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1. Introduction

The global nuclear order is undergoing a profound transformation. What Thomas Schelling and Morton Halperin once called the rational management of the arms race – a project grounded in a relatively stable, bipolar balance and a narrow set of technologies – is now being challenged by a more crowded, multi-polar and technologically entangled landscape. (Schelling and Halperin, 1961) Asia sits at the centre of this transformation. It is home to the fastest-growing nuclear arsenals, the most acute flashpoints involving nuclear-armed states, and some of the most sophisticated non-nuclear strategic capabilities in the world.

At the same time, Asia is not starting from a normative vacuum. The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) remains a foundational global framework; nuclear-weapon-free zones (NWFZs) in Southeast Asia and Central Asia, Mongolia's nuclear-weapon-free status, and an emerging humanitarian discourse anchored in Hiroshima and Nagasaki provide important normative anchors. Yet these have not coalesced into a region-wide arms control and disarmament regime that reflects Asia's specific risks, political geometry and technological realities.

This paper proceeds from three core assumptions. First, traditional "numbers-based" arms control between the United States and Russia is unlikely to be replicated in Asia in the foreseeable future. Second, however, the absence of large, legally-binding bilateral treaties do not mean the absence of arms control. A broader understanding – encompassing risk-reduction, behavioural constraints, minilateral arrangements and normative commitments – offers more realistic avenues. Third, Asia's non-nuclear and middle powers, particularly Japan, South Korea, Australia and key ASEAN states, are not mere rule-takers. They can act as "regime entrepreneurs," shaping a layered architecture that links arms control to long-term disarmament and non-proliferation goals.

The argument unfolds in six steps. Section 2 situates Asia in what scholars have called a "Third Nuclear Age", highlighting the specific drivers of instability in the region. Section 3 maps the existing normative and institutional anchors that a future regime can build upon. Section 4 rethinks what "arms control" should mean in an Asian context, moving beyond Cold War templates. Section 5 sketches concrete building blocks for a future regional regime, organized around risk reduction, behavioural arms control, and cross-domain "guardrails". Section 6 concludes with policy recommendations and a research agenda.

2. Asia in the "Third Nuclear Age"

2.1 From classical arms control to a more complex nuclear era

Classical arms control emerged in a particular historical and technological context. Thomas Schelling and Morton Halperin famously defined it as a set of measures designed to reduce the likelihood, costs and risks of war, and to lessen the political and economic burden of preparing for it, while recognizing that strategic rivalry would persist (Schelling and Halperin, 1961). Hedley Bull likewise conceptualized arms control as a way to manage military competition under conditions of mutual vulnerability, emphasizing transparency, predictability and crisis stability (Bull, 1961). These ideas underpinned a series of bilateral, predominantly U.S.–Soviet treaties focused on capping or reducing specific categories of strategic weapons.

In recent years, however, scholars have argued that we are entering a "Third Nuclear Age" characterized by the spread of strategic non-nuclear weapons (SNNW), increasingly entangled command-and-control systems, and multi-polar great-power competition (Futter and Zala, 2021). In this environment, non-nuclear capabilities such as long-range precision strike, missile defence and offensive cyber operations can shape nuclear postures and crisis dynamics as much as nuclear warheads themselves (Acton, 2018; Futter and Zala, 2021).

Asia is a central theatre of this new age. It is where strategic competition between the United States and China intersects with long-standing regional rivalries and unresolved conflicts on the Korean Peninsula, across the Taiwan Strait, and along the India–Pakistan and India–China borders. These dynamics increase the salience of nuclear weapons at the very moment when technological change blurs the line between nuclear and conventional, offensive and defensive, strategic and theatre forces.

2.2 Nuclear–conventional entanglement and escalation risks

One of the most worrying trends for Asia is the growing entanglement of nuclear and conventional forces. James Acton has shown how the vulnerability of dual-use command-and-control systems to non-nuclear attack can create powerful incentives for early or inadvertent nuclear escalation, because states may fear that even "limited" conventional strikes could compromise their ability to respond with nuclear forces (Acton, 2018). Benjamin Zala's recent work applies this logic specifically to Northeast Asia, arguing that overlapping nuclear and conventional capabilities, shared platforms and

co-located assets are driving a new era of "nuclear–conventional entanglement" in the region (Zala, 2024).

In Northeast Asia alone, the United States, Russia, China and the DPRK field a variety of nuclear and dual-capable systems, while Japan and South Korea possess advanced conventional strike and missile-defence capabilities. U.S. and allied forces rely on forward-deployed assets and complex information architectures that may be perceived as high-value targets in a crisis. From an adversary's perspective, attacks on these assets – even if intended as purely conventional – may be seen as threatening nuclear command-and-control. In an entangled environment, distinguishing between different types of attacks and their intended targets becomes extremely difficult, magnifying the risks of misperception and worst-case thinking (Acton, 2018; Zala, 2024).

The NU-NEA ("Reducing the Risk of Nuclear Weapons Use in Northeast Asia") project has illustrated these dangers by constructing detailed "use cases" – plausible pathways through which nuclear weapons might be used, deliberately or inadvertently, in conflicts involving the Korean Peninsula or wider Northeast Asia (von Hippel et al., 2022; Shetty, 2024). These studies show that escalation can result not only from deliberate first-use, but also from misperception, inadvertent attacks on dual-use systems, or misreading of limited strikes. They also underscore the humanitarian and environmental consequences of even "limited" nuclear use in densely populated regions.

2.3 The regional strategic landscape

Asia's nuclear landscape is strikingly heterogeneous. China is rapidly expanding and modernizing its nuclear arsenal, deploying multiple independently targetable re-entry vehicles (MIRVs), building new intercontinental ballistic-missile (ICBM) silo fields, and investing in more survivable mobile and sea-based delivery systems, many of which are dual-capable (Kristensen et al., 2024; U.S. Department of Defence, 2024). These developments are transforming China from a traditionally modest, retaliation-focused posture toward a larger and more flexible force, with consequences for both regional and global stability (SIPRI, 2025).

The Democratic People's Republic of Korea (DPRK) has moved from simply demonstrating nuclear capability to integrating nuclear forces into its military doctrine. Its 2013 and 2022 nuclear laws codify conditions for nuclear use and signal a willingness to employ nuclear weapons pre-emptively

or tactically in specific contingencies, including conventional conflicts perceived as threatening regime survival (Cheong, 2023; Barannikova, 2024). This codified posture lowers the threshold for nuclear use and complicates crisis management on and around the Korean Peninsula.

In South Asia, India and Pakistan remain locked in a dynamic and increasingly complex nuclear competition. India's acquisition of more accurate missiles, expanded surveillance capabilities, and missile defence has fuelled debate about potential counter-force options against Pakistan (Clary and Narang, 2019). Pakistan, for its part, has embraced "full-spectrum deterrence", developing a diverse arsenal that includes short-range, potentially tactical nuclear systems intended to offset India's conventional superiority and deter large-scale conventional operations (Kristensen and Korda, 2023; SIPRI, 2025). The resulting action–reaction cycle heightens the risk that future crises could feature nuclear signalling, limited nuclear-use options or rapid escalation.

The United States remains the ultimate nuclear guarantor for several key regional allies, extending nuclear deterrence to Japan, South Korea and Australia through bilateral alliances and its broader Indo-Pacific force posture (Congressional Research Service, 2024). These extended-deterrence commitments link the Asian theatre directly to the global U.S. nuclear posture, including strategic forces and theatre-range dual-capable systems, and they shape regional debates about nuclear sharing, missile defence and the role of advanced conventional strike capabilities.

Yet Asia's nuclear order is not defined by nuclear-armed states alone. Non-nuclear U.S. allies such as Japan, South Korea and Australia wield substantial economic and technological power and play central roles in alliance networks and minilateral groupings such as the Quad (Government of Japan, 2022; Quad Leaders, 2021; Nayyar, 2023). Their policies on economic security, emerging technologies and critical infrastructure, as well as their decisions on hosting U.S. forces and advanced conventional systems, significantly influence the region's deterrence and arms-control environment.

This combination of diverse nuclear and non-nuclear powers, intertwined alliances and cross-regional linkages means that classical dyadic arms control templates—such as U.S.–Soviet-style bilateral limits—are ill-suited to Asia's strategic reality (Narang, 2014). Instead, the region requires an arms control and disarmament regime capable of: (1) managing nuclear risks in multi-actor crises; (2) addressing cross-domain escalation pathways that link nuclear, conventional, cyber and space

domains; and (3) connecting regional measures to global norms and institutions so that Asian dynamics reinforce, rather than erode, the wider non-proliferation and disarmament regime.

3. Existing Normative and Institutional Anchors in Asia

A future arms control and disarmament regime in Asia does not emerge on a blank slate. Even as the regional security environment deteriorates and strategic entanglement deepens, Asian states operate within a set of global, regional and national frameworks that already shape expectations about appropriate nuclear behaviour. These normative and institutional anchors are uneven and incomplete, but they provide important starting points for any attempt to construct a more coherent regional regime. This section highlights three clusters: global legal and normative pillars centred on the NPT; regional nuclear-weapon-free zones and special status arrangements; and the distinctive "conceptual twist" of Japan and other ambivalent middle powers.

3.1 Global pillars: the NPT and emerging disarmament norms

At the global level, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) remains the central legal framework for non-proliferation and the gradual pursuit of nuclear disarmament (United Nations 1968). It codifies a basic bargain between nuclear-weapon states (NWS) and non-nuclear-weapon states (NNWS), linking strict non-acquisition obligations on the latter to disarmament commitments by the former and to the "inalienable right" to peaceful uses of nuclear energy under international safeguards (United Nations 1968). For most Asian states, the NPT is not merely a legal instrument but a key reference point in national security and foreign policy discourse.

At the same time, new normative currents have emerged over the past decade that push beyond the NPT status quo. The Treaty on the Prohibition of Nuclear Weapons (TPNW) and the broader humanitarian-consequences discourse have gained particular traction among Asia–Pacific NNWS (United Nations 2017). Many have endorsed initiatives such as the Austrian or Humanitarian Pledge (Austria 2014), participated actively in TPNW negotiations, and joined subsequent Meetings of States Parties. These processes have helped to socialize a view of nuclear weapons as inherently incompatible with international humanitarian law and long-term human security, rather than as neutral instruments of statecraft.

For U.S.-allied states such as Japan, South Korea and Australia, however, these emerging disarmament norms sharpen existing dilemmas. On the one hand, they share concerns about the catastrophic humanitarian and environmental consequences of any nuclear use and support strengthening non-proliferation and disarmament institutions. On the other hand, they continue to rely on U.S. extended nuclear deterrence for their security, and therefore refrain from joining the TPNW or endorsing certain humanitarian-framed initiatives that could be seen as delegitimizing deterrence. The result is a dual normative environment: one in which the NPT's gradualist disarmament logic coexists uneasily with a more abolitionist, prohibition-centred discourse that has particular resonance among non-allied NNWS.

3.2 Regional nuclear-weapon-free zones and special status arrangements

At the regional level, Asia is home to several arrangements that directly regulate the presence or potential use of nuclear weapons and thus offer templates for a broader regime.

First, the Treaty on the Southeast Asia Nuclear-Weapon-Free Zone (Bangkok Treaty, 1995) commits ASEAN member states not to develop, acquire, test or station nuclear weapons in their territories and seeks legally binding negative security assurances (NSAs) from the NWS through an associated Protocol (ASEAN 1995). Although, as of 2025, none of the nuclear-weapon states have yet signed or ratified the Protocol, despite repeated indications of willingness by some to do so, the Bangkok Treaty demonstrates that legally binding regional nuclear constraints are politically and legally feasible in Asia. It also embeds nuclear abstinence within ASEAN's broader conception of regional security and centrality, giving non-nuclear Southeast Asian states a platform to engage nuclear powers on issues such as transit, port calls and exercises.

Second, the Treaty on a Nuclear-Weapon-Free Zone in Central Asia (CANWFZ, 2006), while focused on Central Asia rather than the Indo-Pacific, reveals how states with Soviet-era nuclear infrastructure and legacy facilities can commit to and verify denuclearization in a fragile security context (United Nations 2006). The CANWFZ experience highlights the importance of carefully crafted verification provisions, cooperation with the International Atomic Energy Agency (IAEA), and structured dialogue with NWS over security assurances and protocol interpretation.

Third, Mongolia's self-declared nuclear-weapon-free status, recognized by the UN General Assembly, illustrates the potential of "single-state zones" to contribute to regional stability and normative clarity

(Mongolia 2000; United Nations 1998). Surrounded by nuclear-armed neighbors, Mongolia has sought security through legal and political commitments to nuclear abstinence, combined with diplomatic engagement and reassurance from major powers. Its case demonstrates that even highly exposed states can define their identity in non-nuclear terms and use that identity as a basis for international support.

Taken together, these arrangements do not resolve the acute challenges of Northeast Asia. They do, however, offer legal models—for NSAs, verification measures and safeguards—and political precedents that a future Asian arms control regime might adapt. They also underscore that nuclear-weapon-free status is not an alien concept in Asia, but one that has already been asserted and institutionalized in multiple subregions.

3.3 Japan's "conceptual twist" and the ambivalent middle powers

Japan's nuclear posture encapsulates many of the tensions at the heart of Asian arms control. As Masakatsu Ota has argued, Japan lives with a "conceptual twist": it combines strong anti-nuclear norms—rooted in the Three Non-Nuclear Principles and the memory of Hiroshima and Nagasaki—with deep reliance on the U.S. nuclear umbrella (Ota 2018). This twist produces both ambivalence and a distinctive kind of coherence. On the one hand, Tokyo has opposed U.S. adoption of a No First Use (NFU) policy and remained cautious toward the TPNW, out of concern that such steps might weaken the perceived credibility of extended deterrence (Ota 2018). On the other hand, Japan has long championed disarmament diplomacy at the NPT Review Conferences, sponsored resolutions at the UN General Assembly, and more recently advanced the Hiroshima Action Plan as a framework for bridging deterrence and disarmament (Government of Japan 2022).

Other regional middle powers face similar, if differently configured, tensions. South Korea has periodically debated its own nuclear options or some form of nuclear sharing while continuing to rely fundamentally on U.S. extended deterrence. Australia has deepened its security cooperation with the United States and the United Kingdom through AUKUS, including access to nuclear-powered submarines, while maintaining a strong non-proliferation identity and support for global arms control. ASEAN states seek to uphold the Bangkok Treaty and the broader identity of Southeast Asia as a nuclear-weapon-free zone, even as they navigate growing strategic competition among external nuclear powers and pressures to align more closely with one or another major camp.

Across these cases, the ambivalence of middle powers is often framed as a problem of "two responsibilities". Governments feel a responsibility to protect their populations through credible deterrence and alliance management, particularly in an environment of intensifying great-power rivalry, and at the same time a responsibility—rooted in humanitarian experience, normative commitments or aspirations to regional leadership—to advance disarmament and nuclear risk reduction (Ota 2018). These responsibilities can appear contradictory when discourse is polarized between deterrence advocates and abolitionist positions.

A future Asian arms control regime will need to be designed in a way that allows such states to fulfil both responsibilities, rather than forcing a binary choice between deterrence and disarmament. That implies creating institutional spaces and policy instruments through which middle powers can, for example, support concrete nuclear risk-reduction and verification initiatives, promote regional confidence-building measures, and champion incremental disarmament steps, while still maintaining credible alliance relationships and deterrence postures. In this sense, Japan's "conceptual twist" is not an anomaly but an early, explicit manifestation of a broader regional condition. Recognizing this shared ambivalence turns it from a rhetorical liability into a potential source of agency for middle powers seeking to act as regime entrepreneurs in the construction of a future Asian arms control and disarmament architecture.

4. Rethinking Arms Control for Asia

The previous section showed that Asia is not normatively or institutionally "empty": the NPT, regional nuclear-weapon-free zones and the ambivalent nuclear postures of key middle powers already shape expectations and constraints. At the same time, these frameworks were not designed for a nuclear order characterized by multiple nuclear actors, dense alliance networks and cross-domain technological entanglement. Classical arms control thinking—rooted in Cold War U.S.–Soviet practice and conceptual work by Schelling and Halperin (1961) and Bull (1961)—assumed a relatively stable bipolar balance and focused on formal, centralized treaties that limited specific categories of weapons.

To imagine a future arms control and disarmament regime that fits Asia's realities, we need to rethink what "arms control" means in this context. This section proposes four conceptual shifts: from arms

counting to risk management; from dyadic bargains to networked minilateral arrangements; from hardware to behaviour; and from nuclear-only measures to cross-domain "guardrails." The next section then translates these shifts into concrete regional building blocks and policy options.

4.1 From "arms counting" to risk management

Classical arms control placed heavy emphasis on counting and limiting particular categories of weapons—warheads, launchers, or delivery systems—often through elaborate ceilings and sub-ceilings. In Asia, this template has limited traction. Overall arsenal sizes (with the exception of China's projected expansion) are smaller than Cold War U.S.–Soviet levels; opacity is pronounced; and non-nuclear capabilities and crisis dynamics are at least as important as warhead numbers for stability (Futter and Zala 2021).

A more promising approach is to adopt a risk-reduction lens, such as that developed in UNIDIR's work on "closing pathways to use" (Wan 2020; Wan 2021). Rather than treating "arms control" and "disarmament" as entirely separate tracks, this perspective starts with concrete questions:

- Through what specific pathways—crisis misperception, cyber interference with command-and-control, entanglement of conventional and nuclear assets, uncontrolled escalation on the Korean Peninsula—might nuclear use occur in Asia?
- What practical measures could narrow, block or better manage these pathways?

This shift moves the focus away from aggregate numbers toward the conditions under which nuclear weapons might be used: crisis communication channels, notification and transparency mechanisms, de-confliction and hotlines, limits on particularly destabilizing deployments or postures, and cooperative measures to enhance the robustness and resilience of command-and-control systems. In an Asian setting where many actors remain unwilling to discuss numerical limits, risk-reduction measures can be framed as prudential steps consistent with deterrence, rather than as precursors to unilateral vulnerability.

4.2 From dyads to networked, minilateral arrangements

Asia's nuclear dynamics cannot be reduced to a single bilateral rivalry. U.S.–China strategic competition intersects with U.S. alliances in Northeast Asia and Australia, with India–Pakistan and

India–China rivalries in South Asia, and with cross-regional linkages to the Euro-Atlantic theater. A purely dyadic arms control mindset—whether focused on U.S.–Russia or U.S.–China—cannot capture this web of interactions.

In this environment, arms control is better conceptualized as a network of overlapping, minilateral and functional arrangements rather than a single comprehensive treaty. Different problems may require different coalitions:

- Bilateral understandings (for example, U.S.–China measures on notifications, missile tests, or certain forms of military signalling);
- Trilateral or quadrilateral arrangements (for example, U.S.–Japan–ROK mechanisms on extended deterrence transparency and crisis coordination, or formats that bring in Australia and other U.S. allies);
- Sub-regional frameworks that involve the two Koreas and external stakeholders in managing military incidents and escalation risks on the peninsula;
- Broader Asia–Pacific initiatives where ASEAN, Australia, Japan, South Korea and others cooperate on transparency, verification capacity building, or norms for emerging technologies;
- Functional coalitions that cut across alliance lines, for example on cyber-nuclear risks, space security, or the role of artificial intelligence in nuclear command-and-control (Horowitz, Scharre and Velez-Green 2019; SIPRI 2019).

Such a networked architecture does not replace global treaties like the NPT, but layers more tailored arrangements on top of them, allowing subsets of states to move ahead where interests and political conditions permit. For Asia, this flexibility is essential: some states will favor legally binding instruments; others may only accept political commitments, codes of conduct, or informal understandings. A networked approach can accommodate both.

4.3 From hardware to behaviour

Recent scholarship and policy debate have emphasized the value of "behavioural arms control": approaches that focus less on limiting numbers of particular systems and more on constraining destabilizing forms of conduct—such as dangerous military incidents, threatening deployments, or certain categories of exercises (Kühn and Williams 2023; Kühn and Williams 2024; Krepon 2021).

This behavioural turn is especially relevant for Asia, where several patterns of activity drive escalation risks even if warhead numbers remain unchanged:

- Frequent close-proximity operations at sea and in the air, notably in the East and South China Seas and around the Korean Peninsula;
- Cyber operations against critical infrastructure and military networks that could be perceived as threatening nuclear command-and-control;
- Testing and deployment of anti-satellite (ASAT) capabilities and other systems that blur the line between conventional and nuclear signalling (Acton 2018).

Behavioural arms control builds on, but goes beyond, classical confidence-building measures. It seeks informal or politically binding understandings that:

- Proscribe certain especially escalatory behaviours (for example, close-in intercepts, harassment of vessels, or cyber operations against nuclear-related systems);
- Institutionalize incident prevention and management mechanisms (hotlines, incident-at-sea agreements, rules for encounters in the air and at sea);
- Encourage responsible transparency around major exercises or changes in posture, without requiring intrusive verification or formal treaty ratification (Kühn and Williams 2024).

Such measures can be adopted more rapidly than treaties mandating dismantlement, and they may be more politically acceptable to governments wary of legally binding constraints. Over time, however, a dense web of behavioural commitments can create habits of restraint and communication that make deeper limitations feasible.

4.4 From nuclear-only to cross-domain “guardrails”

Finally, any serious arms control and disarmament regime for Asia must move beyond a nuclear-only focus. In what Futter and Zala (2021) call the “Third Nuclear Age,” nuclear stability is deeply affected by non-nuclear systems and domains: high-precision conventional strike, missile defence, cyber operations, space systems and emerging technologies such as artificial intelligence and autonomy. Entanglement between conventional and nuclear assets—where attacks on one category are perceived as threatening the other—can generate powerful incentives for early escalation (Acton 2018).

Cross-domain “guardrails” for Asia should therefore include, at minimum:

- Restraints on certain ASAT tests and cyber operations that might affect nuclear command-and-control systems or early-warning assets;
- Transparency or notification arrangements for missile defence deployments and for dual-capable delivery systems, to reduce worst-case assumptions about offensive–defensive interactions;
- Norms and guidelines for AI-enabled and autonomous systems in nuclear decision-support and operations—such as commitments to maintain meaningful human control over launch decisions, to avoid fully autonomous nuclear weapons platforms, and to test AI tools for robustness against spoofing and inadvertent escalation (Horowitz, Scharre and Velez-Green 2019; SIPRI 2019).

Framed as stabilizing guardrails, these measures need not be presented as attempts to deny any state essential defensive capabilities. Instead, they can be justified as mutually beneficial risk-management tools that protect all parties from the unintended consequences of technological change. For middle powers in Asia, cross-domain guardrails also offer a politically attractive entry point: they can champion norms on space, cyber and AI consistent with their identities as responsible stakeholders, even if they are not themselves nuclear-armed.

Taken together, these four shifts—toward risk management, networked minilateralism, behavioural constraints and cross-domain guardrails—do not replace the ultimate goal of disarmament. Rather, they redefine arms control for Asian realities, offering a more flexible toolkit for managing nuclear risks while keeping open pathways toward deeper reductions. The next section builds on this conceptual reframing to outline practical building blocks and policy proposals for an Asian arms control and disarmament regime.

5. Building Blocks of a Future Arms Control and Disarmament Regime in Asia

Building on the conceptual shifts outlined in the previous section—from “arms counting” to risk management, from dyads to networks, from hardware to behaviour, and from nuclear-only to cross-domain guardrails—this section sketches concrete building blocks for a future arms control and disarmament regime in Asia. The aim is not a single “grand bargain” but a layered architecture that links regional risk-reduction measures to global norms such as the NPT, and that is flexible enough to accommodate both nuclear-armed and non-nuclear states.

The proposals are grouped into four baskets: (1) nuclear risk reduction, (2) behavioural arms control and crisis-management interoperability, (3) cross-domain guardrails on emerging technologies, and (4) normative and institutional steps that connect arms control to long-term disarmament goals.

5.1 Nuclear risk-reduction architecture for Northeast Asia

Given the density of nuclear risks in Northeast Asia—with the United States, China, Russia, the DPRK, Japan and South Korea all implicated—priority should be placed on building a regional nuclear risk-reduction architecture. UNIDIR's framework of "closing pathways to use" offers a useful conceptual starting point: rather than treating risk reduction as a purely declaratory exercise, it calls for identifying concrete escalation pathways in a given region and then narrowing or closing them through tailored measures (Wan, 2020).

First, crisis communication and hotlines. Dedicated crisis-communication channels among Washington, Beijing, Pyongyang, Tokyo and Seoul—potentially with Moscow as a later participant—would help manage fast-moving incidents involving missiles, dual-use assets or cyber operations. These channels need to be exercised regularly, including through scenario-based drills that simulate ambiguous events or cyber disruptions, as recommended in recent work by the NU-NEA (Reducing the Risk of Nuclear Weapons Use in Northeast Asia) project (Shetty, 2024).

Second, notification and transparency measures. Pre-notification of certain categories of missile tests, particularly those whose trajectories might be misinterpreted as attacks on early-warning or command-and-control nodes, would reduce the risk of misperception. Voluntary transparency about major doctrinal changes affecting nuclear posture—including how dual-capable systems are integrated into war plans—would further clarify red lines and reduce worst-case assumptions (Wan, 2020).

Third, agreed "red lines" and protected assets. Building on proposals in the nuclear risk-reduction literature, regional actors could develop understandings—initially as informal norms—that certain categories of facilities (for example, early-warning radars, national leadership bunkers or specific satellite constellations) should not be targeted by conventional or cyber means early in a conflict, because such attacks could be interpreted as preparations for disarming strikes (Wan, Kastelic and

Krabill, 2021). Parallel discussions could explore limits on cyber operations against nuclear command-and-control (NC3), drawing on global debates about the cyber–nuclear nexus.

Fourth, scenario-based dialogue and table-top exercises. Regular Track 1.5 and Track 2 dialogues that use structured scenarios—similar to those developed in the NU-NEA project—can deepen shared understanding of escalation dynamics, misperception risks and humanitarian impacts (Shetty, 2024). Including humanitarian, public-health and disaster-response communities in such exercises would underline the real-world consequences of nuclear use and create constituencies for sustaining risk-reduction measures.

These steps do not presuppose immediate denuclearization. Rather, they are designed to "narrow the pathways" to nuclear use while building habits of cooperation and shared situational awareness that could later support more ambitious arms-control and disarmament arrangements (Wan, 2020).

5.2 Behavioural arms control and crisis-management interoperability

The second basket focuses on constraining destabilizing behaviour and developing "crisis-management interoperability" in Northeast Asia—shared expectations, procedures and tools for handling dangerous encounters and ambiguous incidents. Zala argues that, given deep nuclear–conventional entanglement in the region, such interoperability is essential for preventing conventional crises from cascading into nuclear escalation (Zala, 2024).

Agreements on military encounters at sea and in the air: Existing instruments such as the 2014 Code for Unplanned Encounters at Sea (CUES), adopted by the Western Pacific Naval Symposium, provide a baseline of communications protocols and manoeuvring rules for naval forces (Western Pacific Naval Symposium, 2014). However, CUES is non-binding and limited primarily to naval vessels, and its practical limitations in the East and South China Seas have been well documented (Ton, 2017). In Northeast Asia, states could negotiate enhanced CUES-type arrangements that:

- explicitly cover encounters between dual-capable platforms;
- extend to airspace around critical military and civilian infrastructure; and
- address mixed encounters involving coast guards, law-enforcement and naval units.

Limitations on destabilizing exercises. Following Cold War precedents such as the U.S.–Soviet Incidents at Sea Agreement (INCSEA), which set rules to prevent close encounters from escalating (United States and Union of Soviet Socialist Republics, 1972), Northeast Asian actors could agree to notify and, in some cases, constrain the most escalatory types of exercises—for example, those that explicitly simulate nuclear first strikes, decapitation operations, or integrated cyber attacks on NC3. Confidence-building measures (CBMs) such as observer invitations or post-exercise briefings would help reassure neighbours that drills are not precursors to surprise attacks.

Shared crisis-management "playbooks." A further step would be to develop mutually understood playbooks for responding to ambiguous incidents involving dual-use assets—for instance, accidental missile launches, unexplained satellite outages, or suspected cyber intrusions into NC3. Zala's notion of crisis-management interoperability implies that states should at least agree that certain anomalies automatically trigger communication through hotlines rather than immediate military reactions (Zala, 2024).

These behavioural measures could initially be developed in narrower formats—such as among U.S. allies (U.S.–Japan–ROK) and gradually expanded to include China and Russia as confidence grows and institutional capacities mature.

5.3 Cross-domain guardrails on emerging technologies

The third basket addresses the cross-domain nature of contemporary nuclear risks. As recent scholarship has shown, advances in autonomous systems, AI, cyber capabilities and counter-space weapons can erode crisis stability by threatening second-strike forces, compressing decision-making time and increasing the risk of miscalculation (Horowitz, Scharre and Velez-Green, 2019; Wan, Kastelic and Krabill, 2021).

Norms on AI in nuclear decision-making. Asia-Pacific states could commit not to delegate launch authority to fully autonomous systems and to maintain meaningful human control over nuclear-use decisions. Building on global debates about AI and nuclear stability, regional guidelines could specify minimum standards for testing, validation and human–machine interface design for AI-enabled decision-support tools in nuclear operations, with a view to reducing automation bias and preventing inadvertent escalation (Horowitz, Scharre and Velez-Green, 2019).

Cyber–nuclear CBMs. Given the growing concern about cyber operations that might compromise NC3 systems, UNIDIR's study of the cyber–nuclear nexus recommends developing common understandings of unacceptable behaviours and potential "red lines" in this domain (Wan, Kastelic and Krabill, 2021). Asia-Pacific states could:

- pledge not to conduct cyber operations whose purpose is to degrade each other's NC3, especially early-warning and launch-authorization systems; and
- cooperate on best-practice guidelines for the cyber security of nuclear facilities, possibly under IAEA auspices.

Space and missile-defence transparency. Finally, cross-domain guardrails should address the interaction between missile defence, anti-satellite (ASAT) capabilities and nuclear stability. Transparency on the broad parameters of regional missile-defence deployments—locations, interceptor numbers, general performance characteristics—can help reassure others that such systems are not designed for disarming first-strike strategies. Restraints on the most destabilizing forms of ASAT testing, particularly debris-creating kinetic tests against satellites in heavily used orbits, would reduce risks to the space-based assets on which crisis communication and early warning increasingly depend (Wan, 2020).

Legally binding treaties in these areas may be politically distant, but soft-law instruments, political declarations and shared guidelines can still yield meaningful stabilizing effects and create normative expectations that shape state behaviour over time.

5.4 Normative and disarmament-oriented steps

The final basket links the above risk-reduction and arms-control measures to longer-term disarmament objectives. The goal is not to substitute risk reduction for disarmament, but to ensure that practical steps taken in Asia reinforce, rather than erode, global disarmament norms and legal obligations.

Strengthening NPT review processes. Asian middle powers and non-nuclear-weapon states can use NPT Review Conference cycles to push nuclear-armed states to implement Article VI commitments

while also showcasing Asian CBMs and risk-reduction practices as models for other regions (Wan, 2021). Coordinated regional positions—linking global disarmament benchmarks to concrete regional measures such as hotlines, transparency arrangements or cyber–nuclear CBMs—could help strengthen the NPT review process and ensure that Asian security concerns are more systematically reflected in global debates.

Revisiting a Northeast Asia nuclear-weapon-free zone (NEA-NWFZ). While politically challenging, the idea of a NEA-NWFZ remains an important long-term horizon. A rich body of work—ranging from RECNA's Nagasaki Process to joint policy proposals by Japanese and Korean experts—has outlined comprehensive approaches that link a NWFZ to peace-regime building on the Korean Peninsula and a permanent multilateral security mechanism in Northeast Asia (Yoshida et al., 2019). Even if a full-fledged treaty is not immediately feasible, incremental steps such as negative security-assurance protocols, "no deployment" zones for nuclear weapons around the Korean Peninsula, or model treaty texts could keep the vision alive and provide a focal point for regional diplomacy (Hamel-Green, 2020).

Bridging between NPT and TPNW communities. Asia is home to both U.S. allies under the nuclear umbrella and active supporters of the Treaty on the Prohibition of Nuclear Weapons. A growing literature argues that the NPT and TPNW can be made more mutually reinforcing, especially on verification, victim assistance and risk reduction (Toda Peace Institute and Asia-Pacific Leadership Network, 2018; Hilgert, 2021; Carlson, 2022; Abe, 2022). Asia-Pacific states could sponsor "bridge-building" dialogues that focus on concrete areas of overlap—such as strengthening safeguards, clarifying the humanitarian consequences of nuclear use and integrating risk-reduction commitments into NPT Review Conference outcomes—rather than on the legal status of the TPNW per se.

Institutionalizing regional dialogue platforms. Finally, a sustainable regime will require institutions that can carry forward the conversation beyond episodic crises and diplomatic windows. Existing fora such as ASEAN, the ASEAN Regional Forum and the East Asia Summit provide partial platforms for discussing nuclear issues, but their agendas are broad and their mandates limited. Building on experiences such as the NU-NEA project and RECNA's multi-stakeholder dialogues, states and civil society could work toward a dedicated "Asia Nuclear Dialogue" mechanism that convenes officials, military officers, experts and NGOs on a regular basis (Shetty, 2024; Yoshida et

al., 2019).

Such an institutional framework would help maintain momentum behind risk-reduction and arms-control initiatives, socialize best practices developed in Asia to other regions, and ensure that regional voices—including those of non-nuclear middle powers—shape the evolution of global disarmament and arms-control norms.

6. Conclusion: Toward a Layered Arms Control and Disarmament Regime in Asia

Asia is emerging as the central theatre of what some have called a "third nuclear age": a period marked by multiple nuclear actors, deep nuclear–conventional entanglement, rapid technological change and cross-regional linkages to the Euro-Atlantic space. The region's nuclear landscape is heterogeneous—encompassing established and emergent nuclear powers, U.S. allies under extended deterrence, and influential non-nuclear states—and classical, dyadic Cold War arms control templates are ill-suited to this complexity. Yet Asia is not starting from zero. Global frameworks such as the NPT, regional and national nuclear-weapon-free arrangements, and a dense set of emerging norms around humanitarian consequences and nuclear restraint already provide important normative and institutional anchors.

The analysis in this paper suggests that arms control in Asia needs to be rethought and rebuilt, rather than simply revived. Four conceptual shifts are central: from arms counting to risk management; from bilateral bargains to networked minilateral arrangements; from hardware-centric approaches to behavioural constraints; and from nuclear-only measures to cross-domain "guardrails" that take AI, cyber, space and advanced conventional weapons seriously. On this basis, the paper outlined a set of practical building blocks: risk-reduction architectures in Northeast Asia; behavioural arms control and crisis-management interoperability; cross-domain norms and confidence-building measures; and normative and institutional steps that link regional practice to long-term disarmament objectives.

Crucially, the drivers and guardians of such a layered regime are unlikely to be the major nuclear powers alone. Regional middle powers and non-nuclear states—including but not limited to U.S. allies, ASEAN members and other key actors—have both strong security stakes and significant diplomatic and technical capacities. They can act as regime entrepreneurs: framing nuclear risk reduction as a shared regional interest; initiating minilateral and functional arrangements when

comprehensive bargains are out of reach; experimenting with pilot projects in crisis management, cyber–nuclear CBMs or AI norms; and using their positions in global and regional fora to "Asianize" NPT review processes and to build bridges between different normative communities, including NPT and TPNW supporters.

Asia's nuclear future is not predetermined. The same trends that heighten risk—multi-polar rivalry, strategic non-nuclear weapons, AI and cyber capabilities—also create new incentives for transparency, restraint and cooperative risk management. The direction of travel sketched here is from narrow, nuclear-only, state-to-state arms control toward a broader, cross-domain, multi-layered architecture in which arms control and disarmament are mutually reinforcing rather than opposed. Realizing that vision will require sustained political will, institutional innovation and societal engagement, but it does not require waiting for a breakthrough among the largest nuclear powers. By incrementally building and linking the kinds of measures discussed in this paper, Asian states—especially its middle powers and coalitions of the willing—can begin to shape a future regional order in which the risks of nuclear use are progressively narrowed and the horizon of disarmament remains credibly in view.

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