos. Rather, India's nuclear modernization — if it moves toward a more counterforce capability — will be aimed at Pakistan. Indeed, if India does reconsider its no first use pledge (as has been hinted at time and again), that change will likely be aimed at coercing Pakistan, not China.

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Right now, India is satisfied with the nuclear status quo with China. But in the medium to long term, as two different nuclear policies for Pakistan and China evolve, India might have to reconsider its asymmetry vis-à-vis China.

**Then-President Barack Obama's 2010 nuclear posture review acknowledged nuclear weapons should still play a role in deterring "conventional or chemical and biological weapons attacks." All of these threats — and nuclear threats themselves — have only grown since then. It is dangerous and naïve to pretend otherwise.**

Source: *War on the Rocks*, <https://warontherocks.com/2021/10/chinas-missile-silos-and-the-sino-indian-nuclear-competition/>, 13 October 2021.

#### **OPINION – Jim Risch**

### **The US Must Reject a 'Sole Purpose' Nuclear Policy**

For decades, U.S. administrations have embraced a policy of strategic ambiguity regarding the use of nuclear weapons. While administrations have considered shifting to a no first use policy, they inevitably understood it would damage U.S. and allied security. Indeed, the Obama administration studied this closely and rejected such a policy

change not once, but twice. Earlier this year, our British allies also rejected this change, and they maintain their own policy of strategic ambiguity. But President Joe Biden campaigned on a "sole

purpose" nuclear policy, and his administration is now considering its adoption. "Sole purpose" is another name for a "no first use" policy and must be rejected.

As much as the world dislikes nuclear weapons, they are an important tool that helps maintain stability around the world. Declaring that the United States will never be the first to use a nuclear weapon represents the worst in potential policy. It scares our friends, encourages our adversaries and damages the very nonproliferation goals it claims to advance.

Then-President Barack Obama's 2010 nuclear posture review acknowledged nuclear weapons should still play a role in deterring "conventional or chemical and biological weapons attacks." All of these threats — and nuclear threats themselves — have only grown since then. It is

dangerous and naïve to pretend otherwise.

The Biden administration says it wants to strengthen U.S. alliances, but our allies have been clear with me that they strongly object to a sole purpose policy. During a recent committee hearing, a Biden nominee denied our allies would be betrayed by such a policy change and suggested all we need to do is "educate our allies." I believe our allies understand their security challenges far better than the Biden administration.

This, of course, would not be the first time the Biden administration has ignored allied concerns on mutual security interests. Among the starkest



examples is that the administration has made an agreement with Germany on Nord Stream 2 despite the objections of most NATO allies, its disastrous withdrawal from Afghanistan and its inability to communicate the AUKUS deal to our friends in France.

**Air Force Secretary Frank Kendall recently warned of a new system that gives China a surprise, first use nuclear capability, which arguably violates the Outer Space Treaty. The challenges that arise from China's ability to threaten more and more U.S. and allied territory are immense and growing.**

An embrace of a sole purpose doctrine will erode our allies' confidence in our commitment to NATO's Article 5, as well as U.S. commitments to transatlantic and northeast Asian security. If the Biden administration chooses this path, it could

destroy the nuclear umbrella that has protected our allies and discouraged nuclear weapons proliferation. Beyond abandoning our allies and closest friends around the world, a sole purpose nuclear policy would embolden China and Russia and risk new aggression and coercion. Adm. Charles Richard, commander of U.S. Strategic Command, called China's nuclear buildup "breathtaking" and noted China will soon possess weapons that would make them "capable of coercion."

At the same time, Air Force Secretary Frank Kendall recently warned of a new system that gives China a surprise, first use nuclear capability, which arguably violates the Outer Space Treaty. The challenges that arise from China's ability to threaten more and more U.S. and allied territory are immense and growing. Meanwhile, Russia has pursued a massive nuclear modernization effort and developed new delivery systems to evade U.S. defenses and strike targets with greater precision and lethality, including hypersonic cruise missiles, nuclear-powered undersea drones, and larger ICBMs.

Finally, proponents of a sole purpose doctrine see it as only a first step toward U.S. disarmament.

This policy is in fact a stalking horse for unilateral cuts to U.S. nuclear forces, regardless of the threats from China and Russia. No one wants to see the use of nuclear weapons ever again. However, endorsing a sole purpose doctrine and surrendering our nuclear capabilities before the rest

of the world agrees to do so will only destabilize the international system. Nuclear deterrence works; it has promoted international security and served the United States and our allies well. Now is not the time to abandon 70-plus years of proven policy.

**Beijing's powerful missile arsenal has driven New Delhi to improve its weapons systems in recent years, with the Agni-5 believed to be able to strike nearly all of China. India is already able to strike anywhere inside neighbouring Pakistan.**

*Source: The author is the ranking member of the Senate Foreign Relations Committee, <https://www.defensenews.com/opinion/commentary/2021/10/25/the-us-must-reject-a-sole-purpose-nuclear-policy/>, 25 October 2021.*

### NUCLEAR STRATEGY

#### INDIA

##### India Tests Nuclear-Capable Missile Amid Tensions with China

India has test-fired a nuclear-capable intercontinental ballistic missile with a range of 5,000 km (3,125 miles) from an island off its east coast amid rising border tensions with China. The successful launch was in line with "India's policy to have credible minimum deterrence that underpins the commitment to no first use", said a government statement.

The Agni-5 missile splashed down in the Bay of Bengal with "a very high degree of accuracy", said the statement issued. Beijing's powerful missile arsenal has driven New Delhi to improve its weapons systems in recent years, with the Agni-5 believed to be able to strike nearly all of China.

India is already able to strike anywhere inside neighbouring Pakistan, its archrival against whom it has fought three wars since gaining independence from British colonialists in 1947. India has been developing its medium- and long-range missile systems with and without nuclear warheads since the 1990s amid increasing strategic competition with China in a major boost to the country's defence capabilities. ...

Source: <https://www.aljazeera.com/news/2021/10/28/india-nuclear-capable-missile-border-tensions-china>, 28 October 2021.

### NORTH KOREA

#### North Korea Tests Possible Submarine Missile Amid Tensions

North Korea on Tuesday fired at least one ballistic missile, which South Korea's military said was likely designed to be launched from a submarine, in what is possibly the most significant demonstration of the North's military might since U.S. President Joe Biden took office. The launch of the missile into the sea came hours after the U.S. reaffirmed an offer to resume talks on North Korea's nuclear weapons program. It underscored how North Korea has continued to expand its military capabilities during the pause in diplomacy.

South Korea's Joint Chiefs of Staff said in a statement it detected that North Korea fired one short-range missile it believed was a submarine-launched ballistic missile from waters near the eastern port of Sinpo, and that the South Korean and U.S. militaries were closely analyzing the launch. The South Korean military said the launch

was made at sea, but it didn't say whether it was fired from a vessel underwater or another launch platform above the sea's surface.

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Japanese legislative elections later this month and returned to Tokyo because of the launch. He ordered his government to start revising the country's national security strategy to adapt to growing North Korean threats, including the possible development of the ability to pre-emptively strike North Korean military targets. "We cannot overlook North Korea's recent development in missile technology and its impact on the security of Japan and in the region," he said.

Japanese Defense Minister Nobuo Kishi said one of the North Korean missiles reached a maximum altitude of 50 kilometers (30 miles) and flew on "an irregular trajectory" while traveling as far as 600 kilometers (360 miles). He said the missile didn't breach Japan's exclusive economic zone set outside its territorial waters.

South Korean officials held a national security council meeting and expressed "deep regret" over the launch occurring despite efforts to revive diplomacy. A strong South Korean response could anger North Korea, which has accused Seoul of hypocrisy for criticizing the North's weapons tests while expanding its own conventional military capabilities.

U.N. Secretary-General Antonio Guterres is concerned at the latest reported launches and

**Kishida interrupted a campaign trip ahead of Japanese legislative elections later this month and returned to Tokyo because of the launch. He ordered his government to start revising the country's national security strategy to adapt to growing North Korean threats, including the possible development of the ability to pre-emptively strike North Korean military targets.**

again calls on North Korea's leaders to comply with their obligations under U.N. Security Council resolutions and "swiftly resume diplomatic efforts towards sustainable peace and the complete and verifiable denuclearization of the Korean peninsula," U.N. deputy spokesman Farhan Haq said.

The apparent site of the missile firing — a shipyard in Sinpo — is a major defense industry hub where North Korea focuses its submarine production. In recent years, North Korea has also used Sinpo to develop ballistic weapons

systems designed to be fired from submarines. North Korea last tested a submarine-launched ballistic missile, or SLBM, in October 2019. Analysts had expected North Korea to resume tests of such weapons after it rolled out at least two new submarine-launched missiles during military parades in 2020 and 2021. There have also been signs that North Korea is trying to build a larger submarine that would be capable of carrying and firing multiple missiles.

Japanese Deputy Chief Cabinet Secretary Yoshihiko Isozaki said Tokyo lodged a "strong protest" to North Korea through the "usual channels," meaning their embassies in Beijing. Japan and North Korea have no diplomatic ties. Chinese Foreign Ministry spokesperson Wang Wenbin said tensions on the Korean Peninsula were at a "critical stage" and called for a renewed commitment to a diplomatic resolution of the issue.

Ending a monthslong lull in September, North Korea has been ramping up its weapons tests while making conditional peace offers to Seoul, reviving a pattern of pressuring South Korea to try to get what it wants from the United States. North Korean leader Kim Jong Un is "developing submarine-launched ballistic missiles because he wants a more survivable nuclear deterrent able to blackmail

his neighbors and the United States," said Leif-Eric Easley, a professor of international studies at Ewha Womans University in Seoul.

Easley said North Korea "cannot politically afford appearing to fall behind in a regional arms race" with its southern neighbor. "North Korea's SLBM

is probably far from being operationally deployed with a nuclear warhead," he added. North Korea has been pushing hard for years to acquire an ability to fire nuclear-armed missiles from submarines, the next key piece in Kim Jong Un's arsenal that

includes a broad range of mobile missiles and ICBMs with the potential range to reach the American homeland.

Still, experts say it would take years, large amounts of resources and major technological improvements for the heavily sanctioned nation to build at least several submarines that could travel quietly in seas and reliably execute strikes. Within days, Biden's special envoy for North Korea, Sung Kim, is scheduled to meet with U.S. allies in Seoul over the prospects of reviving talks with North Korea.

Nuclear negotiations between the U.S. and North Korea have stalled for more than two years

because of disagreements over an easing of crippling U.S.-led sanctions against North Korea in exchange for denuclearization steps by the North. While North Korea is apparently trying to use South Korea's

desire for inter-Korean engagement to extract concessions from Washington, analysts say Seoul has little wiggle room because the Biden administration is intent on keeping sanctions in place until North Korea takes concrete steps toward denuclearization. "The U.S. continues to reach out to Pyongyang to restart dialogue. Our intent remains the same. We harbor no hostile intent toward (North Korea) and we are open to

**The apparent site of the missile firing — a shipyard in Sinpo — is a major defense industry hub where North Korea focuses its submarine production. In recent years, North Korea has also used Sinpo to develop ballistic weapons systems designed to be fired from submarines.**

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meeting without preconditions,” Sung Kim told reporters.

Kim Jong Un reviewed powerful missiles designed to launch nuclear strikes on the U.S. mainland during a military exhibition and vowed to build an “invincible” military to cope with what he called persistent U.S. hostility. Earlier, Kim dismissed U.S. offers to resume talks without preconditions as a “cunning” attempt to conceal its hostile policy toward the North. The country has tested various weapons over the past month, including a new cruise missile that could potentially carry nuclear warheads, and a developmental hypersonic missile. The U.S. Indo-Pacific Command said North Korea’s latest launch did not pose an immediate threat to U.S. personnel, territory, or that of its allies.

Source: Kim Tong-Hyung, Hyung-Jin Kim and Mari Yamaguchi, Associated Press, <https://apnews.com/article/donald-trump-seoul-south-korea-north-korea-joint-chiefs-of-staff-62456fab450ce5bba766a8307cf06af4>, 20 October 2021.

### USA

#### US Army’s Precision Strike Missile Breaks Distance Record in Flight Test

The U.S. Army’s Precision Strike Missile broke its distance record in a flight test at Vandenberg Space Force Base, California, Oct. 13, according to an Oct. 14 Lockheed Martin statement. Lockheed Martin is the PrSM developer. The company and the Army have conducted five consecutive successful flight tests. The company did not disclose the distance the PrSM traveled in its flight test, but the goal of the test was to see

exactly how far the missile can travel beyond its previous set requirement of 499 kilometers.

The original intent was to reach a maximum of 499 kilometers, but America’s 2019 withdrawal from the Intermediate-Range Nuclear Forces Treaty with Russia has allowed the U.S. Army to develop the missile to fly farther. The INF Treaty prevented the development of missiles with ranges between 499 and 5,000 kilometers.

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“The Precision Strike Missile continues to validate range and performance requirements,” Lockheed Martin’s Paula Hartley, vice president of tactical missiles for the company’s missiles and fire control business, said in the statement. “Achieving this long-range milestone for the baseline missile demonstrates PrSM’s capability to meet our customer’s modernization priorities on a rapid timeline.”

**The U.S. Army approved the PrSM program to move into the engineering and manufacturing development phase on Sept. 30 and awarded Lockheed a \$62 million contract for an Early Operational Capability production. The contract drives the Army toward an initial fielding of the weapon in fiscal 2023.**

The Army originally planned for the test shot at Vandenberg to take place August, but due to range scheduling, the event was pushed back to October, Brig. Gen. John Rafferty, who is in charge of Army Long-Range Precision Fires modernization, told Defense News in an

interview before the Association of the U.S. Army’s annual conference this week.

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PrSM is a priority program for the Army and is



intended to replace the Army Tactical Missile System. It will play an important role in the service's future deep-strike capability necessary to counter Russian and Chinese capabilities. The PrSM will also be shot during the Army's Project Convergence campaign of learning at Yuma Proving Ground, Arizona, this year. The missile will have a side-by-side shot during which one missile is launched from one side of the pod and another from the other side of the pod. Lockheed would not disclose the rate of fire for that test involving more than one interceptor.

The missile broke a range record in May, reaching "more than" 400 kilometers — roughly 250 miles — in a test shot at White Sands Missile Range, New Mexico, according to Lockheed Martin. PrSM also went through three flight tests last year during a technology maturation and risk reduction phase, ranging from 240 kilometers, 180 kilometers and 85 kilometers. Shorter ranges can be more difficult to execute, as the missile must go up and come down quicker, according to experts. While the PrSM development program started out as a competitive effort between Lockheed and Raytheon Technologies, the latter ducked out of the competition in early 2020.

The Army is shooting to initially field the capability in 2023, but it will spiral in more technology, including an enhanced seeker, and more capabilities, such as increased lethality and extended range. The priority for PrSM in the near term is to pursue a maritime, ship-killing capability as well as enhanced lethality.

Army Futures Command has yet to determine the timeline to extend PrSM's range, but Rafferty said the Army has been investing in extended-range

propulsion development "for a while, with good results." The Army expects to decide in FY22 on the propulsion approach, he added. "It's going to be a hard choice of which is best, so we've got to refine what's the objective range."

*Source: Jen Judson, Defense News, <https://www.defensenews.com/digital-show-dailies/ausa/2021/10/14/us-armys-precision-strike-missile-breaks-distance-record-in-flight-test/>, 14 October 2021.*

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### BALLISTIC MISSILE DEFENCE

#### NATO

#### NATO to Boost Air and Missile Defense Investments to Counter Russia

NATO's forthcoming plans to deter Russia includes "significant improvements to our air and missile defenses" as well as fifth-generation jets, alliance Secretary General Jens Stoltenberg said. "Today, ministers endorsed a new overarching plan to defend our alliance in crisis and conflict, to make sure that we continue to have the right forces at the right place at the right time," Stoltenberg told reporters, capping the first day of NATO's two-day defense ministerial meeting.

The defense ministers of alliance-member countries committed to the new NATO "capability targets," negotiated as part of the alliance's regular defense planning cycle. A source

said the alliance plans to invest in missile systems like the Raytheon Technologies-built Patriot and the SAMP/T air defense system made by Eurosam.

"We are implementing a balanced package of political and military measures to respond to this threat," Stoltenberg said. "This includes

**The defense ministers of alliance-member countries committed to the new NATO "capability targets," negotiated as part of the alliance's regular defense planning cycle. A source said the alliance plans to invest in missile systems like the Raytheon Technologies-built Patriot and the SAMP/T air defense system made by Eurosam.**

significant improvements to our air and missile defenses, strengthening our conventional capabilities with fifth-generation jets, adapting our exercises and intelligence and improving the readiness and effectiveness of our nuclear deterrent," he added.

Members agreed to "have more forces which are heavier and more high-end capabilities," as well as more advanced forces to "exploit emerging and disruptive technologies," Stoltenberg said. The members approved plans for exercises, intelligence activities, artificial intelligence standards and technological innovation – as well as the plan for thousands of mutually agreed upon targets. ...

Source: Defense News, Joe Gould, <https://www.defensenews.com/global/europe/2021/10/21/nato-to-boost-air-and-missile-defense-investments-to-counter-russia/>, 22 October 2021.

## EMERGING TECHNOLOGIES AND DETERRENCE

### SOUTH KOREA

#### From Spy Satellites to Mobile Networks, S. Korea Pins Space Hopes on New Rocket

South Korea plans to test its first domestically produced space launch vehicle, a major step toward jumpstarting the country's space programme and achieving ambitious goals in 6G networks, spy satellites, and even lunar probes. If all goes well, the three-stage NURI rocket, designed by the Korea Aerospace Research Institute (KARI) to eventually put 1.5-ton payloads into orbit 600 to 800km above the Earth, will carry a dummy satellite into space.

South Korea's last such booster, launched in 2013 after multiple delays and several failed tests, was jointly developed with Russia. The new KSLV-II NURI has solely Korean rocket technologies, and

is the country's first domestically built space launch vehicle, said Han Sang-yeop, director of KARI's Launcher Reliability Safety Quality Assurance Division. "Having its own launch vehicle gives a country the flexibility of payload types and launch schedule," he told Reuters in an email.

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*Military And Civilian Benefits:* It also gives the country more control over "confidential payloads" it may want to send into orbit,

Han said. That will be important for South Korea's plans to launch surveillance satellites into orbit, in what national security officials have called a constellation of "unblinking eyes" to monitor North Korea. So far, South Korea has remained almost totally reliant on the United States for satellite intelligence on its northern neighbour.

In 2020 a Falcon 9 rocket from the U.S. firm Space X carried South Korea's first dedicated military communications satellite into orbit from the Kennedy Space Center in Florida. NURI is also key to South Korean plans to eventually build a Korean satellite-based navigation system and a 6G communications network. "The program is designed not only to support government projects, but also commercial activity," Oh Seung-hyub, director of the Launcher Propulsion System Development Division, told a briefing. South Korea

is working with the United States on a lunar orbiter, and hopes to land a probe on the moon by 2030.

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*Trial Launch:* Given problems with previous launches, Han and other planners said they have prepared for the worst. The launch day may be changed at the last minute if weather or technical

problems arise; the craft will carry a self-destruct mechanism to destroy it if it appears it won't reach orbit; and media won't be allowed to observe the test directly. At least four test

launches are planned before the rocket will be considered reliable enough to carry a real payload.

According to pre-launch briefing slides, the rocket's planned path will take it southeast from its launch site on the south coast of the Korean peninsula, threading its way over the ocean on a trajectory aimed at avoiding flying over Japan, Indonesia, the Philippines, and other major land masses. "This upcoming launch may be remembered as the hope and achievement of Korean rocketry historically no matter the launch is successful or not," Han told Reuters.

**Sensitive Technology:** Space rockets on the Korean peninsula have been fraught with concerns over their potential use for military purposes, leaving South Korea's efforts lagging more capable programmes in China and Japan. "Modern rocketry in Korea couldn't devote its capability much in R&D of rockets because of long-standing political issues," Han said.

The United States has viewed North Korea's own satellite launch vehicles as testbeds for nuclear-tipped intercontinental ballistic missile technology. A North Korean space launch in 2012 helped lead to the breakdown of a deal with the United States.

Source: Josh Smith, Reuters, <https://www.reuters.com/world/asia-pacific/spy-satellites-mobile-networks-skorea-hopes-new-rocket-gets-space-programme-off-2021-10-15/>, 15 October 2021.

### USA

#### Pentagon Says Hypersonic Weapons are Too Expensive

The Pentagon wants defense contractors to cut the ultimate cost of hypersonic weapons, the head

of research and development said on Tuesday, as the next generation of super-fast missiles being developed currently cost tens of millions per unit. "We need to figure out how to drive towards more affordable hypersonics," Under Secretary of Defense for Research and Engineering Heidi Shyu told reporters at the Association of United States Army conference in Washington. She said cost was something she "would like to help industry focus on."

Currently, the U.S. uses cruise missiles which are mature technologies

costing less than \$5 million per unit to strike deep into enemy territory. But cruise missiles are inferior to hypersonic weapons because they have a shorter range, are far slower and more vulnerable to being detected and shot down. Both Lockheed Martin (LMT.N) and Raytheon Technologies (RTX.N) are working on hypersonic weapons for the Pentagon. The Pentagon's budget request in the 2022 fiscal year for hypersonic research was \$3.8 billion which was up from \$3.2 billion the year before.

In September, the Defense Advanced Research Projects Agency successfully tested an air-breathing hypersonic weapon capable of speeds faster than five times the speed of sound. It was the first successful test of the class of weapon since 2013. Hypersonic weapons travel in the upper atmosphere at speeds of more than five times the speed of sound, or about 6,200 kilometers (3,853 miles) per hour. ...

Source: Mike Stone, Reuters, <https://www.reuters.com/business/aerospace-defense/pentagon-says-hypersonic-weapons-are-too-expensive-2021-10-12/>, 12 October 2021.

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NUCLEAR ENERGY

AUSTRALIA

**Australian Report on Small Modular Reactor Potential**

The Minerals Council of Australia (MCA) has issued a report *Small Modular Reactors in the Australian Context*, written by Dr. Ben Heard. It provides an SMR technology overview and assesses their potential role in Australia's economy with operating cost estimates. It focuses on three SMRs: NuScale's Power Module, GE-Hitachi's BWRX-300 and Terrestrial Energy's Integral Molten Salt Reactor (IMSR). The report says that under conservative assumptions, the future LCOE for these would range between A\$64/MWh and A\$77/MWh (US\$46 to \$56/MWh). "If realized, this would make it the cheapest 24/7 zero emission power source available in Australia."

The MCA calls on the Australian federal government to pivot from its current stance of being an observer of SMR technology to begin quickly adopting action plans to include these solutions into the country's energy mix. Some policy and legislative change "will allow Australia to match a diverse range of nations from Canada to Rwanda who are actively establishing the context and capabilities to deploy SMRs" and not be left behind. The substantial Australian Workers Union has called for the government to put SMRs at the heart of its decarbonisation plans, in line with the national commitment to nuclear-powered submarines.

*Source: World Nuclear Association, <https://wna.informz.ca/informzdataservice/onlineversion/ind/bWFpbGluc2luc3RhbmNlaWQ9MTI5ODY0NCZzdWJzY3JpYmVyaWQ9OTA5ODk4NDQ5>, 13 October 2021.*

**Time for Nuclear, Australian Union Says**

The recent announcement through the trilateral AUKUS partnership that Australia will acquire nuclear submarines "means it's time to reconsider our ban on civil nuclear energy," AWU National Secretary Dan Walton said. Walton described SMRs as a "logical progression" from the plan for nuclear submarines. "SMRs are at the core of the US and British plans to create zero-carbon economies. Australia should be following suit. We already have the uranium, why would we not

develop the capacity to use it in safe and effective modern ways?" he said.

"It's absurd that Australia will rely on nuclear submarines for its defence, yet lack the capacity to build and maintain them," he

said, adding that if nuclear submarines are to help secure Australia's national interest it must be able to develop and maintain them itself. "And if we go to all the effort of developing that manufacturing capability we should maximise the potential to also manufacture modern small modular reactors to power emission-free industry.

That would make Australia part of the international supply chain for this nascent, zero-emissions energy technology," he said. This would also boost Australian manufacturing, he added.

Prime Minister Scott Morrison has said he is not seeking to establish an Australian civil nuclear capability, but "if we don't allow ourselves to explore the option, we'll be letting hysterical scaremongers triumph over the environment and our economy", Walton said. "If Australia wants to accelerate along the path to becoming a zero-carbon economy, this is a golden opportunity to create the capacity to build small modular reactors capable of powering energy-hungry manufacturing.

"You could easily envision SMRs attached to factories, steel mills and aluminium smelters.

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**SMRs are at the core of the US and British plans to create zero-carbon economies. Australia should be following suit. We already have the uranium, why would we not develop the capacity to use it in safe and effective modern ways.**



They would provide the kind of reliable, constant energy these facilities need to survive and thrive. "Attaching SMRs to heavy manufacturing hubs could enable Australia to rapidly grow its capacity to make things. If we don't provide manufacturing with the reliable, constant power it needs then Australian factories will shut. And this will do nothing positive for the climate, because production will just move overseas."

**Attaching SMRs to heavy manufacturing hubs could enable Australia to rapidly grow its capacity to make things. If we don't provide manufacturing with the reliable, constant power it needs then Australian factories will shut. And this will do nothing positive for the climate, because production will just move overseas.**

... Australia is the world's third-ranking uranium producer, behind Kazakhstan and Canada, and although it has a significant nuclear infrastructure - including the Australian Nuclear Science & Technology Organisation, which owns and runs the modern 20 MWt Opal research reactor at Lucas Heights - all of its uranium production is exported. The use of nuclear power in the country is currently prohibited by federal and state-level regulations. Tracing its roots back to the establishment of the Australasian Shearers' Union in 1886, the AWU is one of Australia's oldest and largest trade unions and today covers hundreds of industries across the nation. The union has previously expressed its support for lifting Australia's ban on nuclear energy.

**The energy and economy ministers from ten EU member states have called for nuclear power as "an affordable, stable and independent energy resource" to be urgently included in the framework of the EU sustainable finance taxonomy, as supported by scientific reports and despite the issue becoming highly politicised.**

Source: *World Nuclear News*, <https://www.world-nuclear-news.org/Articles/Time-for-nuclear-Australian-union-says>, 13 October 2021.

## EU

### EU Countries Urge Increased Nuclear Power

The energy and economy ministers from ten EU member states have called for nuclear power as "an affordable, stable and independent energy resource" to be urgently included in the framework of the EU sustainable finance taxonomy, as supported by scientific reports and despite the

issue becoming highly politicised. Finland, led by its Green Party, joined France and the Czech Republic, along with Poland, Hungary, Slovakia, Bulgaria, Romania and others. This push is opposed by Germany, Austria and Spain, though 126 reactors now operate in 14 European countries. The major trade unions of ten EU countries earlier renewed their call for the European Commission to support finance provisions

for new nuclear capacity. The unions called for "fair treatment" of the nuclear power sector, noting it should be included "on the basis of neutral technology and science-based evidence."

Nuclear power is at the heart of the new France 2030 plan for re-industrialisation. The first priority is a EUR 1 billion programme to demonstrate small reactor technology. Then two large electrolyser factories to equip mass production of hydrogen using nuclear electricity are planned as part of EUR 8 billion for energy projects by 2030. Separately, a decision on construction of six large new reactors is expected in a few weeks.

Earlier, the OECD International Energy Agency published Seven Key Principles for Implementing Net Zero, including that energy systems "need to be sustainable, secure, affordable and resilient", so that those managing them meet challenges "including ensuring uninterrupted flow of energy." These have been supported by most IEA members. The role of reliable nuclear power as an "indispensable contribution to fighting climate change" while keeping the lights on is highlighted by the current EU energy crisis.

Source: *World Nuclear Association*, <https://wna.informz.ca/informzdataservice/onlineversion/ind/bWfPbGluZ2luc3RhbmNla>

WQ9MTI5ODY0NCZzd WJzY3JpYmVyaWQ  
90TA5ODk4NDQ5, 11 October 2021.

## JAPAN

### Japan Aims for Increased Renewables and More Nuclear Restarts

Japan has adopted a new energy policy promoting nuclear and renewables as sources of clean energy to achieve carbon neutrality targets for 2050. The plan, adopted in July received government approval on 22 October. The 128-page plan, compiled by the Ministry of Economy, Trade and Industry (METI), calls for drastically increasing use of renewable energy to cut fossil fuel consumption over the next decade. It also says reactor restarts are key to meeting emissions targets.

The plan says Japan should set ambitious targets for hydrogen and ammonia energy, carbon recycling and nuclear energy and notes that offshore wind and the use of rechargeable batteries have potential for growth. ...The changes in the plan are meant to achieve the carbon emissions reduction target announced in April by former Prime Minister Yoshihide Suga. His successor, Fumio Kishida, who supports nuclear plant restarts, assumed his post earlier in October.

Japan has pledged to reduce its emissions by 46% from 2013 levels, up from an earlier target of 26% and has a goal to achieve carbon neutrality by 2050. Japan says it aims for a reduction of up to 50% to be in line with the European Union's commitment. The energy plan says renewables should account for 36-38% of the power supply in 2030. The aim is for 14-16% to come from solar, 5% from wind, 1% from geothermal, 11% from hydropower and 5% from biomass.

The target for fossil fuel use was slashed to 41% in 2030 from 56%. The plan says Japan will reduce dependence on fossil fuel without setting a timeline. It noted that Japan will abide by a Group of Seven pledge earlier this year to stop providing overseas assistance for coal-fired generation projects that lack emissions reduction measures.

**The 128-page plan, compiled by the Ministry of Economy, Trade and Industry (METI), calls for drastically increasing use of renewable energy to cut fossil fuel consumption over the next decade.**

important energy source. ...Japan will continue nuclear fuel reprocessing cycle despite the closure of its Monju plutonium-burning fast neutron reactor and international concerns over safeguards for its plutonium stockpile. A government taskforce will "accelerate" restarts of reactors, which have been slowed by the more stringent safety standards introduced after the

The plan keeps the target for nuclear power unchanged at 20-22%. Japan says it aims to reduce its reliance on nuclear power as much as possible but nuclear will remain an important energy source. ...Japan will continue nuclear fuel reprocessing cycle despite the closure of its Monju plutonium-burning fast neutron reactor and international concerns over safeguards for its plutonium stockpile. A government taskforce will "accelerate" restarts of reactors, which have been slowed by the more stringent safety standards introduced after the 2011 Fukushima accident.

Only ten reactors have restarted in the past decade, while 24 of the country's 54 operable reactors have been assigned for decommissioning. The plan does not mention the possibility of new reactors, despite such calls from some industry officials and pro-nuclear lawmakers.

Japan is meanwhile pursuing research and development of small modular reactors.

Source: <https://www.neimagazine.com/news/newsjapan-aims-for-increased-renewables-and-more-nuclear-restarts-9189704>, 27 October 2021.

### Japan Strengthens Nuclear Power Commitment

The new prime minister and senior ministers are confronting public post-Fukushima reservations about nuclear power. "Nuclear power is indispensable when we think about how we can ensure a stable and affordable electricity supply

while addressing climate change," according to Japan's new minister for economy, trade and industry. The PM later said that restarting nuclear plants awaiting various approvals since the 2011 Fukushima Daiichi accident is vital - "It's crucial that we restart nuclear power plants". Though the tsunami causing that accident killed about 19,000 people, none died from the radiation releases.

Until 2011, Japan was generating some 30% of electricity from its 33 reactors and this was expected to increase to at least 40% by 2017. The plan is now for at least 20% by 2030. The first two reactors restarted in 2015, with a further eight having restarted since. 16 more reactors are currently in the process of negotiating new regulatory requirements from 2013 and local government approvals. In addition to these, supposed threats from a dormant volcano and anti-terrorism guidelines have constrained progress.

The reactor restarts are facing significant implementation costs ranging from \$700 million to \$1 billion per unit, regardless of reactor size or age. Up to March 2017 the total cost was estimated at JPY 1900 billion (\$16.6 billion) for eight companies, according to an industry survey. An Institute of Energy Economics report noted that for each 1000 MWe of nuclear off-line, replacement fossil fuel costs are JPY 60 billion (\$520 million) per year and CO2 emissions of four million tonnes per year result. In 2020, only 5.1% of electricity came from nuclear plants.

Source: World Nuclear Association, <https://wna.informz.ca/informzdataservice/>

[onlineversion/ind/bWFpbGluZ2luc3RhbmNlaWQ9MTMwMDQ0NiZzZWJzY3JpYmVyaWQ9OTA5ODk4NDQ5](https://www.bbc.com/news/health-57411111), 13 October 2021.

## UK

### Government Pledges £1.7bn of Public Money to New Nuclear Plant

The government will make its first direct investment in a large-scale nuclear reactor since 1995 after pledging to plough up to £1.7bn of taxpayers' money into a new power plant. Treasury documents published alongside the autumn statement did not name which nuclear project would be in line for the

public funds, but the Guardian understands it is most likely to be the planned £20bn Sizewell C plant in Suffolk.

Government officials are locked in talks with Sizewell C's developer, the French state-backed energy company EDF, about how to finance its successor to the Hinkley Point C plant in Somerset.

The first investment would be enough to hand the UK government an 8.5% stake in Sizewell C, and potentially oust China General Nuclear (CGN) from the project with help from private investors.

The plant, which is still going through the planning process, could eventually power 6m homes, but has been plagued by opposition

from local campaigners, concerns about costs and the involvement of state-owned CGN. The Guardian understands that the government is eager to replace CGN, which has a 20% share of Sizewell, through a combination of government and private sector investment, due to growing security concerns over Chinese involvement in

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critical national infrastructure.

The government set out new legislation earlier this week for a financial support framework for nuclear plants which would make the projects more attractive to investors by piling part of the upfront cost on to household energy bills before the plants start generating electricity. By making a direct investment in a nuclear plant through the new financial framework, known as a Regulated Asset Base (RAB) model, the government could effectively put both taxpayers and energy bill payers on the hook for costly construction delays.

The Treasury said the £1.7bn of direct government funding would help to secure a final investment decision in a major nuclear power plant before the end of this parliament, which was a key pillar within the government's net zero strategy. ... The government's nuclear ambitions are also backed by £385m for research and development of 'advanced nuclear' technologies, and it has set aside £120m to address the nuclear industry's barriers to entry. The Treasury also revealed that it would make up to £230m from the Global Britain Investment Fund available to support investment in the UK's offshore wind manufacturing sector.

Source: Jillian Ambrose, <https://www.theguardian.com/environment/2021/oct/27/government-pledges-17bn-of-public-money-to-new-nuclear-plant>, 27 Oct 2021.

### UK Government Puts Nuclear Power at Heart of Energy Policy for Net Zero

As Britain struggles with constrained gas supplies and a wind drought the government has identified nuclear power as the key to future reliable supply with environmental virtue. Nuclear currently supplies about 16% of electricity but much of the

plant is old. Winter power constraints loom with the countdown to COP26 in Glasgow. Wholesale electricity prices have soared to many times normal. Gas prices have climbed four-fold since April. The new UK Net Zero Strategy is an economy-wide plan to reduce reliance on fossil fuels.

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Hinkley Point C project is not attracting support for the next large plant - Sizewell C in Suffolk. Minority equity in both plants by China General Nuclear Corp has become contentious. After years of standing back from investing in generating capacity it seems that the government might now invest directly in future plants. Sizewell C is due to start construction in 2024. A new £120 million Future Nuclear Enabling Fund is to help in "retaining options for future nuclear technologies, including small modular reactors, with a number of potential sites including Wylfa in North Wales."

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The UK Ten Point Plan in November 2020 announced the Advanced Nuclear Fund of up to £385 million to invest in the next generation of nuclear including up to £215 million for SMRs and up to £170 million for a research and development programme to deliver an Advanced Modular Reactor (AMR) demonstrator by the early 2030s. Plans to be announced next year for several smaller Rolls Royce reactors is expected to kick start what could be a new wave of investment at that level. In May 2021 the cost of a 470 MWe Rolls Royce SMR was put at about £1.8 billion with LCOE at £35 to £50/MWh, and the company expected the design to enter the UK generic design assessment process by year end.

UK public opinion is about 65% pro nuclear and



12% against. Meanwhile the two 1720 MWe Hinkley Point C reactors are due online in 2026 and 2027, and four projects for large reactors are suspended due to financing problems.

Source: World Nuclear Association, <https://wna.informz.ca/informzdataservice/onlineversion/ind/bWFpbGluZ2luc3RhbmNlaWQ9MTMwMDQ0NiZzdWJzY3JpYmVyaWQ9OT A5ODk4NDQ5>, 19 October 2021.

### NUCLEAR COOPERATION

#### CANADA–SOUTH KOREA

##### Canada-South Korea MoU to Leverage Used Fuel Experience

Canadian Nuclear Laboratories (CNL) and Korea Hydro & Nuclear Power (KHNP) plan to leverage data gathered through decades of experience of the storage of used Candu fuel to underpin cooperative research activities under a new Memorandum of Understanding between the two organisations. They will engage in knowledge-sharing and other joint activities to advance storage, transportation and disposal practices for used fuel, and to explore opportunities to collaborate on nuclear decommissioning and waste management initiatives.

CNL has operated multiple Candu prototype and test reactors at the Chalk River, Douglas Point, Gentilly and Whiteshell sites and has also managed used fuel and performed supporting research for these and other commercial reactors for many decades, the organisation said. Its Chalk River Laboratories campus is also home to shielded facilities and advanced materials research capabilities that are uniquely equipped to conduct post-irradiation examination on used

Candu fuels.

South Korea's 24 operable reactors include three Canadian-designed Candu reactors at the Wolsong site, all of which entered operation in the mid-to-late 1990s. The first Candu unit at the site - Wolsong 1 - was permanently closed in 2019, over 36 years after first entering commercial operation. To safely manage the spent fuel from these operations, KHNP has been preparing to start a research project focusing on the long-term management of Candu used fuel in dry storage.

Candu reactors are pressurised heavy water reactors (PHWRs) which use natural uranium fuel and can be refuelled whilst online. As well as the 19 units currently in operation in Canada and the three in South Korea, Candus are also in operation in Argentina, China, India, Pakistan and Romania. India also operates indigenously-designed PHWR reactors based on the Candu design.

Source: World Nuclear News, <https://www.world-nuclear-news.org/Articles/Canada-South-Korea-MoU-to-leverage-used-fuel-exper>, 18 October 2021.

### NUCLEAR PROLIFERATION

#### IRAN

##### IAEA: Surveillance of Iran Nuclear Program no Longer 'Intact'

Temporary measures to monitor Iran's nuclear activities are no longer "intact," the head of the UN's nuclear watchdog has warned. Rafael Grossi, director-general of the International Atomic Energy Agency, told the Financial Times that he urgently needs to meet with Iran's new foreign minister to discuss proposals to resume monitoring. "I haven't been

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able to talk to (Hossein Amirabdollahian)," Grossi said. "I need to have this contact at the political level. This is indispensable. Without it, we cannot understand each other."

Up until recently, temporary cameras and other monitoring devices had sustained an uneasy status quo following the breakdown of the 2015 Joint Comprehensive Plan of Action — widely known as the Iran deal — which curbed the country's nuclear program in exchange for sanctions relief. The Biden administration had hoped to renegotiate the deal with Iran, but six rounds of indirect talks have stalled since Ebrahim Raisi was elected president in June.

The US State Department said it hopes Iran will return to the ongoing talks in Vienna "as soon as possible," but President Joe Biden had "made clear that if diplomacy fails we are prepared to turn to other options." Iran has steadily revitalized its nuclear research and facilities in recent years, including by increasing the levels of enriched uranium it is producing, bringing it ever-closer to the highly enriched level required for nuclear weaponry. Grossi said Iran is "within a few months" of having enough material for a nuclear weapon.

The so-called breakout time — how long it would take Iran to field a nuclear weapon — is "continuously lessening" as it enriches more uranium with more efficient centrifuges, Grossi said. He added that he needed working cameras in Iran's recently reinstated Tesa Karaj manufacturing complex — which builds centrifuges — "yesterday." A last-minute compromise in February this year kept cameras rolling at key sites, albeit with an agreement to temporarily forgo examination of footage.

Last month, Grossi protested Iran's refusal to allow

surveillance at Tesa Karaj, which he views as a "very important" facility because of its role in manufacturing centrifuges. "There is this issue

with Karaj, and I'm working on it," he said. "Our stop-gap has been seriously affected so it's not intact. But it's not valueless either." Grossi said Tehran had told him he could meet Amirabdollahian "but they are taking their time."

Source: Arab News, <https://www.arabnews.com/node/1951036/middle-east>, 19 October 2021.

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### NUCLEAR NON-PROLIFERATION

#### GENERAL

#### IAEA Chief Begins US Visit Focused on Non-Proliferation and Climate Change Challenges

Director General Rafael Mariano Grossi discussed current non-proliferation issues with Secretary of State Antony J. Blinken on 18 October, at the start of a five-day visit to the United States during which he will highlight the IAEA's growing role in fostering global peace and development.

In Washington, D.C., Director General Grossi will also meet other senior administration officials, prominent members of both houses of Congress, executives of international development agencies and

leading think-tank experts.

With less than two weeks to go before the COP26 climate summit in Glasgow, the United Kingdom, he will stress the importance of nuclear energy being part of the solution to fight climate change and power the world economy in a predictable and sustainable way. He will also brief his hosts on new IAEA initiatives to step up the use of nuclear techniques to improve human health around the world.

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In [the] meeting with Secretary Blinken at the Department of State, Mr Grossi spoke about the IAEA's verification and monitoring under the JCPOA, the 2015 Iran nuclear agreement. With a 24/7 inspector presence in Iran, the IAEA stands ready to continue playing its role as guarantor and verifier of the JCPOA and any future agreement, he said. They also spoke about recent developments in the nuclear programme of the DPRK – also known as North Korea, – which the IAEA continues to follow closely even though its inspectors were expelled from the country in 2009.

Mr Grossi thanked Secretary Blinken for the United States' strong support of the IAEA's mandate. The United States is the largest contributor to the IAEA's regular budget. It also provides significant extra-budgetary funding, which – together with support from other Member States – has enabled the IAEA to increase its assistance the use of nuclear techniques in areas benefiting millions of people around the world, such as food security, cancer care, nutrition, animal health, water management, energy planning and others.

...“As countries' demand increasing IAEA assistance to address the warming of the planet, disease outbreaks and other critical issues, such Member State backing is more important than ever,” he added. For example, swift and substantial contributions from the United States and many other Member States enabled the IAEA to provide technical support, including testing equipment and kits, to more than 125 countries in responding to the COVID-19 pandemic. It was the largest single technical cooperation project in the IAEA's history. Mr Grossi has also launched new initiatives to help prevent future pandemics and combat plastic pollution. However, with national budgets under pressure, he has also identified resource mobilization as a key priority for the IAEA, a policy initiative that includes reaching out to new partners among international

financial institutions and in the private sector. ...

### **Meeting with Senators, Government Officials:**

The JCPOA and the IAEA's safeguards activities were also topics of discussion when Mr Grossi on Tuesday visited the Senate Foreign Relations Committee at the invitation of Chair Robert Menendez and ranking member James Risch. Around a dozen senators attended the meeting on Capitol Hill, asking questions and exchanging views with Mr Grossi on non-proliferation matters. He thanked them for their steadfast backing of the IAEA and its work. He also met with Senate Majority Whip Richard Durbin.

In talks with the Department of Energy and the Nuclear Regulatory Commission, Mr Grossi will

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discuss the future of nuclear energy as well as nuclear safety and security. The United States – the world's largest producer of nuclear energy – will host the IAEA's fifth ministerial conference on nuclear power in Washington, D.C. in October 2022. “As a clean and reliable energy

source, the world needs nuclear power,” Mr Grossi said. “With energy prices rising, nuclear power is attracting renewed attention from governments, experts and others.”

*Source: Fredrik Dahl, IAEA Office of Public Information and Communication, International Atomic Energy Agency, <https://www.iaea.org/newscenter/news/iaea-chief-begins-us-visit-focused-on-non-proliferation-and-climate-change-challenges>, 19 October 2021.*

### **NORTH KOREA**

#### **US to North Korea: It's Time for Sustained, Substantive Talks**

The United States has offered to meet North Korea without preconditions and made clear that Washington has no hostile intent toward Pyongyang, the U.S. ambassador to the United Nations, Linda Thomas-Greenfield, said as the

Security Council met over North Korea's latest missile launch. ... "The DPRK must abide by the Security Council resolutions and it is time to engage in sustained and substantive dialogue toward the goal of complete denuclearization of the Korean Peninsula," Thomas-Greenfield told reporters.

North Korea has been subjected to U.N. sanctions since 2006, which have been steadily strengthened in a bid to cut off funding for Pyongyang's nuclear and ballistic missile programs. The measures include a ban on ballistic missile launches. "We have offered to meet the DPRK officials, without any preconditions, and we have made clear that we hold no hostile intent toward the DPRK," Thomas-Greenfield said.

North Korea's mission to the United Nations in New York did not immediately respond to a request for comment on Thomas-Greenfield's remarks. ... Thomas-Greenfield said President Joe Biden's administration was "prepared to engage in serious and sustained diplomacy." European council members - France, Estonia and Ireland - also urged North Korea to "engage meaningfully" with repeated offers of dialogue by the United States and South Korea.

North Korea test-fired a new, smaller ballistic missile from a submarine, prompting the United States and Britain to raise the issue in the 15-member U.N. Security Council. "It is the latest in a series of reckless provocations," Thomas-Greenfield told reporters. "These are unlawful activities. They are in violation of multiple Security Council resolutions. And they are unacceptable."

Source: Michelle Nichols, Reuters, [https://www.reuters.com/world/asia-pacific/us-north-](https://www.reuters.com/world/asia-pacific/us-north-korea-its-time-sustained-substantive-talks-2021-10-20/)

[korea-its-time-sustained-substantive-talks-2021-10-20/](https://www.reuters.com/world/asia-pacific/us-north-korea-its-time-sustained-substantive-talks-2021-10-20/), 21 October 2021.

### NUCLEAR SAFETY

#### GENERAL

#### IAEA Guidance on Computer Security for Nuclear Security

The IAEA recently issued its first implementing guide to comprehensively address computer security – Nuclear Security Series (NSS) No. 42-G

Computer Security for Nuclear Security – to support experts worldwide in implementing computer security measures to strengthen their national nuclear security regimes.

"This guide will support Member States in strengthening computer

security in their national nuclear security regimes, ensuring the benefits of digital technology can be embraced without weakening the regime and the capacity to protect, detect and respond to cyber threats," said Elena Buglova, Director of the

IAEA Division of Nuclear Security.

Computer-based systems play an essential role in all aspects of our lives, and this is no different when it comes to nuclear and related activities. These systems are used in a variety of ways in the nuclear industry to support

the effective, safe and secure operation of facilities and activities engaged in using, storing and transporting nuclear and other radioactive materials.

Because of this key role, these digital systems can be an attractive target for terrorists and saboteurs. They could aim to exploit the potential vulnerabilities of a facility's digital systems, which

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could lead to unauthorized access, disruption of operations, and even the sabotage of facilities or the theft of nuclear or other radioactive materials. "Ensuring that these systems are secured against such acts, protects facilities from cyber-attacks and sabotage and bolsters other areas of the nuclear security by keeping, for example, physical protection and detection systems operational," said Buglova.

The new publication highlights the need for and provides guidance on how to implement computer security as an integral component of a national nuclear security regime. The guidance supports the development and implementation of an integrated national strategy, regulatory approach, and adherent computer security programmes designed to protect computer-based systems, the compromise of which could adversely affect nuclear security or nuclear safety.

This guidance publication, as with all in the NSS, is produced by the IAEA in cooperation with Member States. Other publications in the NSS that touch upon computer security for nuclear security are NSS No. 17-T (Rev. 1) Technical Guidance on Computer Security at Nuclear Facilities, published in September 2021, and NSS No. 33-T Technical Guidance on Computer Security of Instrumentation and Control Systems at Nuclear Facilities.

*Source: Eni Lamce and Sarah Henry Bolt, International Atomic Energy Agency, <https://www.iaea.org/newscenter/news/now-available-iaea-guidance-on-computer-security-for-nuclear-security>, 21 October 2021.*

### NUCLEAR WASTE MANAGEMENT

#### UZBEKISTAN

##### **Clean-up Set to Start at Uzbek Legacy Uranium Sites**

The grant agreement was signed on 22 October at a hybrid ceremony attended by Balthasar Lindauer, director of the European Bank for Reconstruction and Development's (EBRD's) Nuclear Safety Department, and Islombek Boqijonov, Deputy Chairman of the State Committee for Ecology and Environmental

Protection of Uzbekistan.

The grant will support a recently established Project Management Unit (PMU), which will be dealing with the clean-up of the Yangiabad and Charkesar sites, located in the mountains east of the Uzbek capital Tashkent, the EBRD said. As a first step, the PMU can start preparing the necessary tender documentation for remediation works at the two sites. Physical work on the ground is expected to begin in the third quarter of 2022 and will take approximately two years to complete.

Located at an altitude of 1300 metres in an area with a high risk of seismic activity, and around 70km from Tashkent, Yangiabad was a uranium mining site for nearly 40 years. It is spread across a 50-square-kilometre area and contains about 2.6 million cubic metres of radioactive waste. Planned remediation works include closing four shafts, demolishing contaminated buildings and processing facilities, relocating several waste rock dumps to a central covered dump and other associated activities.

The village of Charkesar, located in the mountains 140km to the east of the Uzbek capital, was a uranium mining site until 1995 and is still home to approximately 3500 people. Planned remediation works at this site include the closure of two shafts and the demolition of abandoned buildings. The EBRD established the Environmental Remediation Account for Central Asia in 2015 at the request of the European Commission, to tackle the legacy of Soviet uranium mining in region. The account, which became operational in 2016, is supported by contributions from the European Commission, Belgium, Lithuania, Norway, Spain, Switzerland and the USA.

The signing of the Uzbek grant agreement follows the approval last month of an updated Strategic Master Plan (SMP) for resolving the uranium legacy in Central Asia. The SMP was approved by Kyrgyzstan, Tajikistan and Uzbekistan, as well as the International Atomic Energy Agency, the European Union, the EBRD and Russian state

nuclear corporation Rosatom. The revised plan will be published by the end of this year. It will outline the current status of the uranium legacy sites in Kyrgyzstan, Tajikistan and Uzbekistan, including updated cost estimates for their remediation.

Central Asia served as an important source of uranium for the former Soviet Union. Uranium was mined for over 50 years and uranium ore was also imported from other countries for processing, and large amounts of radioactively contaminated

material were placed in mining waste dumps and tailing sites. Most of the mines were closed by 1995 but very little remediation was done before or after the closure of the mining and milling operations. The contaminated material is a threat to the environment and the health of the population. The hazards include the possible pollution of ground and surface water in a key agricultural centre of the region.

*Source: World Nuclear News, <https://www.world-nuclear-news.org/Articles/Clean-up-set-to-start-at-Uzbek-legacy-uranium-site>, 25 October 2021.*



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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